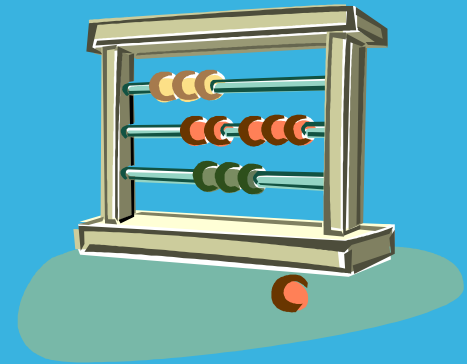
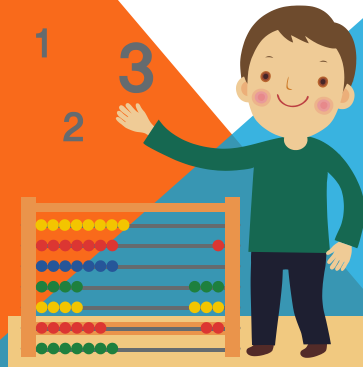


- ✓ Divide by 10 to find 10%
- ✓ Then half to find 5%
- ✓ Or Multiply to find other multiples of 10 e.g. 20%, 30%, 40%
- ✓ Divide by 1000 to find 1%.



31% of 1800

26% of 1200

43% of 1100

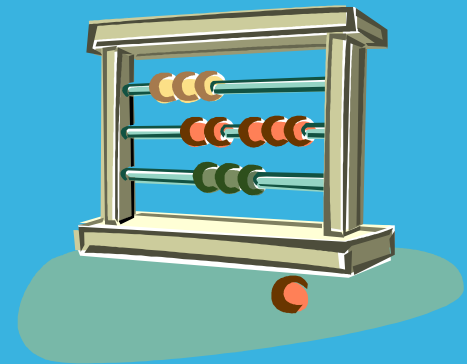
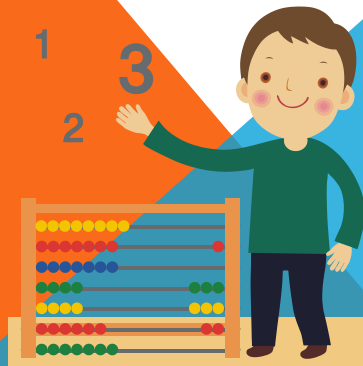
21% of 1400

52% of 800

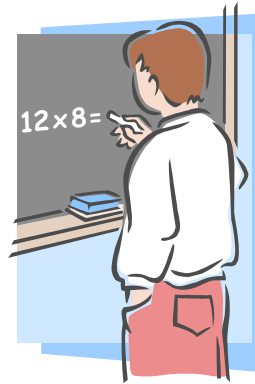
38% of 900

29% of 700

46% of 600



Learning Objective



To know the difference between ratio,
proportion and Fractions

First Thoughts ...

There's lots of differences between the classes in your school –

... Some have more boys than girls

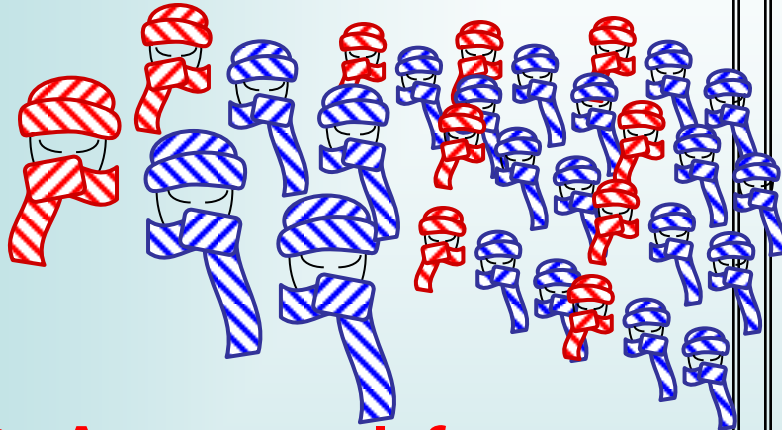
... Less Chelsea fans than Arsenal fans

... More cat-lovers than dog-lovers

... Less pizza-munchers than chicken-dippers

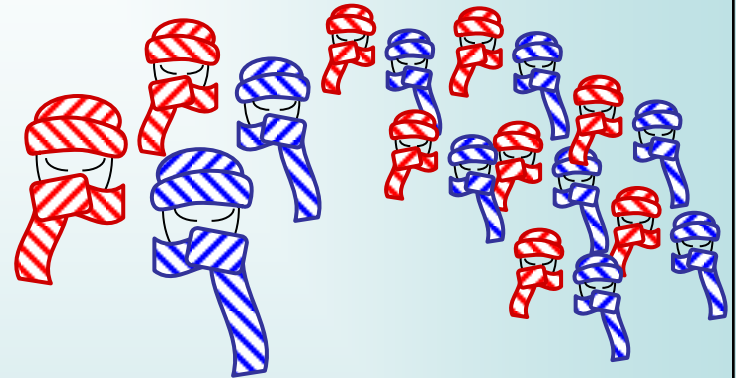
First Thoughts ...

Class 6 has 30 pupils:



10 Arsenal fans
20 Chelsea fans

Class 5 has 18 pupils:





9 Arsenal fans
9 Chelsea fans

You're a Arsenal fan.

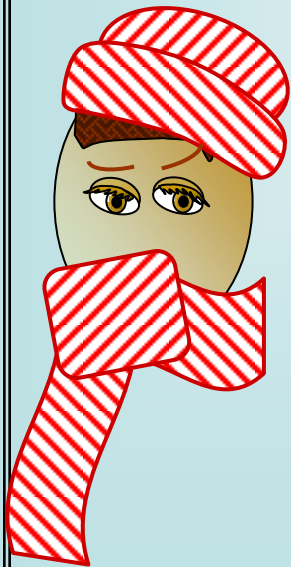
Which class would you rather be in?

Discuss and take a class vote.

Did You Pick 6?

6: 10  20  30 5: 9  9  18

—
Matt, a mad Arsenal fan, picked 6:



**“10 is bigger than 9,
so there’s more Arsenal fans
in 6 than 5.
Yay!”**

Did You Pick 5?

$$6: 10 + 20 = 30 \quad 5: 9 + 9 = 18$$

- But other red Arsenal fans picked 5:

third and half are
fractions

2 to 1
is a **ratio**

1 out of 3 is a
proportion

CIARA SAYS

"I'm not going to 6 - I'd be outnumbered 2 Chelsea to every 1 Arsenal fan!"

MEGAN SAYS:
"Only one third of 6 Arsenal fans. It's one half in 5."

OLIVIA SAYS:
"6 only has 10 out of 30 Arsenal fans. That's 1 out of 3."

All answers are correct! But - 3 different sorts of answer.

Which do you prefer? Why?

Recap – 3 Ways to Compare Numbers



“6 only has 10 out of 30 Arsenal fans.
That’s 1 out of 3.”

Which question
is a ...

Fraction?

Ratio?

Proportion?



“I’m not going to 6.
I’d be outnumbered 2
to every 1.”

“Only one third of 6
Arsenal fans.
It’s one half in 5.”



What's the Difference - Summing Up:

3 different ways to say the same thing

3 different ways to compare numbers

"1 to every 2" is a Ratio

"1 Arsenal fan to every 2 Chelsea fans"

"The ratio of Arsenal to Chelsea fans is 1 to 2"

"The ratio of Chelsea to Arsenal fans is 2 to 1"



Ratios compare PART WITH PART

"1 out of 3" is a Proportion

"1 out of every 3 fans is a Arsenal fan"

"The proportion of Arsenal fans is 1 out of 3"



Proportions compare PART WITH WHOLE

"One third" is a Fraction

"One third of all fans are Arsenal fans"

"1/3 of all fans are Arsenal fans"



Fractions compare PART WITH WHOLE using shorthand such as $\frac{1}{3}$

Ratio, Proportion or Fraction?

two out of five

This is a ... **proportion**

two fifths

This is a ... **fraction**

four tenths

This is a ... **fraction**

four to every ten

This is a ... **ratio**

ten to every four

This is a ... **ratio**

four out of ten

This is a ... **proportion**

$4/10$

This is a ... **fraction**

$4:10$

This is a ... **ratio**

Ratio, Proportion or Fraction?

3 Chelsea fans to every 2 Rangers fans

This is a ... **ratio**

9 girls out of 10 use soap

This is a ... **proportion**

3 boys out of 10 use deodorant

This is a ... **proportion**

The dinner queue

Ratio of girls to boys?

4 girls to every 8 boys

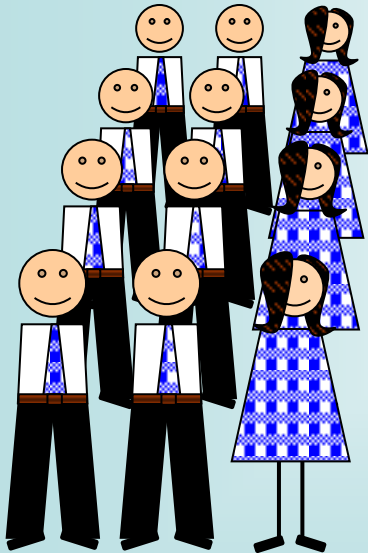
girls : boys = 4 : 8

But the simplest ratio is still 1 : 2

3 girls to every 6 boys

girls : boys = 3 : 6

But the simplest ratio is still 1 : 2



2 girls to every 4 boys

girls : boys = 2 : 4

But the simplest ratio is still 1 : 2

1 girl to every 2 boys

girls : boys = 1 : 2

This is the simplest ratio is 1 : 2

The dinner queue

Ratio of boys to girls?

8 boys to every 4 girls

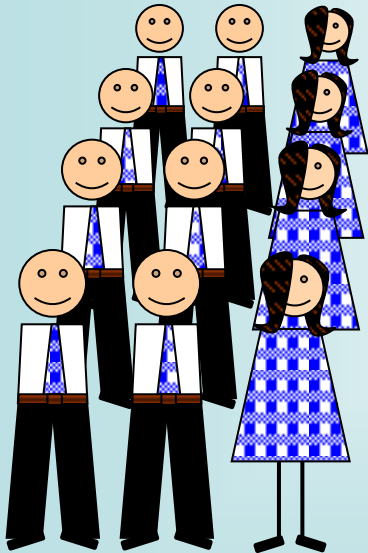
boys : girls = 8 : 4

But the simplest ratio is still 2 : 1

6 boys to every 3 girls

boys : girls = 6 : 3

But the simplest ratio is still 2 : 1



4 boys to every 2 girls

boys : girls = 4 : 2

But the simplest ratio is still 2 : 1

2 boys to every 1 girl

boys : girls = 2 : 1

This is the simplest ratio is 2 : 1

Simplest ratios

2 : 1 is a simpler ratio than 4 : 2

but

They both mean the same

$$2 : 1 = 4 : 2$$

Can you explain why

$$2 : 1 = 6 : 3 ?$$

$$2 : 1 = 8 : 4 ?$$

$$2 : 1 = 100 : 50 ?$$

The dinner queue

What
proportion
is girls?

4 girls out of 12

*Simplest proportion of girls
is still 1 out of 3*

3 girls out of 9

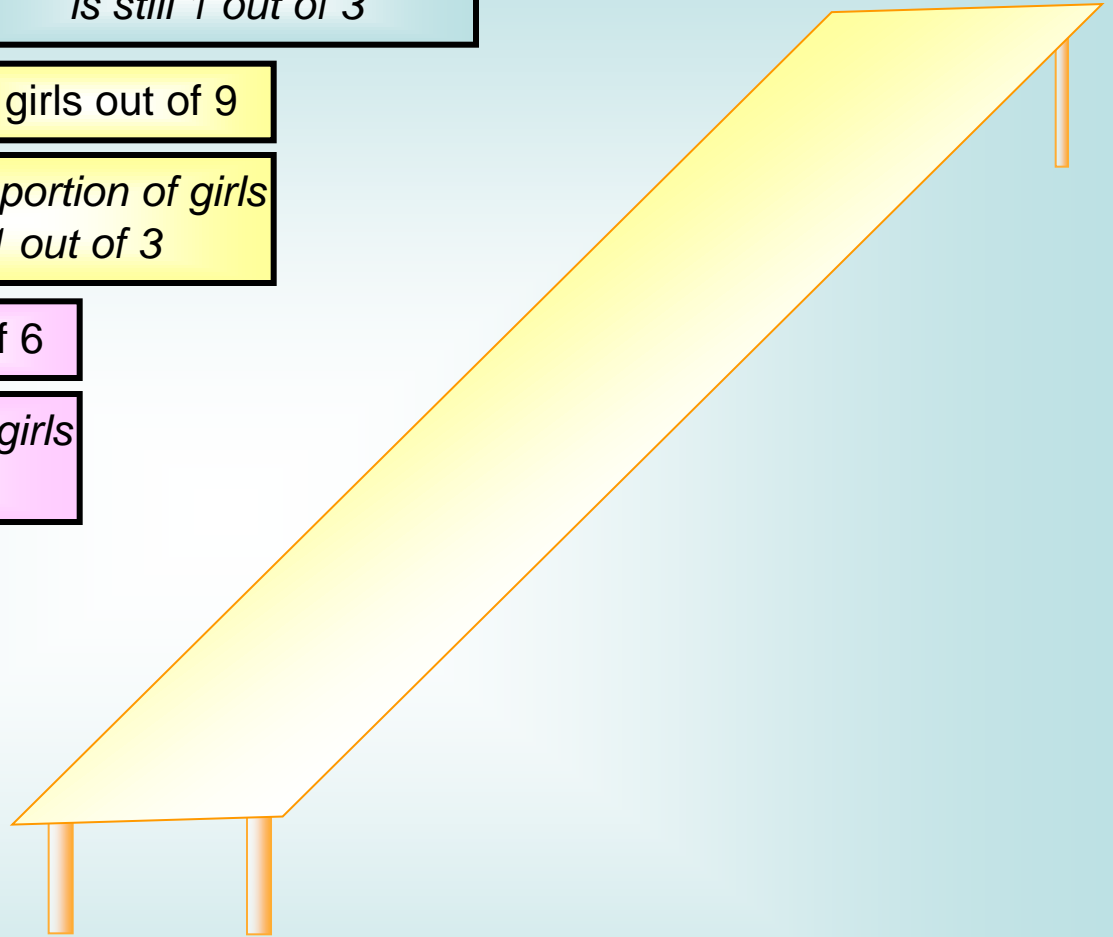
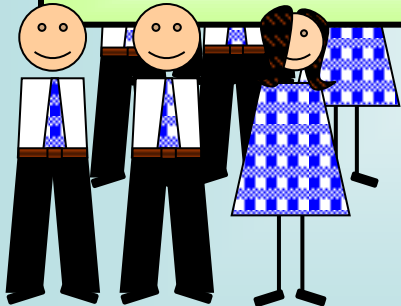
*Simplest proportion of girls
is still 1 out of 3*

2 girls out of 6

*Simplest proportion of girls
is still 1 out of 3*

1 girl out of 3

*This is the simplest
proportion of girls
= 1 out of 3*



Does order matter?

There are 20 boys and 10 girls in Year 6 .

Which of these are correct?

b) girls : boys = 2 : 1

a) boys : girls = 2 : 1

c) boys : girls = 1 : 2

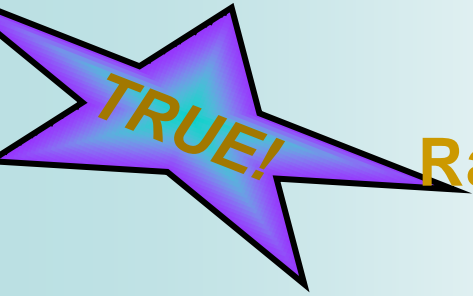
boys : girls = 2 : 1 *means* 2 boys to every girl

girls : boys = 2 : 1 *means* 2 girls to every boy

ORDER MATTERS!

Be careful what you write!

True or Not True?



Ratio of teachers to pupils = 30 : 1



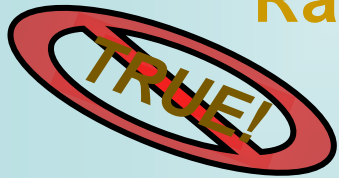
Ratio of fans to players = 1 : 1000



This would mean all the players
would be sitting in the stadium!

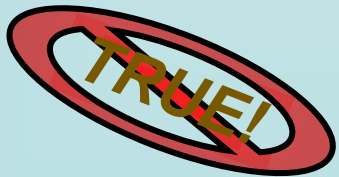
Ratio of weekdays to weekend days = 2 : 5

You wish!

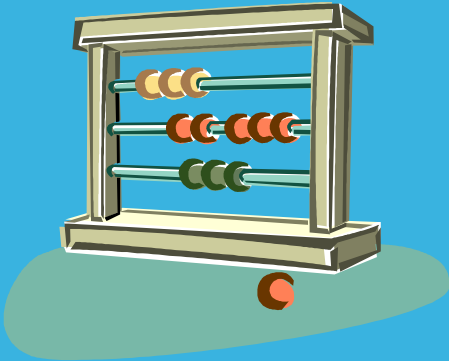
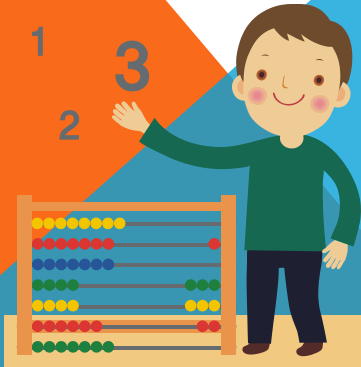


Ratio of porridge lovers to pizza guzzlers = 100 : 1

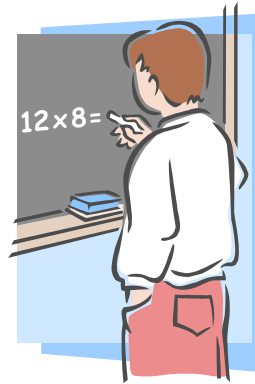
- Not until they invent Porridge Takeaways ..



FRACTION	1/2		1/10	1/5	2/5	3/10			
PERCENTAGE	50 %						70%	1%	25%



Learning Objective



To scale proportion up or down using multiplication and division.

Biscuits and Bananas Skins

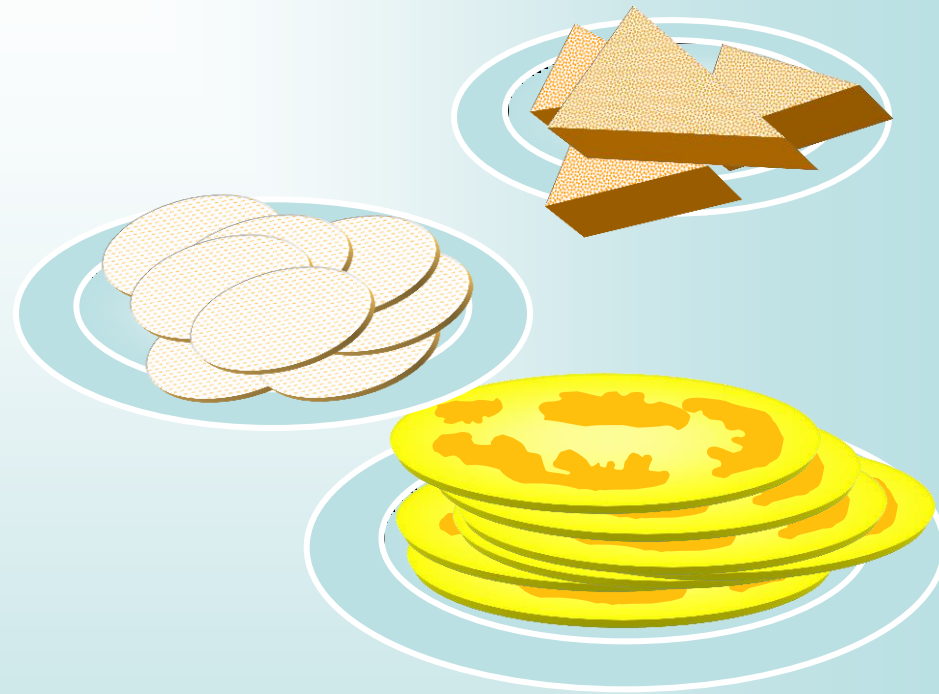
Enjoy cooking?

Check out these fantastic recipes!

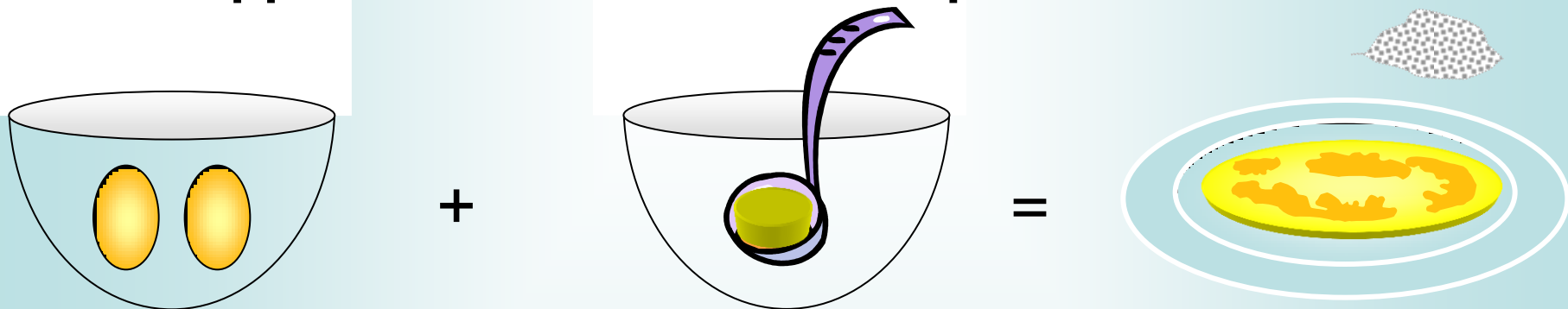
*Some of them need changing
to suit the number of people,*

*- But remember to
keep them in proportion,*

- And watch out for the



It's supper time! You make a simple omelette like this:



2 eggs + 1 teaspoon of butter = 1 omelette

Your omelette tastes amazing! - So of course your mates start turning up.

*Can you **scale up** your ingredients to feed them all?*

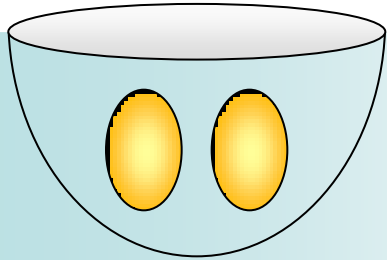
4 eggs + 2 tsp of butter = 2 omelettes

6 eggs + 3 tsp of butter = 3 omelettes

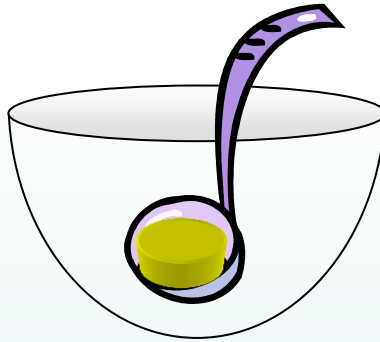
8 eggs + 4 tsp of butter = 4 omelettes

10 eggs + 5 tsp of butter = 5 omelettes

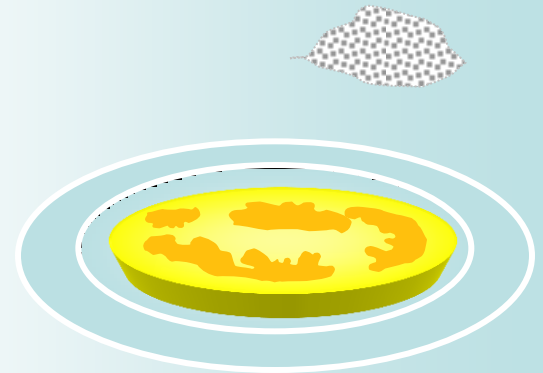
And the next week ...



+



=



2 eggs + 1 teaspoon of butter = 1 omelette

... word's getting around and more mates turn up the next day.

*Can you **scale up** your ingredients to feed them?*

4 eggs + 2 tsp of butter = 2 omelettes

10 eggs + 5 tsp of butter = 5 omelettes

20 eggs + 10 tsp of butter = 10 omelettes

22 eggs + 11 tsp of butter = 11 omelettes

Recipe for Shortbread Biscuits

Makes 20 shortbread biscuits

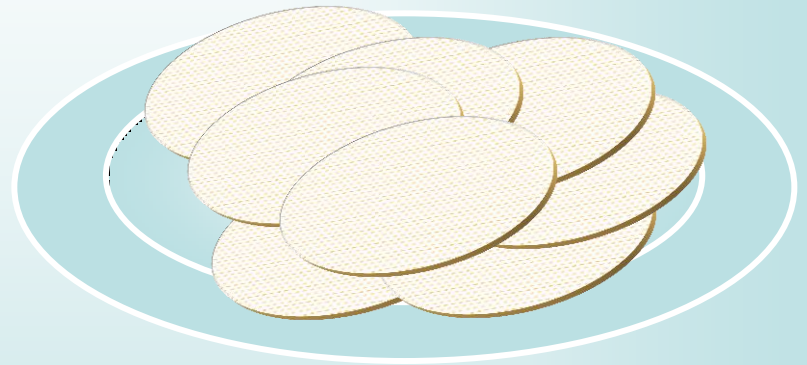
Ingredients

200g butter

200g plain flour

100g golden caster sugar

100g fine semolina



Pre-heat the oven to gas mark 2, 300°F (150°C).

*You will also need an 8 in (20 cm) diameter fluted flan tin,
1¼ in (3 cm) deep with a loose base.*

10 Mouth-watering Shortbread Biscuits!

STEP 1: Choose the maths!

x or ÷ ?

BIGGER means X

SMALLER means ÷

biscuits. Can you scale

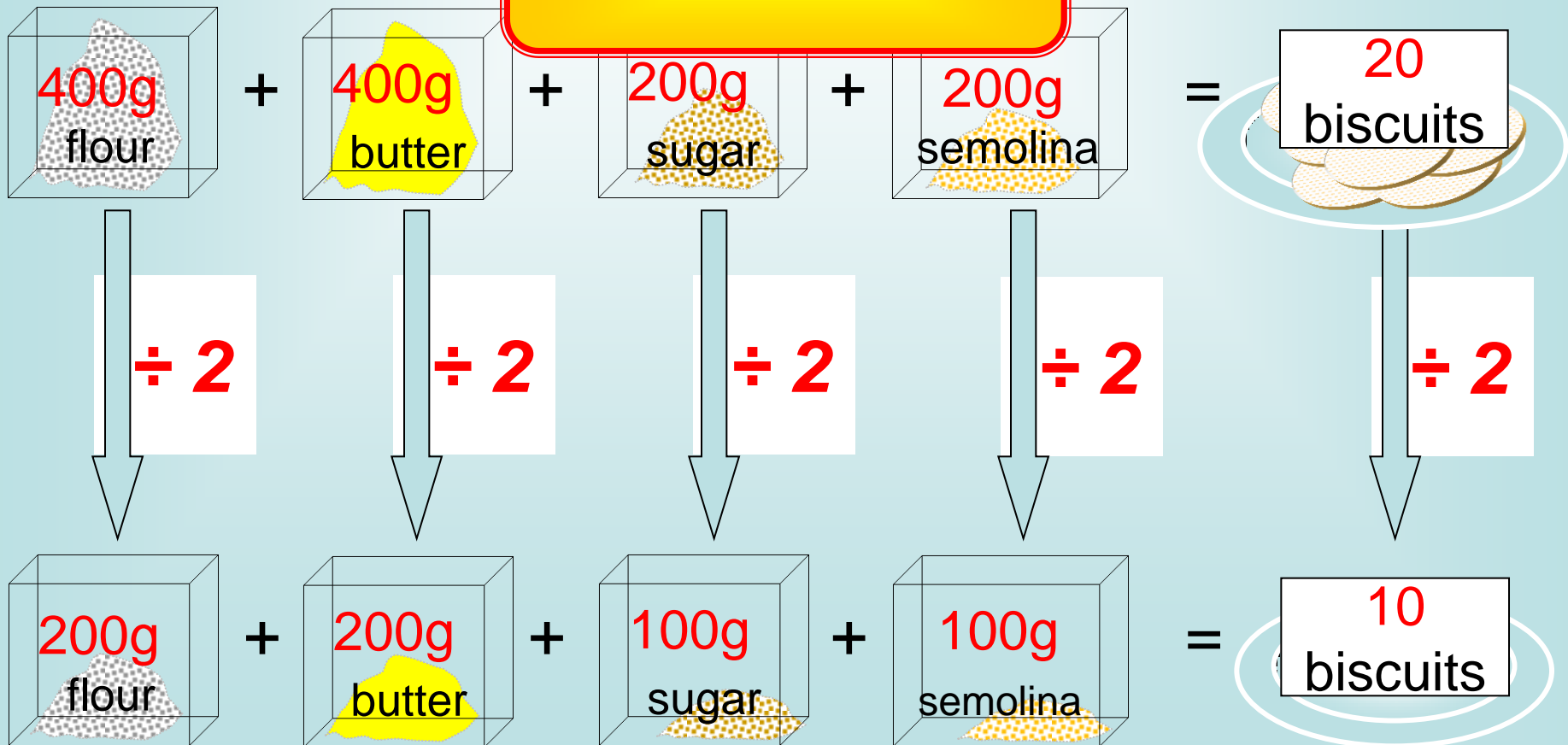
STEP 2: Do the maths!

DO THE SAME X or ÷ to ALL ingredients

STEP 3: CHECK the maths!

- using ratio.

Eg: The weight of the butter is always 2 times the weight of the sugar.



STEP 1: CHOOSE the maths!

CHOOSE FROM \times or \div

... BIGGER means \times

... SMALLER means \div

STEP 2: DO the maths!

DO THE SAME \times or \div to ALL ingredients

STEP 3: CHECK the maths!

- using ratio.

Eg: If the weight of the butter is always 2 times the weight of the sugar...

Whoops!

Nirmal makes 2 shortbread biscuits

Mistake in STEP 1: Choose the maths!

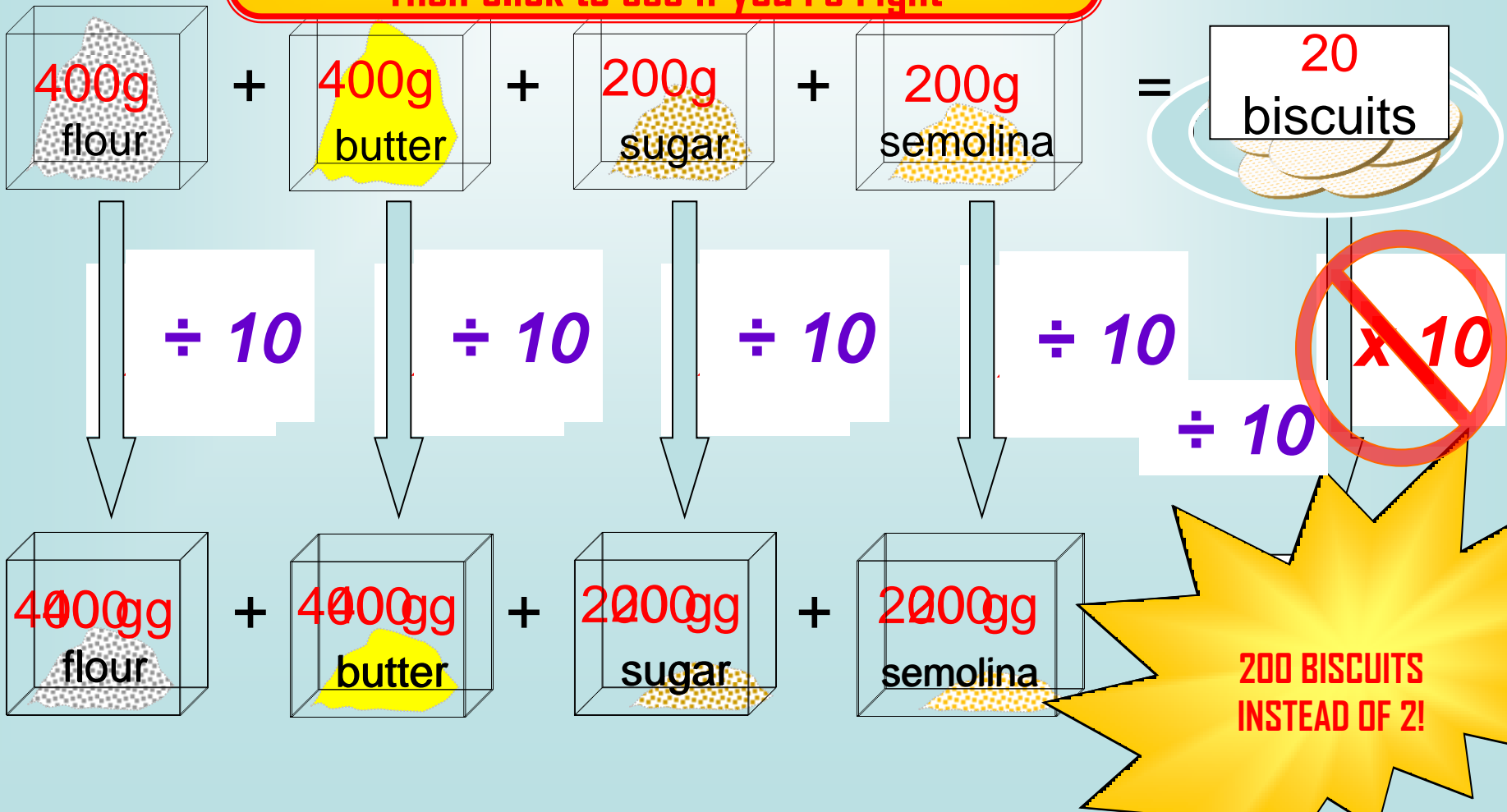
Check his working out

Why don't they taste right!

Did he

in proportion?

Then click to see if you're right



STEP 1: CHOOSE the maths!

CHOOSE FROM \times or \div

... BIGGER means \times

... SMALLER means \div

STEP 2: DO the maths!

DO THE SAME \times or \div to ALL ingredients

STEP 3: CHECK the maths!

- using ratio.

Eg: If the weight of the butter is always 2 times the weight of the sugar...

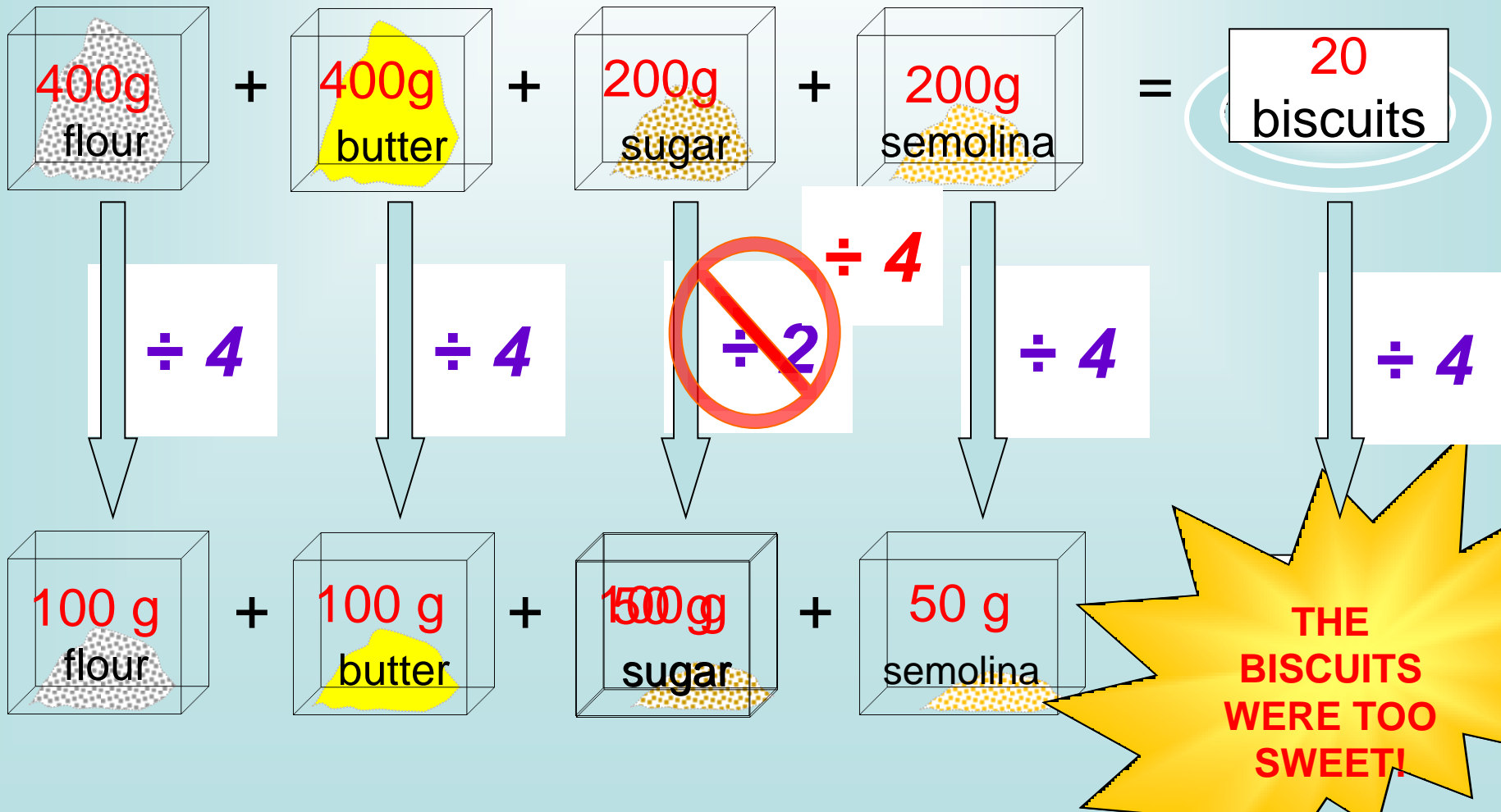
Whoops!

... Liana makes 5 shortbread biscuits

Mistake in STEP 2: Do the maths!
DO THE SAME X or \div to ALL ingredients
BUT ...Liana did not do $\div 2$ to the sugar.

... don't taste right!

Did s in proportion?



STEP 1: CHOOSE the maths!

CHOOSE FROM \times or \div

... BIGGER means \times

... SMALLER means \div

STEP 2: DO the maths!

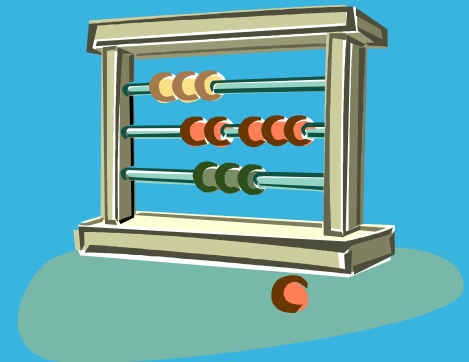
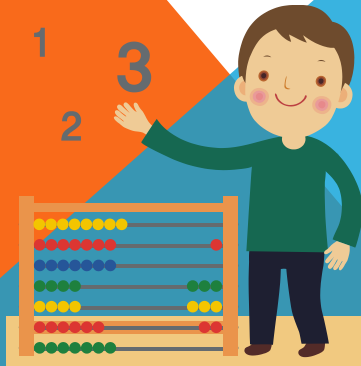
DO THE SAME \times or \div to ALL ingredients

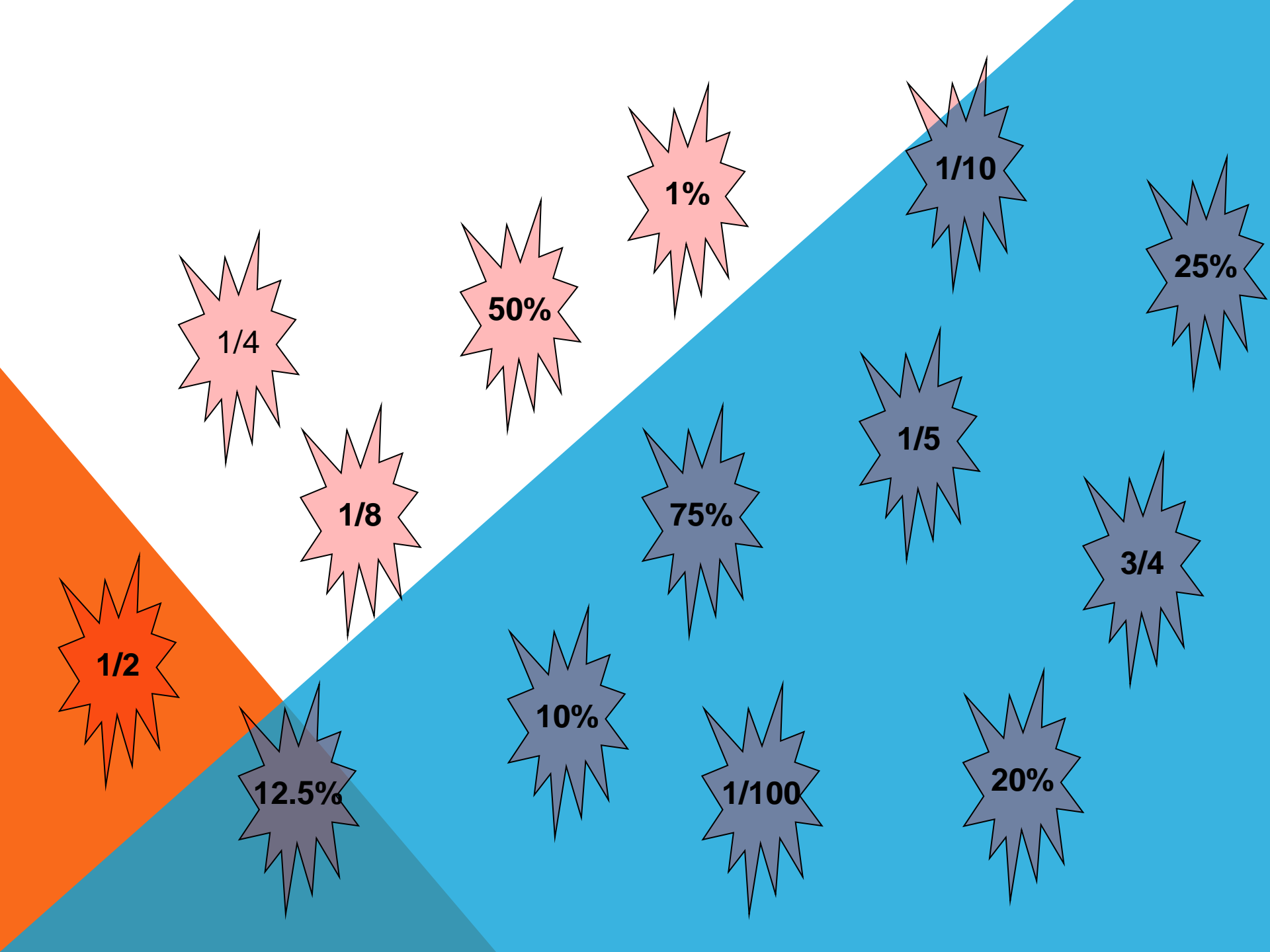
STEP 3: CHECK the maths!

- using ratio.

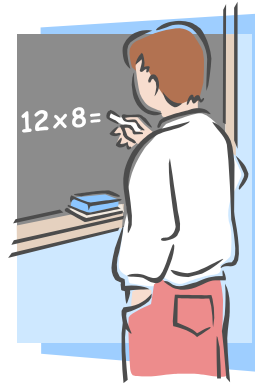
Eg: If the weight of the butter is always 2 times the weight of the sugar...

Find equivalent fractions
and percentages.





Learning Objective



To scale proportion up or down using multiplication and division.

Further Practical Examples

Recipe No.1 Melon Merenga

Serves 8 people

Ingredients

300 g raspberries

200 g bananas

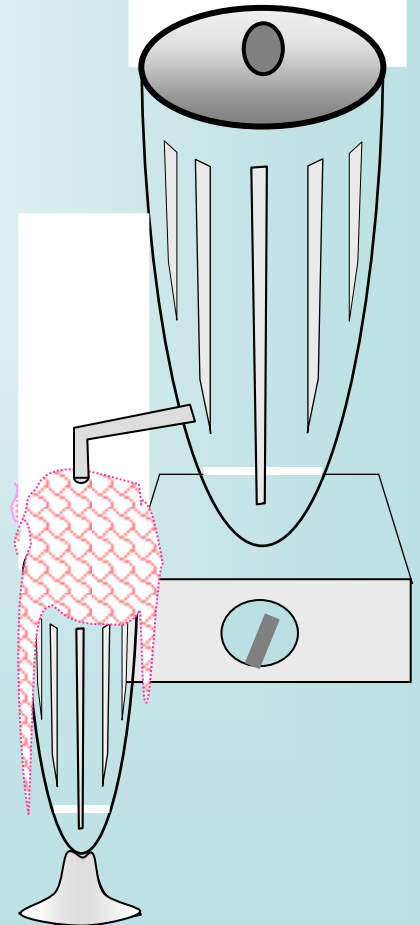
100 g melon



Method

Place ingredients in a juicer and switch on power for 30 seconds.

Pour and serve with ice or ice-cream.



STEP 1: Choose the maths!

x or ÷ ?

BIGGER means X

SMALLER means ÷

STEP 2: Do the maths!

DO THE SAME X or ÷ to ALL ingredients




STEP 3: CHECK the maths!

- using ratio.




Eg: The bananas' weight is ALWAYS twice the melons' weight.


$$600 \text{ g} + 400 \text{ g} + 200 \text{ g} =$$

Melon Merenga for 8


$$300 \text{ g} + 200 \text{ g} + 100 \text{ g} =$$




Melon Merenga for 4


$$150 \text{ g} + 100 \text{ g} + 50 \text{ g} =$$

Melon Merenga for 2


$$75 \text{ g} + 50 \text{ g} + 25 \text{ g} =$$

Melon Merenga for 1


$$450 \text{ g} + 300 \text{ g} + 150 \text{ g} =$$

Melon Merenga for 6

General Method:

- 1) Work out the recipe for 1.
- 2) Multiply by the number you need

Shortcut:

- 1) Work out from the quantities for 2 people.
- 2) X 3 (easier than X6)

Further Practical Examples

Recipe No.2 Raspberry Fruitloop

(Same ingredients. Different amounts)

Serves 10 people

Ingredients

500 g raspberries

250 g bananas

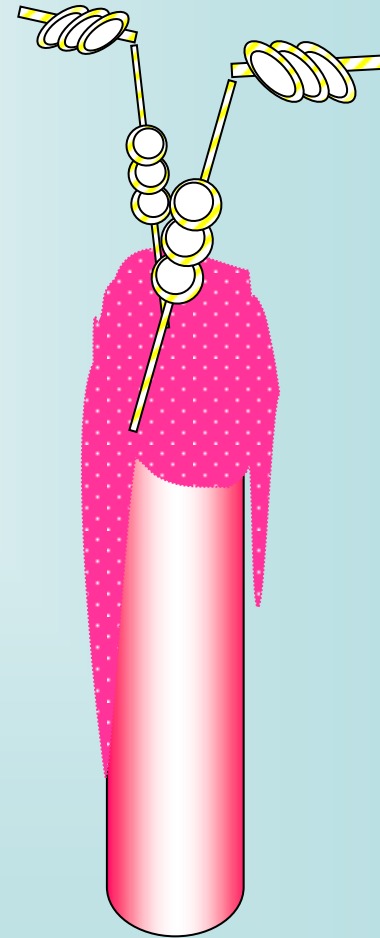
150 g melon



Method

Place ingredients in a juicer and switch on power for 30 seconds.

Pour and serve with fresh raspberries



STEP 1: Choose the maths!

\times or \div ?

BIGGER means \times

SMALLER means \div




STEP 2: Do the maths!

DO THE SAME \times or \div to ALL ingredients




STEP 3: CHECK the maths!

- using ratio.




Eg: The raspberries' weight is ALWAYS twice the melons' weight.


$$500 \text{ g} + 250 \text{ g} + 150 \text{ g} =$$





Raspberry Fruitloop for 10


$$250 \text{ g} + 125 \text{ g} + 75 \text{ g} =$$


Raspberry Fruitloop for 5


$$50 \text{ g} + 25 \text{ g} + 15 \text{ g} =$$


Raspberry Fruitloop for 1


$$200 \text{ g} + 100 \text{ g} + 60 \text{ g} =$$


Raspberry Fruitloop for 4


$$400 \text{ g} + 200 \text{ g} + 120 \text{ g} =$$

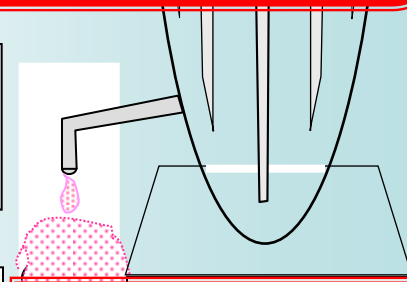

Raspberry Fruitloop for 8

General Method:

- 1) Work out the recipe for 1.
- 2) Multiply by the number you need

Shortcut:

- 1) Work out from the quantities for 4 people.
- 2) Just double it!
(Easier than $\times 8$)



Further Practical Examples

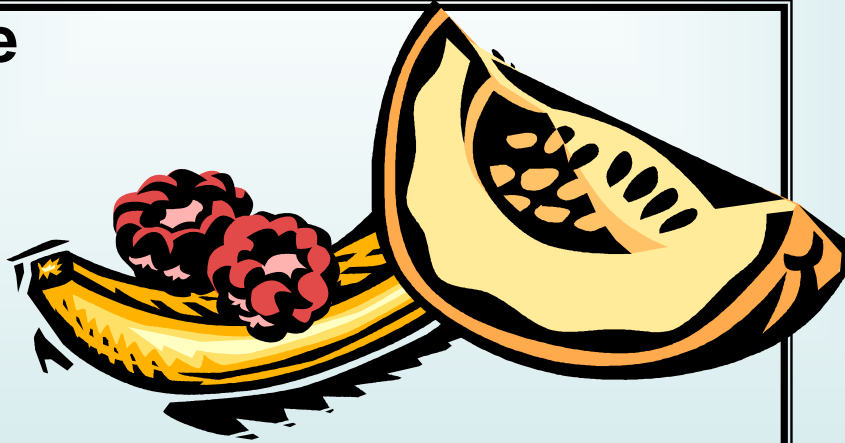
Recipe No.3 Bombastic Banana Boat

(Same ingredients. Different amounts)

Serves 12 people

Ingredients

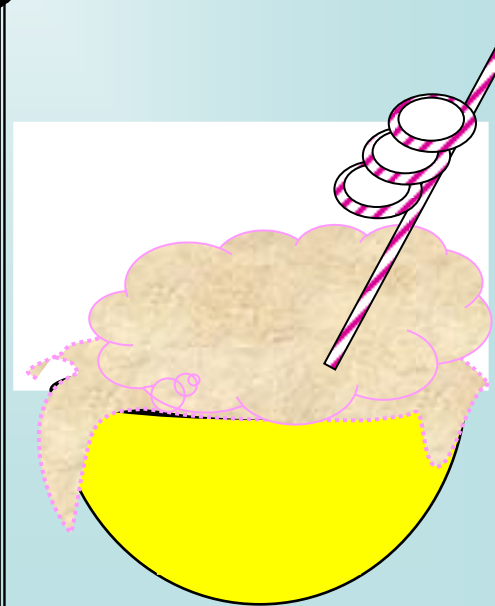
120 g raspberries
600 g bananas
120 g melon



Method

Place ingredients in a juicer and switch on power for 30 seconds.

Pour into a scooped out melon half . Serve with fresh raspberries



STEP 1: Choose the maths!

x or ÷ ?

BIGGER means X

SMALLER means ÷

STEP 2: Do the maths!

DO THE SAME X or ÷ to ALL ingredients

STEP 3: CHECK the maths!

- using ratio.

Eg: The weight of bananas is always 5 times the weight of the melon.


120 g

+



600 g

+



120 g

=

Banana Boat
for 12


60 g

+


300 g

+



60 g

=

Banana Boat
for 6


40 g

+


200 g

+



40 g

=

Banana Boat
for 4


10 g

+



50 g

+



10 g

=


Banana Boat
for 1


80 g

+


400 g

+


80 g

=

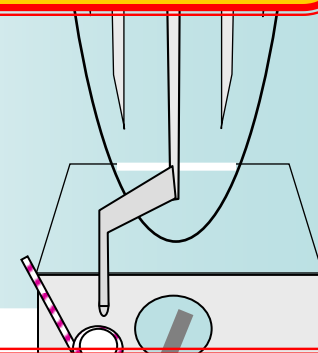
Banana Boat
for 8

General Method:

- 1) Work out the recipe for 1.
- 2) Multiply by the number you need

Shortcut:

- 1) Work out from the quantities for 4 people.
- 2) Just double it!
(Easier than X8)



Ratio and proportion – A SATs question

Mari is the presenter of a weekly radio show.



**She plays five new songs for every two old songs.
Last week she played 15 new songs.
How many songs did she play altogether?**

Ratio and proportion

Mari is the presenter of a weekly radio show.



She plays **five new** songs for every **two old** songs.
Last week she played **15 new** songs.
How many songs did she play altogether?

Ratio and proportion

Mari is the presenter of a weekly radio show.



five new : two old
15 new : ?

Ratio and proportion

Mari is the presenter of a weekly radio show.



5 new	:	2 old
15 new	:	?

Ratio and proportion

Mari is the presenter of a weekly radio show.



5 : 2

15 : ?

Ratio and proportion

Mari is the presenter of a weekly radio show.



X 3

5 : 2

15 : ?

Ratio and proportion

Mari is the presenter of a weekly radio show.



$\times 3$

$5 : 2$

$15 : 6$

$\times 3$

Ratio and proportion

Mari is the presenter of a weekly radio show.



How many songs did she play altogether?

She played 6 old songs and 15 new songs.

Ratio and proportion

Mari is the presenter of a weekly radio show.



How many songs did she play altogether?

She played 21 songs altogether.

Ratio and proportion – Another SATs question

Here is a recipe for raspberry ice cream.

raspberry ice cream
for 8 people

$\frac{1}{2}$ litre of cream

1kg raspberries

250g sugar



This recipe is for 8 people. Josie makes enough raspberry ice cream for 12 people. How much cream does she use?

Fred makes raspberry ice cream in the same way. He uses $2\frac{1}{2}$ kg of raspberries. How much sugar does he use?

Long Division

The space saver method

Let's try $489 \div 7$

$$\begin{array}{r} 069 \text{ r } 6 \\ 7 \overline{) 489} \end{array}$$

Long Division

The space saver method

Let's try $4729 \div 28$

$$\begin{array}{r} 0168 \text{ r } 25 \\ 28 \overline{) 4729} \end{array}$$

Partial products are shown in red below the quotient digits: 4 (under 0), 19 (under 1), 24 (under 6), and 25 (under 8).

These might be useful: 28, 56, 84, 112, 140, 168, 196, 224, 252, 280

Long Division

The space saver method

Let's try $46283 \div 36$

$$\begin{array}{r} 01285 \\ 36 \overline{) 46283} \end{array} \quad \text{r } 23$$

The diagram illustrates the space-saving long division method for $46283 \div 36$. The divisor 36 is on the left. The dividend 46283 is written below a horizontal line. The quotient digits 0, 1, 2, 8, and 5 are written above the line. Red numbers indicate the partial products: 4 (under 4), 6 (under 6), 10 (under 2), 30 (under 8), and 20 (under 3). The remainder 23 is shown to the right of the dividend.

These might be useful: 36, 72, 108, 144, 180, 216, 252, 288, 324, 360

Division practise

3682 divided by 6 613 r 4

6741 divided by 12 561 r 9

2065 divided by 32 64 r 17

3927 divided by 24 163 r 15

Definitions

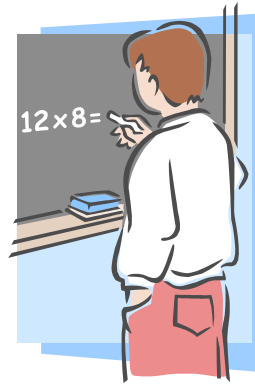
Short Division

Long Division

Practice

Main Menu

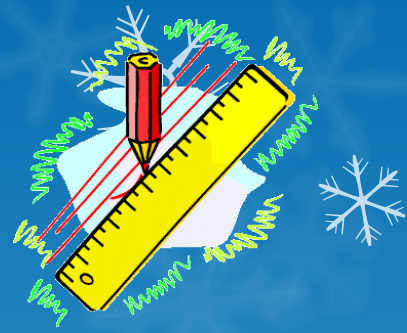
Learning Objective



To find the ratio or proportions of amounts

Ratio & Proportion

Ratio Calculations

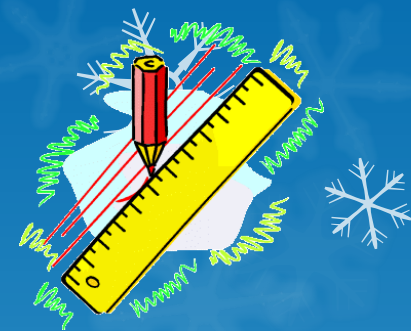


Example : The ratio of boys to girls is 4:5.
If there are 16 boys, how many girls
are there?

boys	girls
4	5
$\times 4$ 16	20 $\times 4$

Ratio & Proportion

Ratio Calculations

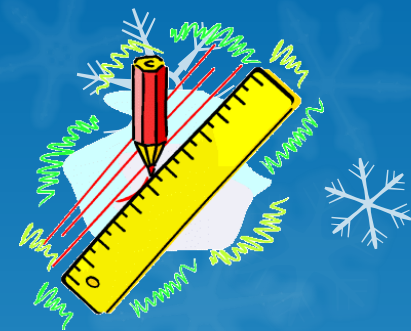


Example : The ratio of cars to buses is 3:7.
If there are 49 buses, how many cars
are there?

	cars		buses	
	3		7	
x 7	21		49	x 7

Ratio & Proportion

Proportional Division



Example : Bill and Ben share a raffle win of £400 in the ratio 3:5. How much does each get ?

Step 1 : Since the ratio is 3:5, there are :

$$3+5 = 8 \text{ shares}$$

Step 2 : Each share is worth : $8 \overline{) 400}$

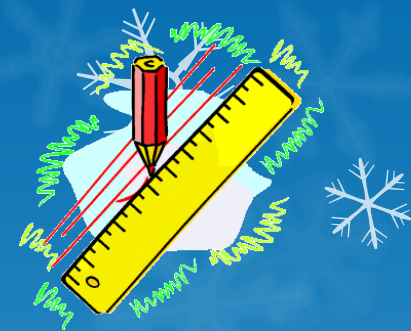
Step 3 : Bill gets $3 \times 50 = \text{£}150$

Ben gets $5 \times 50 = \text{£}250$

Check !
 $150 + 250 =$
 400

Ratio & Proportion

Proportional Division



Example : Ryan and Ross share 24 cakes in the ratio 3:1. How many cakes does each get ?

Step 1 : Since the ratio is 3:1, there are :

$$3+1 = 4 \text{ shares}_6$$

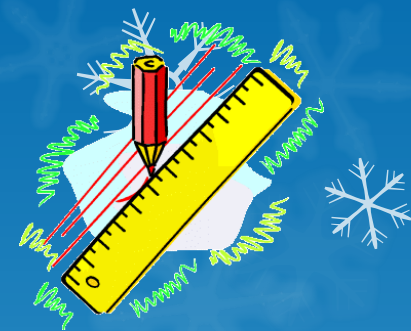
Step 2 : Each share is worth : $4 \overline{)24}$

Step 3 : Ryan gets $3 \times 6 = 18$

Ross gets $1 \times 6 = 6$

Check !
 $18 + 6$
 $= 24$

Ratio & Proportion



Example : The proportion of cats in the vets is one out of four. How many cats will we see if there are:

24 animals

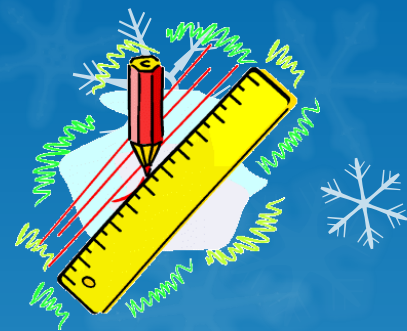
32 animals

16 animals

48 animals

120 animals

Ratio & Proportion



There 40 children in the playground. The Proportion of girls is $\frac{3}{10}$.

How many girls are there?
How many boys are there?

