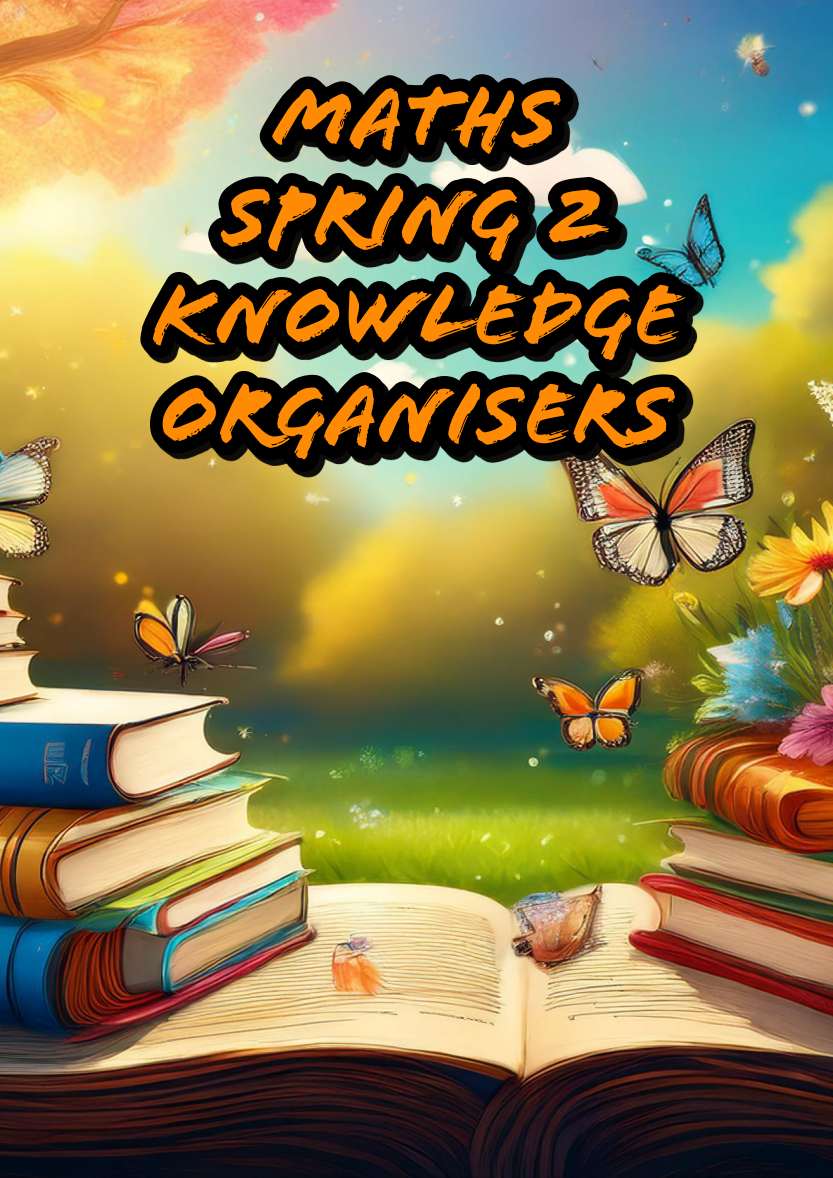


# MATHS SPRING 2 KNOWLEDGE ORGANISERS



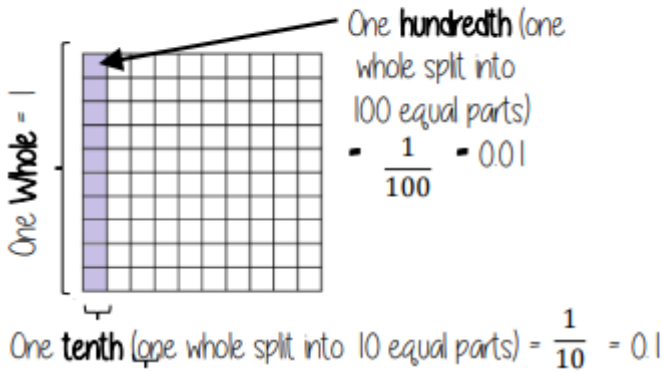




# Year 6 Unit 9a Decimals



## Decimal Place value

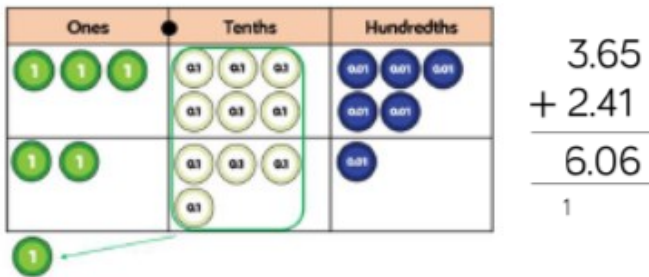


0 ones, 5 tenths and 2 hundredths

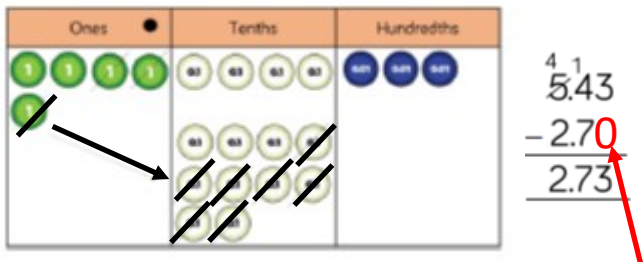
$$0 + 0.1 + 0.1 + 0.1 + 0.1 + 0.1 + 0.01 + 0.01 = 0 + 0.5 + 0.02 = 0.52$$

## Addition and Subtraction

$$3.65 + 2.41 = 6.06$$

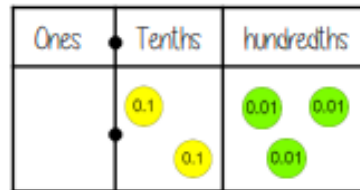
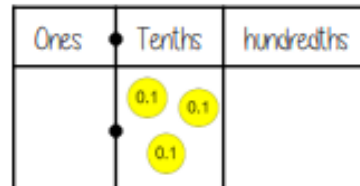


$$5.43 - 2.7 = 2.73$$



## Comparing

Which is the largest of 0.3 and 0.23?



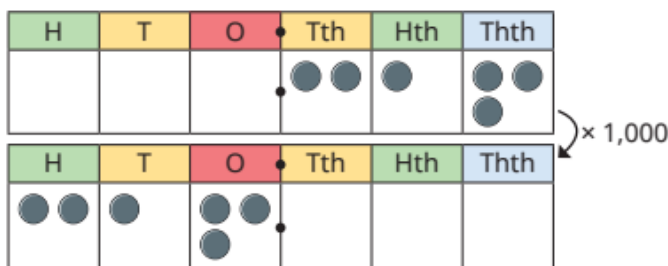
$$0.3 > 0.23$$

"There are more counters in the furthest column to the left"

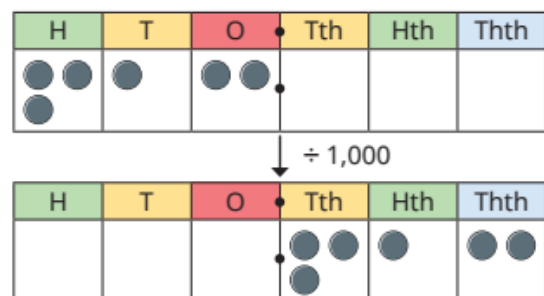
0.30 } Comparing the values both with the same number of decimal places is another way to compare the number of tenths and hundredths

0.23 }

## Multiplying and dividing by 10 and 100



$0.213 \times 1,000 = 213$   
213 is 1,000 times the size of 0.213. 0.213 is one-thousandth the size of 213



$312 \div 1,000 = 0.312$   
312 is 1,000 times the size of 0.312. 0.312 is one-thousandth the size of 312

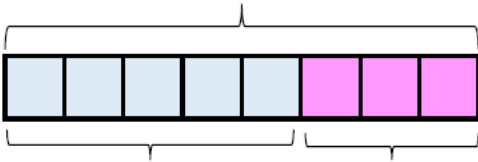


# Year 6 Unit 10—Ratio



**What is a ratio?** For every 5 blues there are 3 pinks

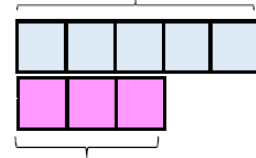
This is the 'whole' - blues and pinks together



This represents the 5 blues    This represents the 3 pinks

5:3

This represents the 5 blues



This is the 'whole' - blues and pinks together

This represents the 3 pinks

**Simplifying a ratio**

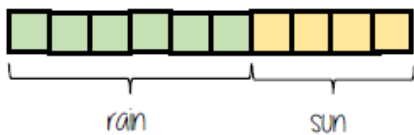
Cancel down the ratio to its lowest form

"For every 6 days of rain there are 4 days of sun"

6:4

+ by 2 ↓

3:2



Find the biggest common factor that goes into all parts of the ratio

For 6 and 4 the biggest factor (number that multiplies into them is 2)

"For every 3 days of rain there are 2 days of sun" - when this happens twice the ratio becomes 6:4.

**Order is important**

"For every dog there are 2 cats"



1:2

The ratio has to be written in the same order as the information is given

@whisto\_maths

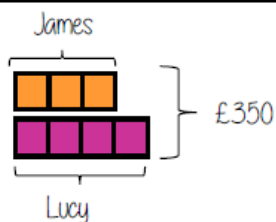
**Dividing into a given ratio**

James and Lucy share £350 in the ratio 3:4.  
Work out how much each person earns

Model the Question

James: Lucy

3 : 4



Find the value of one part

$$£350 \div 7 = £50$$

Whole: £350

7 parts to share between  
(3 James, 4 Lucy)

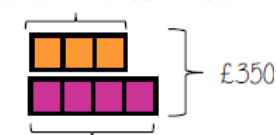
□ = one part  
= £50

Put back into the question

James: Lucy

(x 50) 3 : 4 (x 50)  
↙        ↘  
£150 : £200

$$\text{James} = 3 \times £50 = £150$$

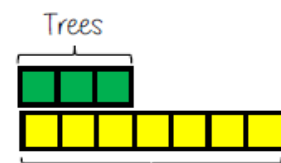


$$\text{Lucy} = 4 \times £50 = £200$$

**Ratio and fractions**

Trees: Flowers

3 : 7



Ratio

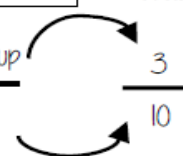
There are 3 parts for trees

Flowers

Fraction of trees

Number of parts of in group

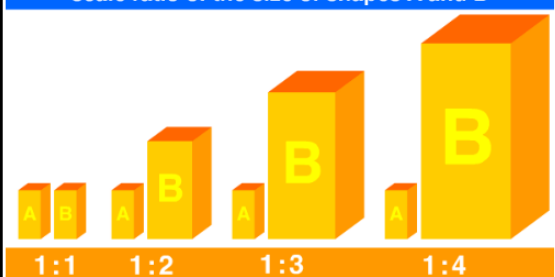
Total number of parts



Fraction

Tree parts 3 + Flower parts 7 = 10

scale ratio of the size of shapes A and B

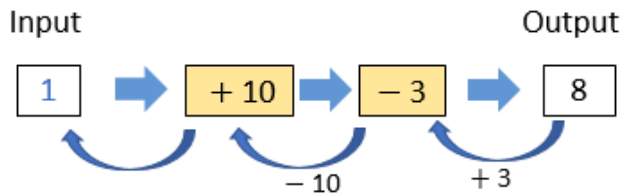
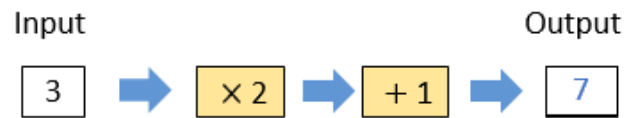
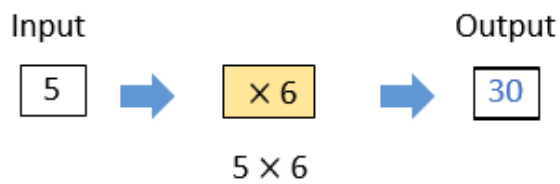


# Year 6 Unit 11

## Algebra



### Function Machines



To find the input when given the output, use the **inverse**

### Algebra Notation

#### We group letters together

$a + a + a$   
means  
3 lots of  $a$   
 $3 \times a$

$b + b$   
means  
2 lots of  $b$   
 $2 \times b$

#### We do not use multiplication signs

$$3 \times a = 3a$$

$$a \times b = ab$$

$$5 \times b = 5b$$

$$a \times b \times c = abc$$

#### We write division using fraction notation

$a \div 2$   
is written as  
 $\frac{a}{2}$  or  $\frac{1}{2}a$

$b \div 3$   
is written as  
 $\frac{b}{3}$  or  $\frac{1}{3}b$

#### We use indices/powers

$$a \times a = a^2$$

(a squared)

$$b \times b \times b = b^3$$

(b cubed)

3 more than  $t$

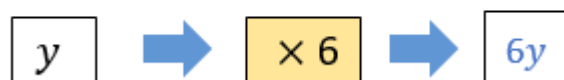
$$t + 3$$

double  $t$

$$2t$$

$t$  divided by 6

$$\frac{t}{6}$$



# Year 7 Unit 6

## Applying Multiplication and Division



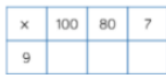
Product	The result when two numbers are multiplied.	$6 \times 3 = 18$ Factor      Factor      Product
Factor	Numbers we can multiply together to get another number.	
Multiple	The result of multiplying a number by a positive whole number	6, 12, 18, 20, 24 ..... are all multiples of 6
Commutative	Numbers can be multiplied in any order, but in division the order is important.	$2 \times 4 = 8$ $4 \times 2 = 8$
Inverse	The reverse or opposite of an operation.	

### Multiplication methods

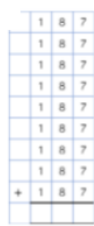
@whisto\_maths



Long multiplication (column)



Grid method



Repeated addition

Less effective method especially for bigger multiplication

#### Multiplication with decimals

Perform multiplications as integers  
 eg  $0.2 \times 0.3 \longrightarrow 2 \times 3$

Make adjustments to your answer to match the question:  
 $0.2 \times 10 = 2$   
 $0.3 \times 10 = 3$

Therefore  $6 \div 100 = 0.6$

Estimations: Using estimations allows a 'check' if your answer is reasonable

### Division methods

$$3584 \div 7 = 512$$

Short division

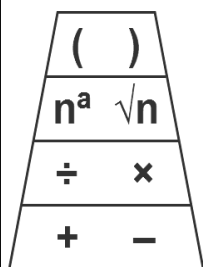
$$\begin{array}{r} 512 \\ 7 \overline{) 3584} \end{array}$$

Complex division

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

Break up the divisor using factors

### Order of Operations



Brackets

Powers /Indices

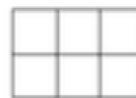
Multiplication or Division

Addition or Subtraction

### Area

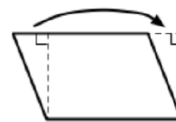
Rectangle

Base x Perpendicular height



Parallelogram/ Rhombus

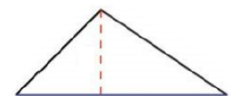
Base x Perpendicular height



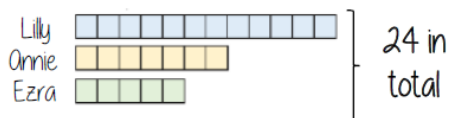
Triangle

$\frac{1}{2} \times \text{Base} \times \text{Perpendicular height}$

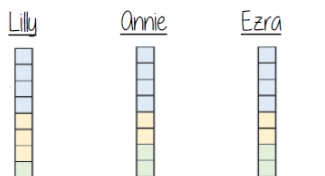
A triangle is half the size of the rectangle it would fit in



### Mean problems



Finding the mean amount is the average amount each person would have if shared out equally



The mean number of blocks would be 8 each

### Multiply by powers of 10



$$3 \times 100 = 300$$

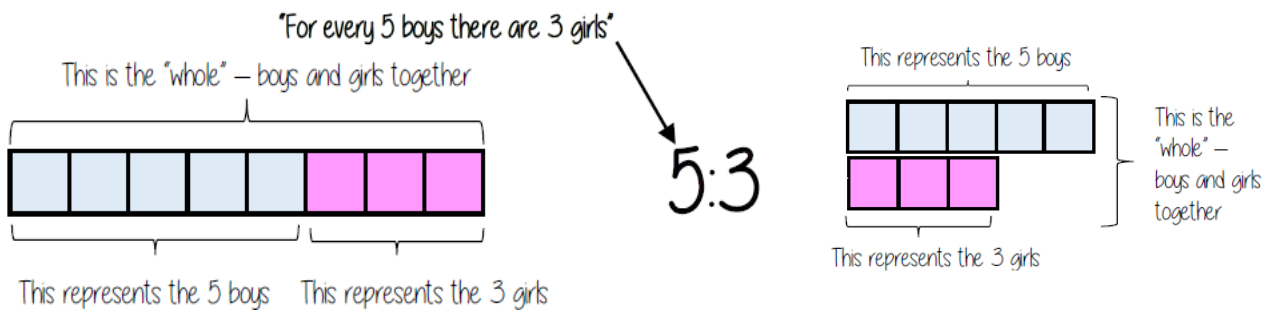


$$0.03 \times 100 = 3$$

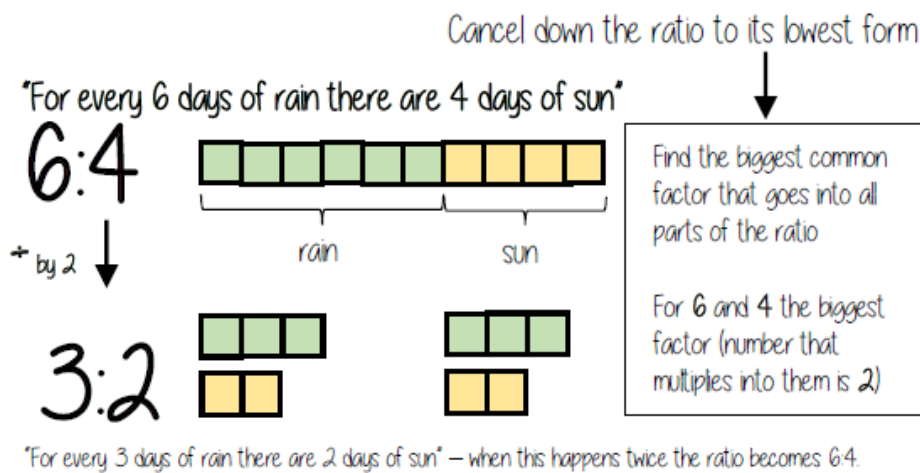
# Year 8 Unit 5—Ratio and Scale



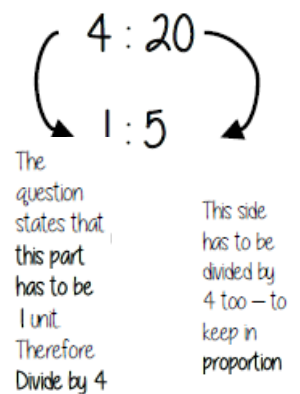
## What is a ratio?



## Simplifying a ratio



## Writing a ratio in form 1:n

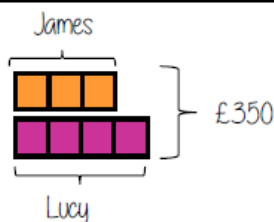


## Dividing into a given ratio

James and Lucy share £350 in the ratio 3:4.  
Work out how much each person earns

### Model the Question

James: Lucy  
**3:4**



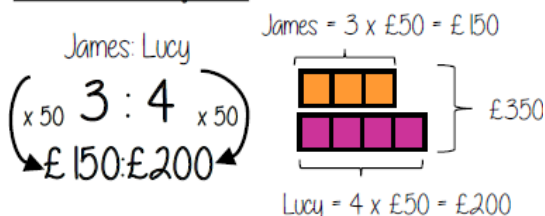
### Find the value of one part

Whole: £350  
7 parts to share between  
(3 James, 4 Lucy)

$$£350 \div 7 = £50$$

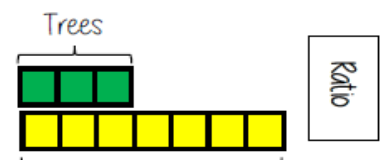
□ = one part = £50

### Put back into the question



## Ratio and fractions

Trees: Flowers  
**3:7**



There are 3 parts for trees

Flowers

Fraction of trees

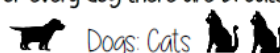
$$\frac{\text{Number of parts of in group}}{\text{Total number of parts}} = \frac{3}{10}$$

Fraction

Tree parts 3 + Flower parts 7 = 10

## Order is important

"For every dog there are 2 cats"



**1:2**

The ratio has to be written in the same order as the information is given

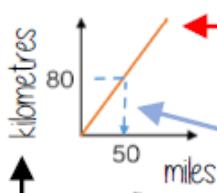
@whisto\_maths

# Year 8 Unit 6 Multiplicative Change



Proportion	A statement that links two ratios
Variable	A part where the value can be changed
Scale Factor	The multiple that increases or decreases a shape in size
Conversion	The process of changing one variable to another

## Conversion Graphs



This is always a straight line because as one variable increases so does the other at the same rate

To make conversions between units you need to find the point to compare – then find the associated point by using your graph  
Using a ruler helps for accuracy  
Showing your conversion lines help as a "check" for solutions

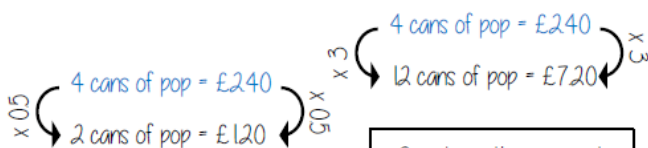
Labelling of both axes is vital

## Direct Proportion

As one variable changes the other changes at the same rate



4 cans of pop = £2.40



This multiplier is the same in the same way that this would be for ratio

Sometimes this is easiest if you work out how much one unit is worth first  
e.g. 1 can of pop = £0.60

## Ratio in similar shapes

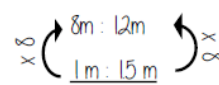
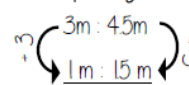


Angles in similar shapes do not change.  
e.g. if a triangle gets bigger the angles can not go above  $180^\circ$

The two rectangles are similar.



Corresponding sides



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## Interpreting Scale Drawings

A picture of a car is drawn with a scale of 1:30

For every 1cm on my image is 30cm in real life

The car image is 10cm



The car in real life is 210cm

