Purbrook Junior School

# MATHS
# KNOWLEDGE ORGANISOR
# YEAR 3

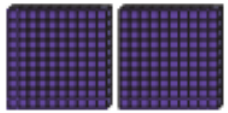
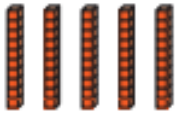
# Number and Place Value — Knowledge Organiser

## Key Vocabulary

- hundreds
- tens
- ones
- zero
- place value
- greater than
- less than
- order
- more
- less
- partition
- digit

## 3-Digit Numbers

**256**

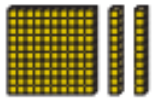
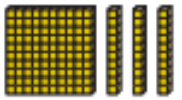
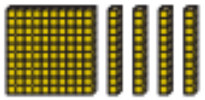
| two hundred | fifty | six |
|---|---|---|
|  |  | |
| 200 | 50 | 6 |

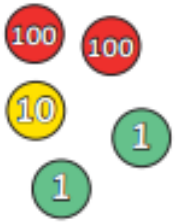
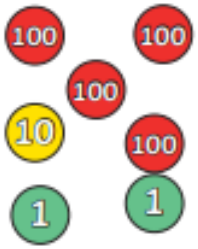
## Counting in 4s and 8s

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 |

## 10 and 100 More or Less

| Ten Less | | Ten More |
|---|---|---|
|  |  |  |
| 120 | 130 | 140 |

| One Hundred Less | | One Hundred More |
|---|---|---|
|  | |  |
| 212 | 312 | 412 |

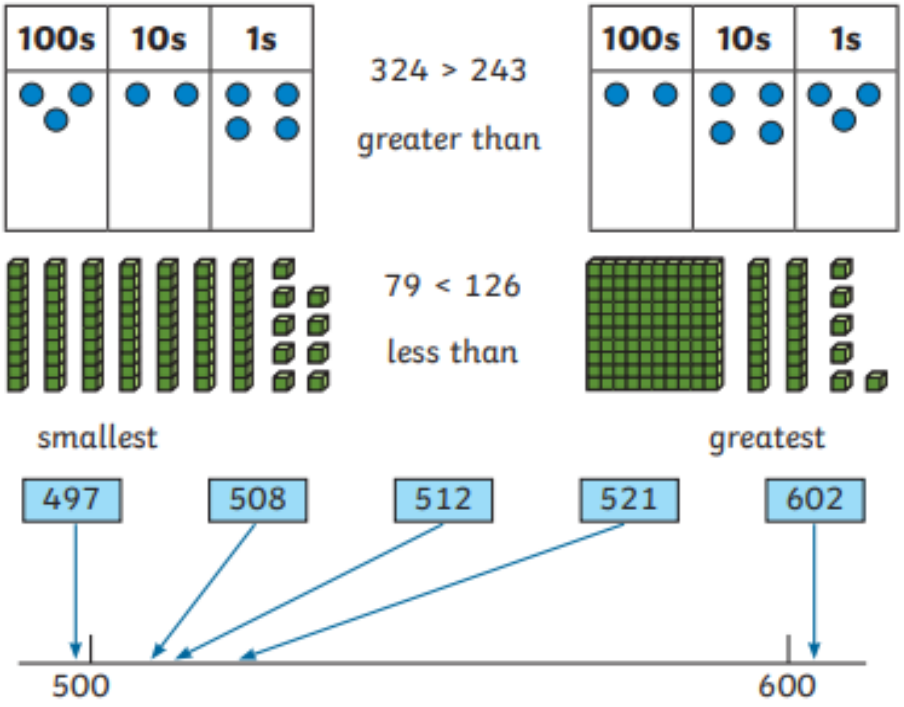
## Counting in 50s and 100s

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 50 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 |

# Number and Place Value — Knowledge Organiser

## Compare and Order

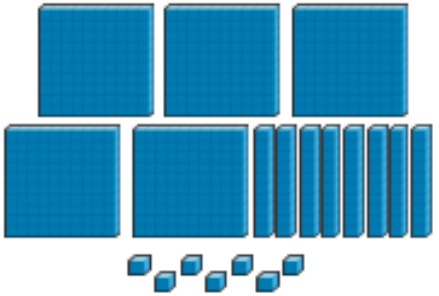



## Represent Numbers to 1000

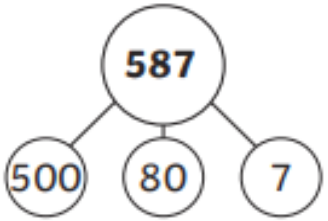
**587**

five hundred and eighty-seven

| Hundreds | Tens | Ones |
|---|---|---|
| 𝍸 | 𝍸 \| | 𝍸 \|\| |

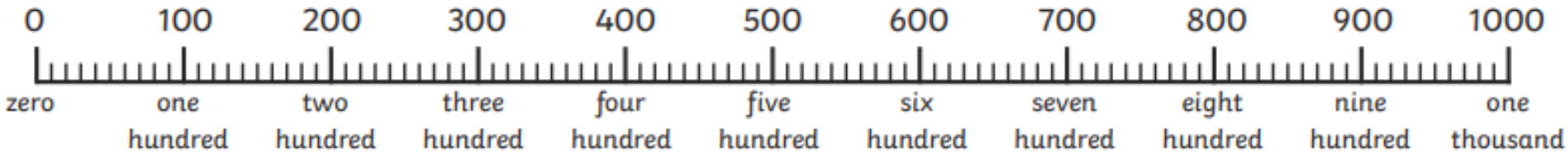


500 + 80 + 7




| Hundreds | Tens | Ones |
|---|---|---|
| 100 100 100 100 100 | 10 10 10 10 10 10 10 10 | 1 1 1 1 1 1 1 |

## Numerals and Words to 1000



# Addition and Subtraction — Knowledge Organiser

## Key Vocabulary

- add
- total
- plus
- sum
- more
- altogether
- difference
- subtract
- less
- minus
- take away
- column addition
- column subtraction
- exchange
- estimate
- inverse operation
- solve problems
- number facts
- place value

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## Addition and Subtraction Methods

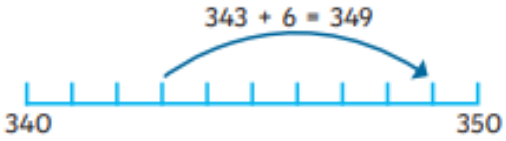
### 3 digit and 1 digit numbers

Not crossing 10s

268 – 4 = 264

| Hundred | Ten | Ones |
|---|---|---|
| ●● | ●●● | ●●●● |

343 + 6 = 349




Crossing 10s (Exchanging)

| 324 | | |
|---|---|---|
| 300 | 20 | 4 |
| 300 | 10 | 14 |

316 + 8 = 32

| 316 | 8 |
|---|---|

324 - 8 = 316

### 3-digit and 2-digit numbers

Add and subtract tens

| Hundred | Ten | Ones |
|---|---|---|
| ●● | ●●● | ● |

451 + 3 tens = 481 (5 + 3 = 8)

451 – 4 tens = 411 (5 – 4 = 1)

Crossing 10s (Exchanging)

258 + 80 = 338

- Column method
- Count in 10s mentally
- Add 100, subtract 20

Crossing 10 and 100

| 368 +73 = 1 (1) | 368 +73 = 41 (1 1) | 368 +73 = 441 (1 1) |
|---|---|---|

| 3 1 441 -73 = 8 | 3 13 1 441 -73 = 68 | 3 13 1 441 -73 = 368 |
|---|---|---|

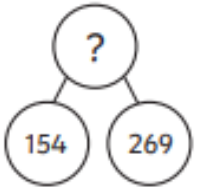
### 3-digit numbers

Not crossing

679 – 351 = 328

| Hundred | Ten | Ones |
|---|---|---|
| ●●● | ●●● | ●●●● |

Crossing 10s (Exchanging)




269 +154 = 423 (11)

| 514 | |
|---|---|
| 268 | ? |

4 10 1
5 1 4
- 268
246

### Add and Subtract 100s

264 + 300 = 564

| Hundred | Ten | Ones |
|---|---|---|
| ■■ | ■ | ▮ |
| ■■■ | | |

# Addition and Subtraction — Knowledge Organiser

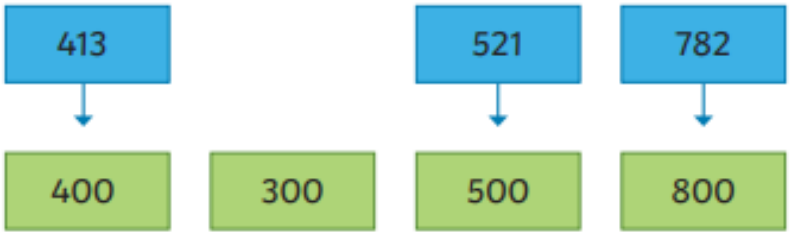
## Estimate

Estimate by dividing the hundred into 250 and 225.

Estimate 10s (330, 340) between 325 and 350.

Estimate 167 – 89
Use near numbers 170 – 90 = 80

Near numbers:

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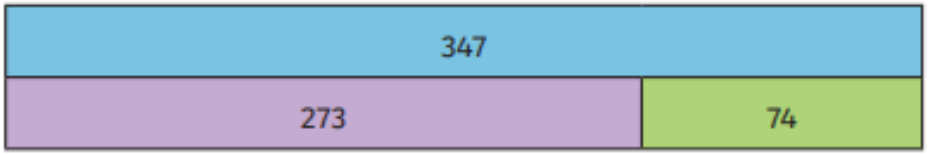
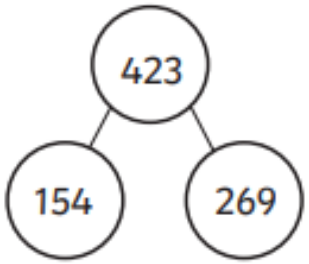
## Check Answers




347 – 74 = 273 can be checked using

273 + 74 = 347

This part whole shows the inverse calculations using these three numbers.




| | |
|---|---|
| 154 + 269 = 423 | 269 + 154 = 423 |
| 423 – 154 = 269 | 423 – 269 = 154 |

# Multiplication and Division

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## Written Multiplication Methods - No Regrouping

| Tens | Ones |
|---|---|
| | |
| | |
| | |

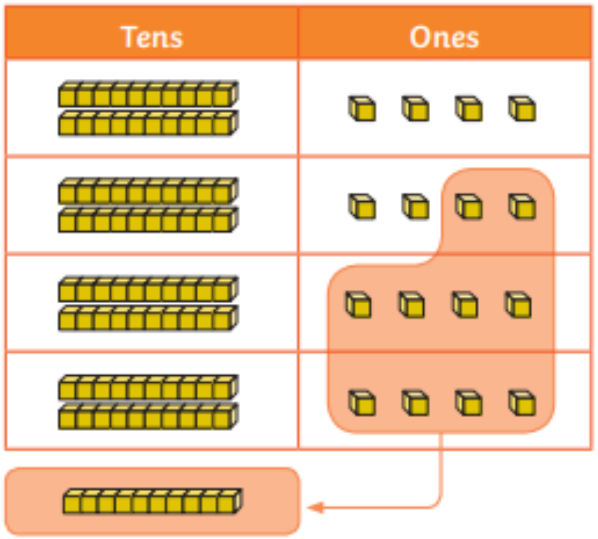
| X | 20 | 3 |
|---|---|---|
| 3 | 60 | 9 |

60 + 9 = 69

**23 × 3 = 69**

| | T | O |
|---|---|---|
| | 2 | 3 |
| × | | 3 |
| | 6 | 9 |
| | | |

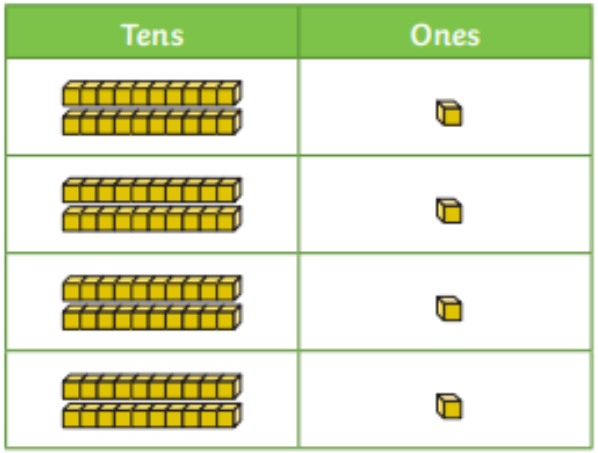
## Written Multiplication Methods - With Regrouping



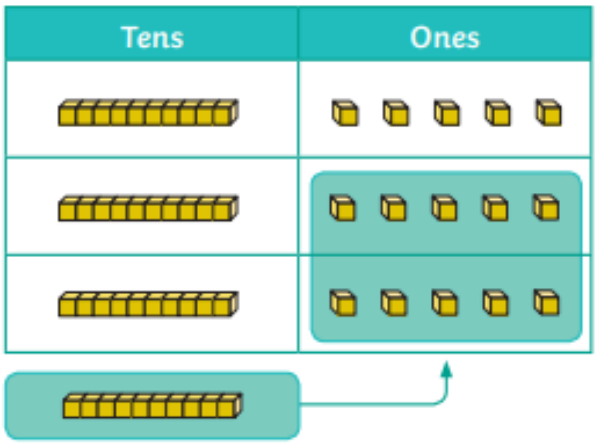

**24 × 4 = 96**

| | T | O |
|---|---|---|
| | 2 | 4 |
| × | | 4 |
| | 9 | 6 |
| | 1 | |

## Written Division Methods - No Regrouping



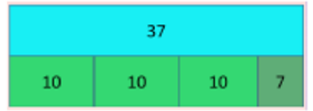

## Written Division Methods - With Regrouping




Jump forward in equal jumps on a number line then see how many more you need to jump to find a remainder.

Draw dots and group them to divide an amount and clearly show a remainder.

Use bar models to show division with remainders.

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# Multiplication and Division — Knowledge Organiser

## Key Vocabulary

- times tables
- multiply by
- divide by
- array
- fact families
- regrouping

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## Multiplication and Division Facts (3, 4 and 8 multiplication tables)

| x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 2 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 |
| 3 | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 |
| 4 | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 | 44 | 48 |
| 5 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 |
| 6 | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 66 | 72 |
| 7 | 7 | 14 | 21 | 28 | 35 | 42 | 49 | 56 | 63 | 70 | 77 | 84 |
| 8 | 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 | 88 | 96 |
| 9 | 9 | 18 | 27 | 36 | 45 | 54 | 63 | 72 | 81 | 90 | 99 | 108 |
| 10 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 |
| 11 | 11 | 22 | 33 | 44 | 55 | 66 | 77 | 88 | 99 | 110 | 121 | 132 |
| 12 | 12 | 24 | 36 | 48 | 60 | 72 | 84 | 96 | 108 | 120 | 132 | 144 |

### 3 x Tables

| | |
|---|---|
| 1 × 3 = 3 | 3 ÷ 3 = 1 |
| 2 × 3 = 6 | 6 ÷ 3 = 2 |
| 3 × 3 = 9 | 9 ÷ 3 = 3 |
| 4 × 3 = 12 | 12 ÷ 3 = 4 |
| 5 × 3 = 15 | 15 ÷ 3 = 5 |
| 6 × 3 = 18 | 18 ÷ 3 = 6 |
| 7 × 3 = 21 | 21 ÷ 3 = 7 |
| 8 × 3 = 24 | 24 ÷ 3 = 8 |
| 9 × 3 = 27 | 27 ÷ 3 = 9 |
| 10 × 3 = 30 | 30 ÷ 3 = 10 |
| 11 × 3 = 33 | 33 ÷ 3 = 11 |
| 12 × 3 = 36 | 36 ÷ 3 = 12 |

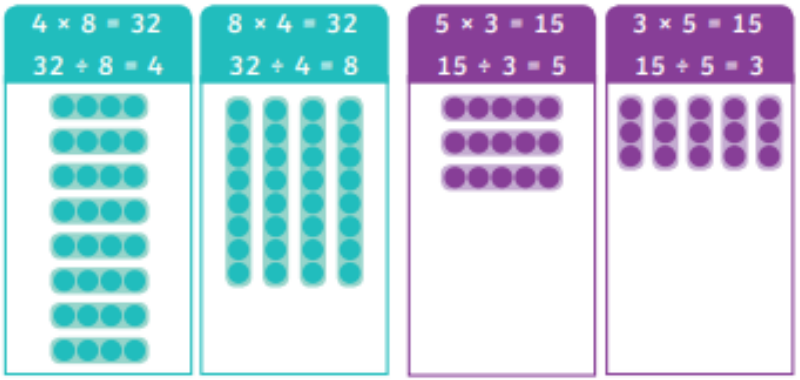
### 4 x Tables

| | |
|---|---|
| 1 × 4 = 4 | 4 ÷ 4 = 1 |
| 2 × 4 = 8 | 8 ÷ 4 = 2 |
| 3 × 4 = 12 | 12 ÷ 4 = 3 |
| 4 × 4 = 16 | 16 ÷ 4 = 4 |
| 5 × 4 = 20 | 20 ÷ 4 = 5 |
| 6 × 4 = 24 | 24 ÷ 4 = 6 |
| 7 × 4 = 28 | 28 ÷ 4 = 7 |
| 8 × 4 = 32 | 32 ÷ 4 = 8 |
| 9 × 4 = 36 | 36 ÷ 4 = 9 |
| 10 × 4 = 40 | 40 ÷ 4 = 10 |
| 11 × 4 = 44 | 44 ÷ 4 = 11 |
| 12 × 4 = 48 | 48 ÷ 4 = 12 |

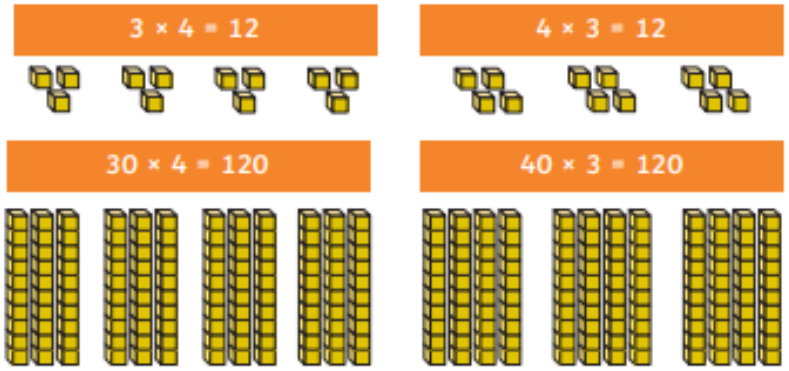
### 8 x Tables

| | |
|---|---|
| 1 × 8 = 8 | 8 ÷ 8 = 1 |
| 2 × 8 = 16 | 16 ÷ 8 = 2 |
| 3 × 8 = 24 | 24 ÷ 8 = 3 |
| 4 × 8 = 32 | 32 ÷ 8 = 4 |
| 5 × 8 = 40 | 40 ÷ 8 = 5 |
| 6 × 8 = 48 | 48 ÷ 8 = 6 |
| 7 × 8 = 56 | 56 ÷ 8 = 7 |
| 8 × 8 = 64 | 64 ÷ 8 = 8 |
| 9 × 8 = 72 | 72 ÷ 8 = 9 |
| 10 × 8 = 80 | 80 ÷ 8 = 10 |
| 11 × 8 = 88 | 88 ÷ 8 = 11 |
| 12 × 8 = 96 | 96 ÷ 8 = 12 |

## Write and Calculate Mathematical Statements




## Related Calculations



# Fractions

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## Key Vocabulary

- numerator
- denominator
- unit fraction
- non-unit fraction
- equivalent
- halves
- thirds
- quarters
- fifths
- sixths
- eighths
- tenths
- decimal tenths

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## Recognising Fractions

$\frac{3}{8}$

**Numerator**
How many equal parts of the whole are needed?

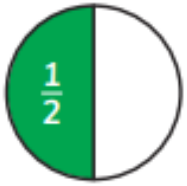
**Denominator**
How many equal parts are in the whole?

## Comparing Fractions

$\frac{1}{3}$ Less than $\frac{2}{3}$

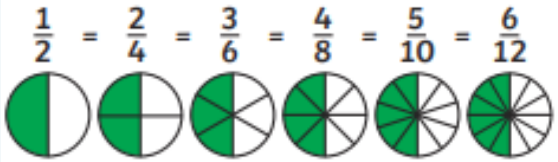
$\frac{4}{5}$ Greater than $\frac{3}{5}$

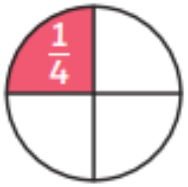
## Equivalent Fractions



$\frac{1}{2}$ is equal to...

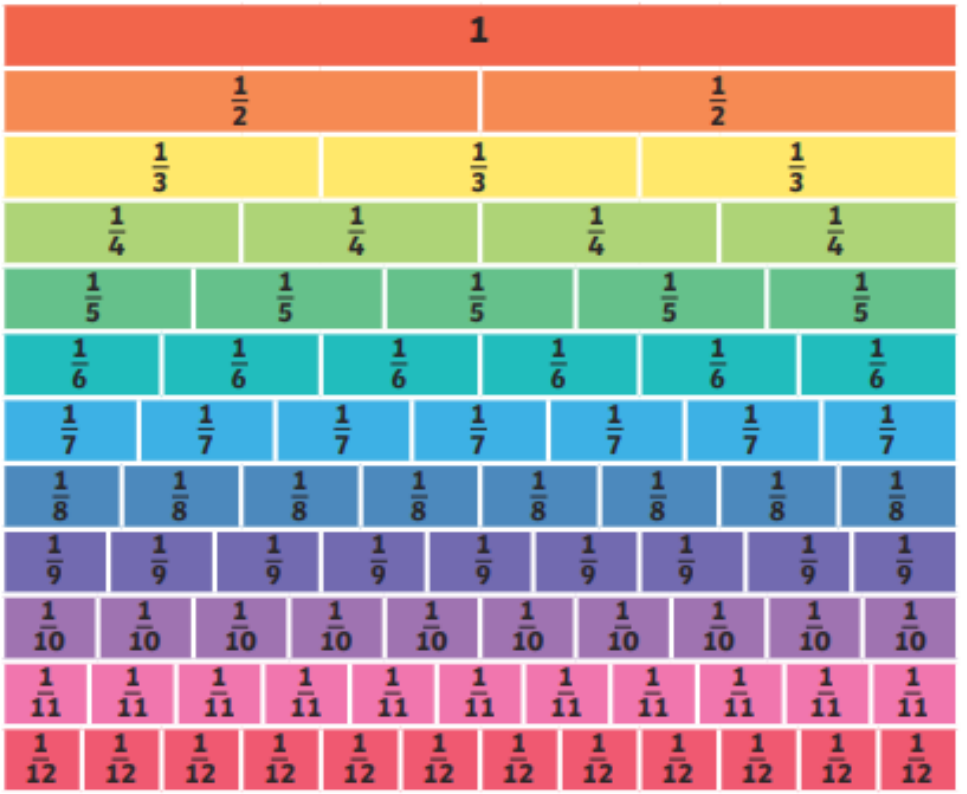
$\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \frac{5}{10} = \frac{6}{12}$





$\frac{1}{4}$ is equal to...

$\frac{1}{4} = \frac{2}{8} = \frac{3}{12} = \frac{4}{16} = \frac{5}{20}$



# Fractions

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## Add and Subtract Fractions

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

$\frac{3}{7} + \frac{2}{7} = \frac{5}{7}$

$\frac{5}{6} - \frac{2}{6} = \frac{3}{6}$

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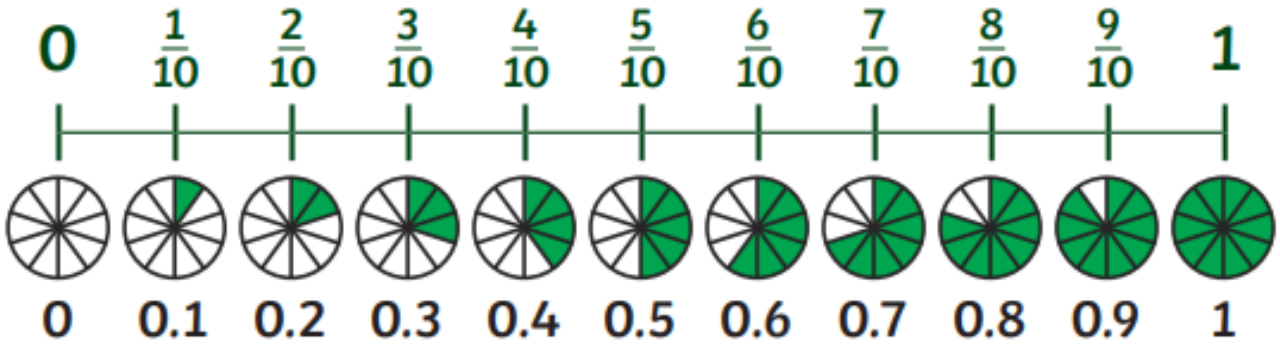
## Tenths




## Fractions of Amounts

$\frac{1}{4}$ of 24 = 6

$\frac{1}{3}$ of 72 = 24

$\frac{2}{5}$ of 40 = 16

# Time — Knowledge Organiser

## Key Vocabulary

- 12-hour time
- 24-hour time
- Roman numerals
- analogue
- digital
- hours
- minutes
- seconds
- o'clock
- half past
- quarter past
- quarter to
- midday
- midnight
- noon

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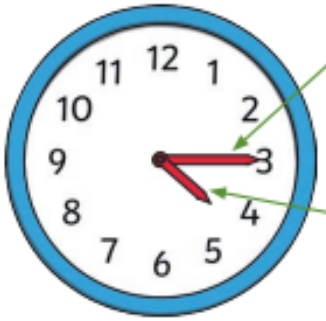
## Analogue and Digital Clocks



**Minute Hand**
The long hand points to the minutes past the hour.

**Hour Hand**
The short hand points to the hour. If this hand is pointing between the hours, it is the earlier hour.

twelve o'clock

quarter past twelve

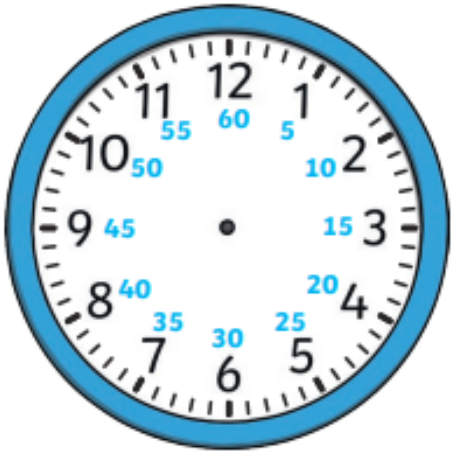
half past twelve

quarter to one

## Time and Roman Numerals

## Hours, Minutes and Seconds

There are **60 seconds** in an minute.



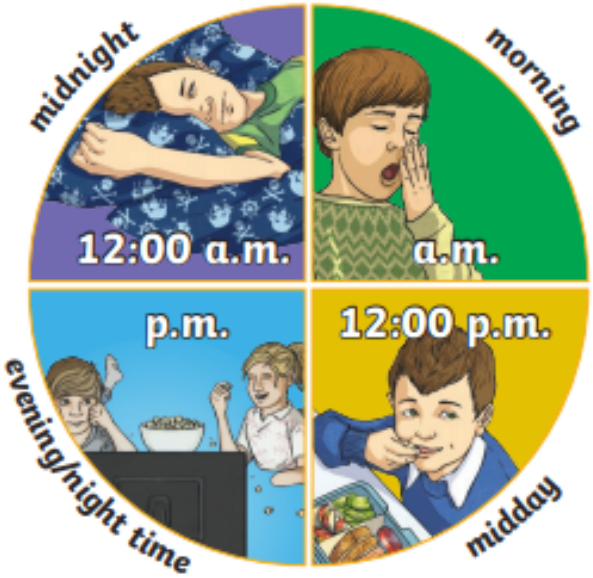

There are **60 minutes** in an hour.

# Time

# Knowledge Organiser

## 24-Hour Time

**There are 24 hours in a day.**




| | | | |
|---|---|---|---|
| 13:00 | 1 p.m. | 1 o'clock | |
| 14:00 | 2 p.m. | 2 o'clock | |
| 15:00 | 3 p.m. | 3 o'clock | |
| 16:00 | 4 p.m. | 4 o'clock | |
| 17:00 | 5 p.m. | 5 o'clock | |
| 18:00 | 6 p.m. | 6 o'clock | |
| 19:00 | 7 p.m. | 7 o'clock | |
| 20:00 | 8 p.m. | 8 o'clock | |
| 21:00 | 9 p.m. | 9 o'clock | |
| 22:00 | 10 p.m. | 10 o'clock | |
| 23:00 | 11 p.m. | 11 o'clock | |
| 00:00 | 12 a.m. | 12 o'clock | |

## Calculate Durations of Time

20 minutes has passed.

## Compare Durations of Time

Compare the time using the vocabulary 'longer' and 'shorter'.

| | | |
|---|---|---|
| 180 seconds | **is the same as** | 3 minutes. |
| 90 minutes | **is shorter than** | 2 hours. |
| 48 hours | **is longer than** | 1 day. |

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# Mass and Capacity — Knowledge Organiser

## Key Vocabulary

- mass
- gram
- kilogram
- capacity
- volume
- millilitre
- litre
- lighter
- heavier

## Measure and Compare Mass

Scales can be used to measure grams.

A gram is a unit of measurement that is used to measure the mass of something.

Grams can be written as **g**.

Scales can be used to measure kilograms.

A kilogram is a unit of measurement that is greater than a gram. It is also used to measure the mass of something.

Kilograms can be written as **kg**.

1000g = 1kg

To compare mass, we can use the words 'heavier' and 'lighter'.

## Measure and Compare Capacity

**Capacity** is the amount of liquid a container can hold.

**Volume** is how much liquid is in the container.

Measuring cylinders can be used to measure smaller volumes.

Smaller volumes are measured in millilitres.

Millilitres can be written as ml.

Measuring jugs can be used to measure larger volumes.

Greater volumes are measured in litres.

Litres can be written as l.

1000ml = 1l

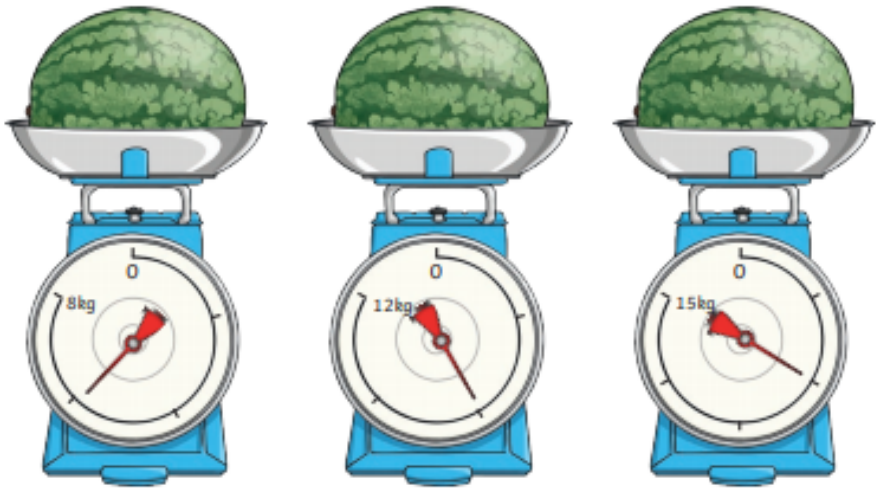
To compare capacities, we can use the word 'full'.

# Reading Scales

# Knowledge Organiser

## Mass

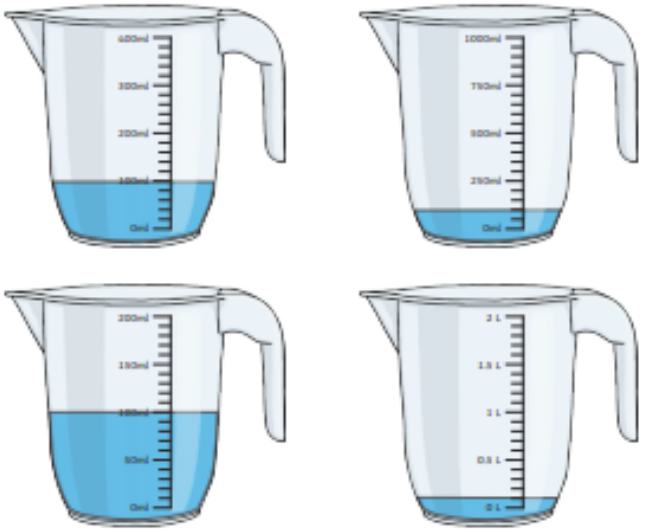
Each of the melons has a mass of 6kg but the arrows are all pointing at different points on the scales. This is because each of the measuring scales have different increments marked on them.




Always look carefully at how the numbers on the scales increase when reading a measurement.

## Capacity

Measuring containers all have different capacities.

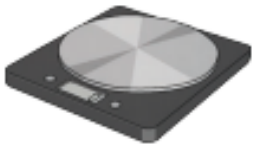


Each of these containers contain the same volume of 100 millilitres but have different capacities and scales. Always look carefully at how the numbers on the scales increase when reading a measurement.

## Add and Subtract Mass

600g + 500g = 1100g = **1kg 100g**

1kg - 300g = 1000g - 300g = **700g**



## Add and Subtract Capacities

800ml + 400ml = 1200ml = **1l 200ml**

1l 300ml – 200ml = **1l 100ml**

# Statistics — Knowledge Organiser

## Key Vocabulary

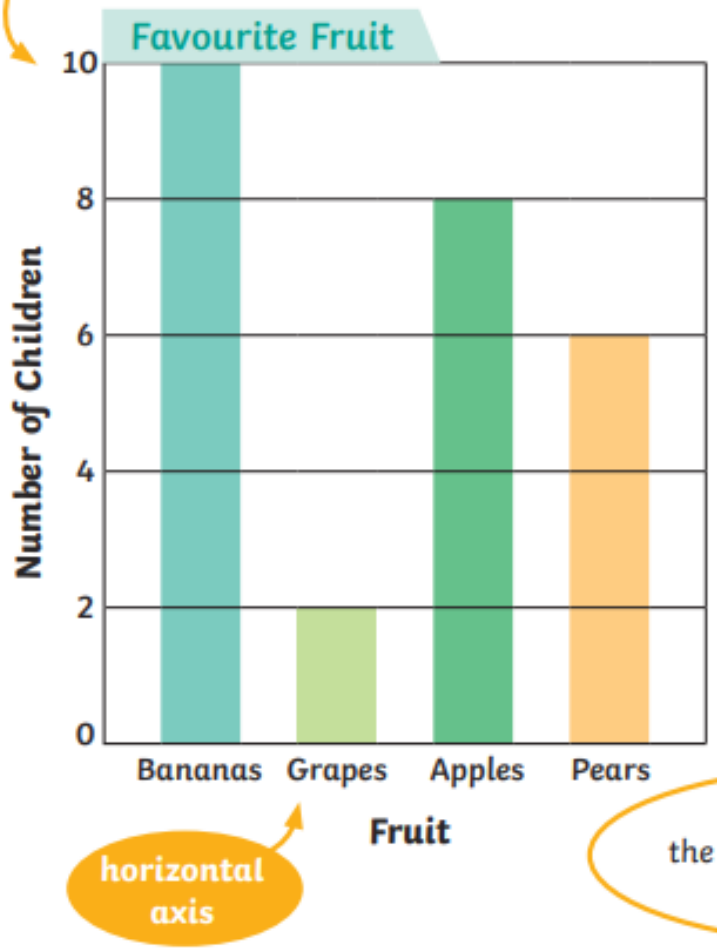
- data
- pictogram
- symbol
- bar chart
- horizontal axis
- vertical axis
- axes
- scale
- intervals
- table
- interpret

## Bar Charts

Bars are used to show the data in each category. There must be a gap between each bar. Bar charts can have different scales.

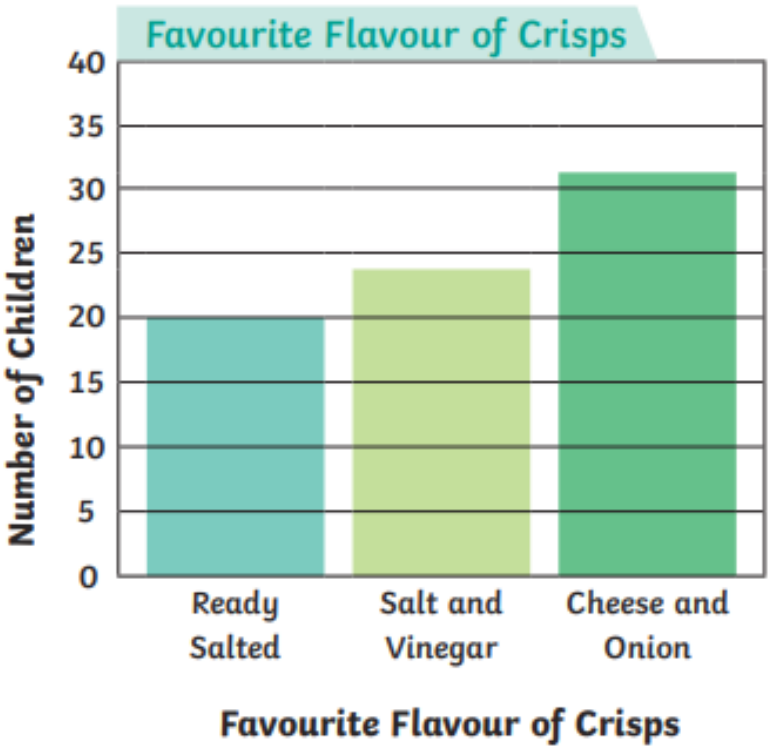
vertical axis

The scale on this bar chart counts in twos.




horizontal axis

The scale on this bar chart counts in fives.




The scale on the bar chart depends on the range of the data.

# Statistics — Knowledge Organiser

## Tables

In order to understand the data presented in a table, you must read the table's title and the headings. Remember to always look at the heading above each piece of information.

title

**Table to Show Ticket Prices at a Local Cinema**

heading

| Ticket Type | Weekday Price | Weekend Price |
|---|---|---|
| Adult | £6 | £7.50 |
| Child | £4 | £4.50 |
| Student | £5.50 | £6 |

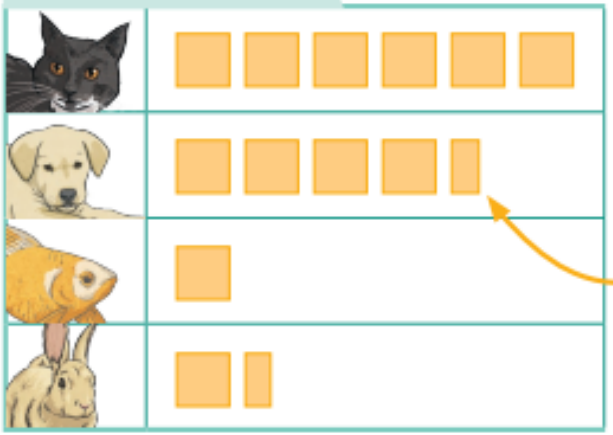
information

Using the table, we can see the cost of an adult and a child visiting the cinema on a Monday would be £10.

## Pictograms

Pictograms use pictures or symbols to represent data. The key shows what each symbol represents. This pictogram uses 1 symbol to represent 2 pets.

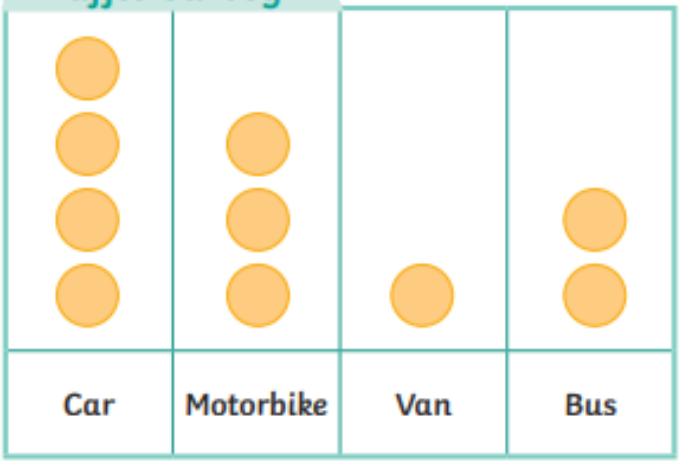
### Class A's Pets



Key
= 2 pets

To represent 1 pet, a picture of half a square is used.

### Traffic Survey



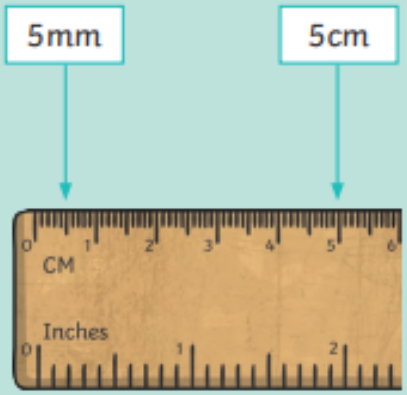

Key
= 8 vehicles

Using the key, we can see that 16 people travel by bus.

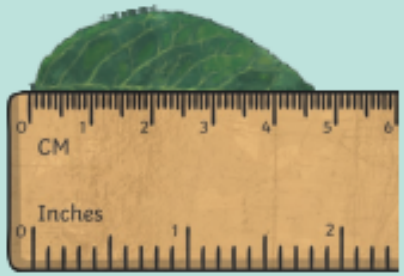
## Key Vocabulary

| |
|---|
| metre (m) |
| centimetre (cm) |
| millimetre (mm) |
| height |
| length |
| width |
| perimeter |
| further/furthest |
| higher/highest |
| longer/longest |
| shorter/shortest |
| taller/tallest |

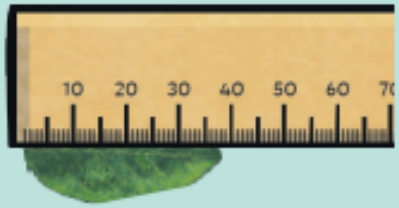
## Measure Length




10mm = 1cm




4cm 6mm

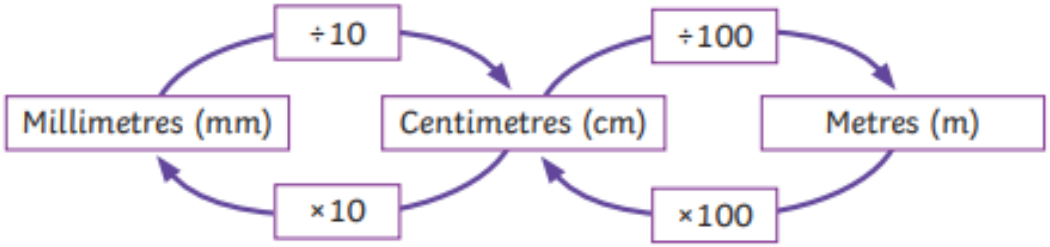



38mm

## Equivalent Length

100 centimetres = 1 metre

10 millimetres = 1 centimetre




| 317cm | |
|---|---|
| 300cm | 17cm |
| 3m | 17cm |
| 3m 17cm | |

# Length and Perimeter

Knowledge Organiser

## Compare Lengths

6mm < 6cm
6cm = 60mm
6mm is shorter than 6cm

320cm > 2m 6cm
320cm > 200cm + 60cm
320cm is longer than 2m 60cm

98mm < 12cm 3mm
98mm < 120mm + 3mm
98mm is shorter than 12cm 3mm

## Add and Subtract Lengths

14cm + 19cm = 33cm
8cm 2mm + 16mm =
98mm or 9cm 8mm

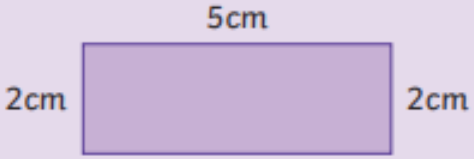
| ? | |
|---|---|
| 8cm 2mm | 16mm |
| 82mm | 16mm |

6m – 2m 28cm
6m – 2m = 4m
4m – 28cm = 3m 72cm

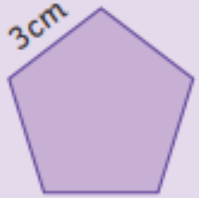
| 6m | |
|---|---|
| 2m 28cm | ? |

## Perimeter

..... = perimeter




5cm + 2cm + 5cm +
2cm = 14cm



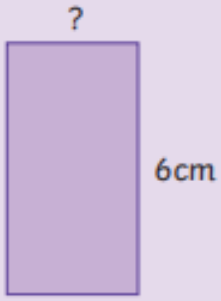

3cm + 3cm +
3cm + 3cm
3cm = 15cm

perimeter = 20cm

6cm + 6cm = 12cm

20cm – 12cm = 8cm

8cm ÷ 2cm = 4cm



# Money

Knowledge Organiser

## Key Vocabulary

- amount
- change
- coin
- combinations
- convert
- note
- pence
- penny
- pounds
- value

## UK Coins

**1p**
one penny coin

**2p**
two pence coin

**5p**
five pence coin

**10p**
ten pence coin

**20p**
twenty pence coin

**50p**
fifty pence coin

**£1**
one pound coin

**£2**
two pound coin

## UK Notes

**£5**
five pound note

**£10**
ten pound note

**£20**
twenty pound note

**£50**
fifty pound note

## Pounds and Pence

£3 and 25 pence

£52 and 13 pence

## Convert Pounds and Pence

120 pence
100 pence is £1
120 pence is £1 and 20 pence.