

Year 4 Maths Knowledge Organisers

Spring



Week 1	Week 2	Week 3	Week 4	Week 5	Half term	Week 1	Week 2	Week 3	Week 4	Week 5
4OPs <u>Place value</u> <u>+ & -</u>	<u>Fractions</u>	<u>Measurement</u>	<u>Geometry</u>				<u>Time</u>		<u>Multiplication</u>	<u>Money</u>



Vocabulary

- Place value
- Ones
- Tens
- Hundreds
- Thousands
- Twenty
- Thirty
- Forty
- Fifty
- Sixty seventy
- Eighty
- Ninety
- Negative numbers

Count in 50s (link with 5s)

50	250	450
100	300	500
150	350	550
200	400	600

1000 more or less

- Identify the thousand digit (E.g. 5432 is 5 thousand)

Th H T O

5 4 3 2

- Add 1 to 5, which means $1000 + 5000 = 6000$ (1000 more than 5432 = 6432)

Th H T O

6 4 3 2

Y3 find 1, 10 or 100 more or less. They do this the same way with numbers less than 1000

Recognise the value of digits

What is the value of 2?

214

- Label the HTO

H T O

2 1 4

- There are 2 hundreds so the value is 200
- Use resources to prove it

H	T	O

2 hundreds

Y4 to the same but with thousands.

- Prove with resources and drawings

Th	H	T	O

1000 more

Ordering

Order from largest to smallest

482 → 1st
428 → 2nd
824 → 3rd
284 → 4th

- Look at the largest digit first (hundreds).

824 Greater
482

- Then go to the next digit if the first digit is the same.

428 Greater
482

Y4 ordering process is the same but includes thousands. Children can use resources in school to prove it.

Children can use resources to prove what is greater than what.

Roman Numerals

Y4 objective only

I = 1

I

V = 5

Visited

X = 10

X-Factor's

L = 50

Last

C = 100

Champion

❖ You cannot have more than 3 of the same letter in a row

e.g. III ~~IIII~~

V and L can only be used one time in a number.

e.g. LVIII = 58 ~~LVIII~~

Place Value

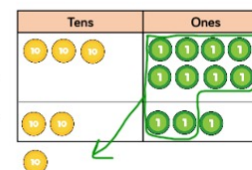
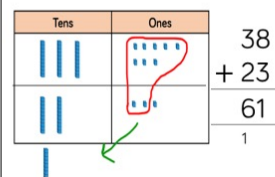
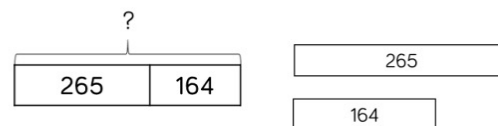
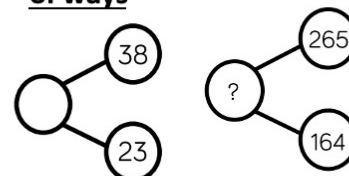
Y3/4



Count in 100s (link with 1s and 10s)

100	600
200	700
300	800
400	900
500	1000

Represent numbers in a variety of ways



Rounding to the nearest 10, 100 or 1000

Round 589 to the nearest ten.

The same process is for rounding to the nearest 100 and 1000

Identify the tens

589

Look at the digit beside the tens

Rounding rhyme – 0,1,2,3,4 stays the number before

5,6,7,8,9 rounds up on the number line

So, rounding 589 to the nearest ten will mean it will round up on the number line because of the 9 digit in the ones.

Rounded up

589 rounded to the nearest 10 = 590

584 would round down as the 4 means it is close to 580

[Click here to return to selection page](#)

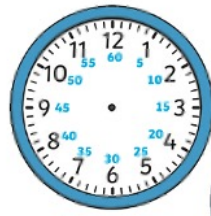
Vocabulary

- Time
- Analogue
- Digital
- Hours
- Minutes
- Seconds
- O'clock
- Half past
- Quarter past/to
- Midday
- Am and pm

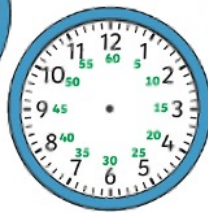
What is time?

Time is what is happening and what has happened. It can be measured using clocks.

How we measure time?



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



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



There are **24 hours** in a day



There are **7 days** in a week.



There are **12 months** in a year.

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



Time Y3/4



Telling the time - o'clock

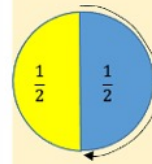
The long hand is the minute hand.



The short hand is the hour hand.

The time is **8 o'clock**.

Half past



Half past is when the minute hand is half way around the clock, so it points to the number 6.

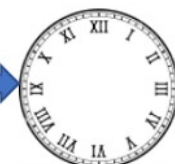
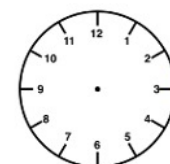


4 o'clock



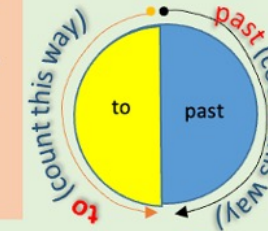
Half past 4

Roman numerals



Past and to (5 minute intervals)

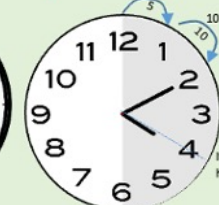
When the minute hand is on this side, you count to see how many minutes it is until the next hour (count this way from 12)



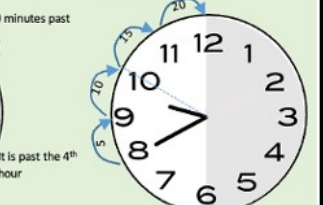
When the minute hand is on this side, you count to see how many minutes it is past the last hour (count in 5s this way from 12)



4 o'clock



10 minutes past 4 o'clock

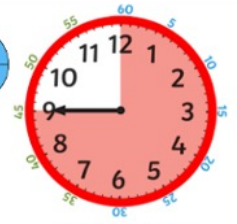
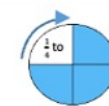


20 minutes to 10 o'clock

Quarter past and to

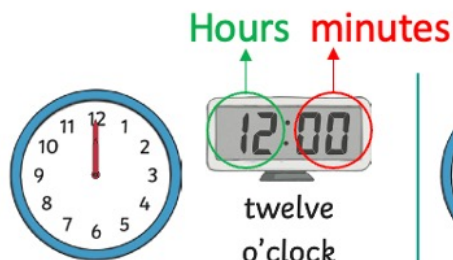


quarter past

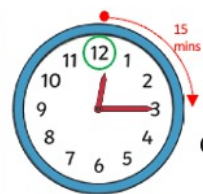


quarter to

Digital and analogue



twelve o'clock



quarter past twelve

[Click here to return to selection page](#)

Vocabulary

- -
- Add
- Plus
- Total
- Sum
- Altogether
- Equals
- Digit
- Tens
- Ones
- Hundreds
- Subtract
- Minus
- Take away
- Regroup

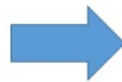
Add and subtract mentally

1. 3 digit and ones

Circle the ones and subtract

$$384 - 3 = 381$$

$$4 - 3 = 1$$



2. 3-digits and tens

Circle the tens and add

$$839 + 60 = 899$$

$$\underline{3} + 6 = 9$$

3. 3-digit and hundreds

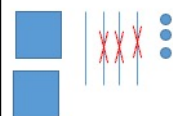
Circle the hundreds

$$649 - 400 = 249$$

$$6 - 4 = 2$$

Prove all with resources and drawings in school. E.g.

$$243 - 30 = 213$$



Column addition (without regrouping)

$$241 + 52 = 293$$

- Write in a column
- Make sure each digit is in the correct column HTO

$$\begin{array}{r} 241 \\ + 52 \\ \hline 293 \end{array}$$

❖ Start with the ones. $1+2=3$

❖ Then go to the tens.

Wrong column as fifty should be in the tens column

HTO

241

+52

—

HTO

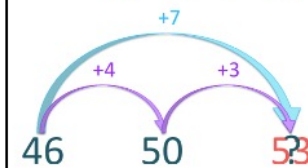
241

+ 52

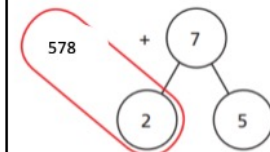
293

Mental addition and subtraction bridging

$$46 + 7 = 53$$



❖ Get to the next ten or hundred and then add the rest.



E.g. $394 - 40 =$
 $404 + 30 = 434$

$$580 + 5 = 585$$

Addition and subtraction Y3/4



Column addition (with regrouping)

$$482 + 138 = 620$$

- Start with ones, $2 + 8 = 10$
So regroup by carrying
The 1 to the tens column
- $8 + 3 + 1 = 12$
Don't forget to add the 1
That you regrouped!
- $4 + 1 + 1 =$

$$\begin{array}{r} \text{HTO} \\ 482 \\ + 138 \\ \hline 620 \end{array}$$

Column subtraction (without regrouping)

$$875 - 254 = 621$$

See the steps in column

addition (without

regrouping)

HTO

875

- 254

621

Column subtraction (with regrouping)

$$875 - 287 = 589$$

- Start with ones, $5 - 7$, you cannot do so regroup by taking one ten from the 7, leaving 6 tens, and put in the ones column to make 15. $15 - 6 = 9$
- Next, the tens. $6 - 8$, you cannot do so regroup by taking one of the hundreds, leaving 7 hundred, and put it in the tens column to make 16. $16 - 8 = 8$
- Finally, $7 - 2 = 5$

$$\begin{array}{r} \text{HTO} \\ 875 \\ - 287 \\ \hline 589 \end{array}$$

You cannot do $5 - 7$ so go to the tens column. Take a ten to leave 6 tens and make 15 in the ones column.

Estimate

$$598 + 242$$

Close to 600

$$600 + 242 = 842$$

So the answer will be close to 842.

[Click here to return to selection page](#)

Vocabulary

- Multiply
- Multiplication
- Lots of
- Times
- Division
- Grouping
- Sharing
- Arrays

What are times tables?

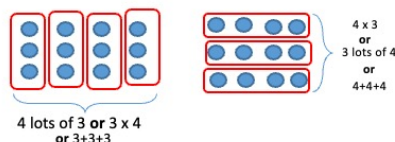
Times tables is when you add the same number multiple times.

$$3 \times 4 = 12$$

Multiplier

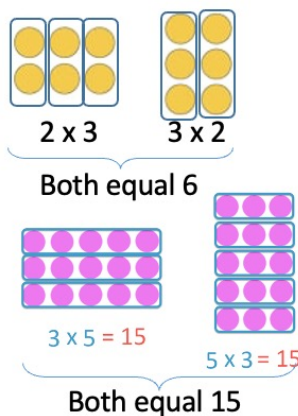
Here we start with 3 and we have 3 four times (3+3+3+3).

You can draw and make this as shown below.



Commutative Law

You can multiply in any order to get the same answer. This only differs the way the number is grouped (see what are times tables).



Apply times tables

If you know $2 \times 8 = 16$, then you know...

$$2 \times 8 = 16$$

$$20 \times 8 = 160$$

$$2 \times 80 = 160$$

Top tip – look at the number of zeros. This tells you if you need to write any zeros in your answer

$$20 \times 80 = 1600$$

20 has a 0 so your answer will have 1 zero as it is 10x greater

In total, 20 and 80 have 2 zeros so the answer will have 2 zeros as it is 100x greater

Important facts

- Anything $\times 0$ is always 0 as you do not have any groups.
E.g. $20 \times 0 = 0$
 $185 \times 0 = 0$
- Dividing by 1 leaves the number unchanged
E.g. $35 \div 1 = 35$
 $124 \div 1 = 124$

Column multiplication

$$324 \times 13$$

- Write the calculation in a column. Make sure the digits are in the correct column.

e.g.
$$\begin{array}{r} \text{HTO} \\ 324 \\ \times 13 \\ \hline \end{array}$$
 X

$$\begin{array}{r} \text{HTO} \\ 324 \\ \times 13 \\ \hline \end{array}$$
 ✓

- Start with multiplying the 3 in 13 with the ones column. So, $3 \times 4 = 12$. Carry the 1 in the number 12 into the tens column.
- Move onto 3×2 (the tens column) and **add the extra 1** that you carried. $3 \times 2 = 6$, add $1 = 7$
- Then, 3×3 (in the hundreds column), which is 9
- You have multiplied the 3 in 13, now move onto the 1 ten in 13.
- Put a zero (0) in the ones column as we are \times by 10 not 1.
- Then follow the same process described in the previous Steps but multiplying each digit by 1 instead ($1 \times 4, 1 \times 2, 1 \times 3$)
- Finally, $972 + 3240 = 4212$. Use the column method (see the addition and subtraction KO for support)

$$\begin{array}{r} \text{HTO} \\ 324 \\ \times 13 \\ \hline 972 \\ \text{HTO} \\ 324 \\ \times 13 \\ \hline 972 \\ + 3240 \\ \hline 4212 \end{array}$$

Multiplication and division Y3/4



Times tables – click the links for the songs

3x - https://youtu.be/QYiK5a40z_8

4x - https://youtu.be/JO66NtuQ_e8

6x - <https://youtu.be/aXITg56os1o>

7x - <https://youtu.be/hsM4FRWJ5yl>

8x - https://youtu.be/yGeJKWQ_e2Y

9x - <https://youtu.be/dEogUYtuiBg>

Inverse

Division is the opposite of multiplication.

So, if you understand that $5 \times 4 = 20$, then you know:

$$20 \div 4 = 5 \text{ and } 20 \div 5 = 4$$

This is because you can divide by grouping the numbers (i.e. counting using the times tables)

$20 \div 5$ simply means: how many 5s are in 20? 5, 10, 15, 20



$20 \div 4$ simply means: how many 4s are there in 20? 4, 8, 12, 16, 20



[Click here to return to selection page](#)

Vocabulary

- Fractions
- Denominator
- Numerator
- Equivalent
- Bar model
- Parts
- Equal
- Tenths
- Half
- Quarters
- Thirds
- Decimal place (DP)

Round decimals to the nearest whole number

Rounding rhyme – 0,1,2,3,4 stays the number before

5,6,7,8,9 rounds up on the number line

4.73

1. Look at the first DP
2. The digit is a 7 so it must round up to 5 as it is closer to 5.

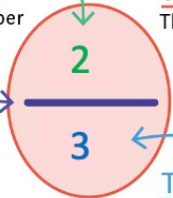
4.73 → 5

[Click here to return to selection page](#)

What is a fraction?

The Numerator

The top half of the fraction. The number of parts you have.



The Fraction

The whole thing!

The line that separates the numerator and the denominator (doesn't have a name).

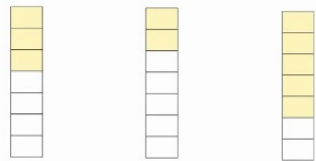
The Denominator

The bottom half of the fraction. The number of parts in a whole.

Adding and subtracting fractions

You do not add or subtract the denominator as this just tells you how many parts there are.

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



$$\frac{3}{7} - \frac{2}{7} = \frac{1}{7}$$



Compare decimals

Look at the first DP. Which is larger?

Which is larger: 0.73 or 0.39?

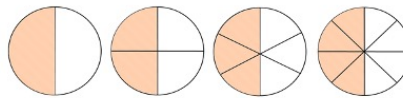
0.73

0.39

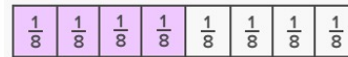
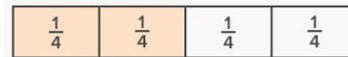
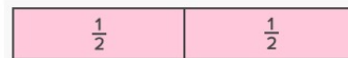
0.73 is larger as 7 is greater than 3

Equivalent fractions

Fractions that have the same value.



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



Fractions and decimals Y3/4



Fractions of an amount

Rule – Divide by the bottom, times by the top.

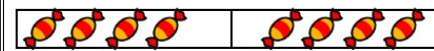
Find $\frac{1}{2}$ of 8.



Divide by 2 (count in twos to help)

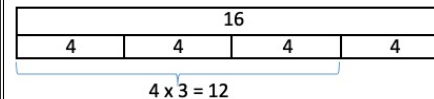
4 and then times by the top

$$4 \times 1 = 4$$



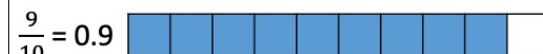
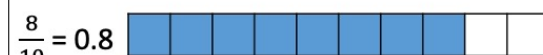
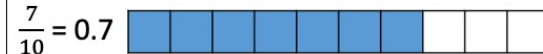
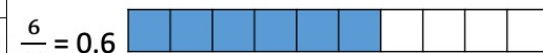
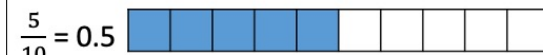
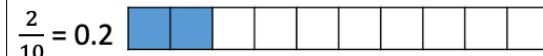
Find $\frac{3}{4}$ of 16.

1. Divide by the bottom. $16 \div 4 = 4$



Count in tenths

Tenths means dividing by 10.



Counting in hundredths

Hundredths means dividing by 100.

$$\frac{1}{100} \quad \frac{2}{100} \quad \frac{3}{100} \quad \frac{4}{100} \quad \frac{5}{100} \quad \frac{6}{100}$$

$$\frac{7}{100}$$

$$\frac{1}{100} = 0.01 \quad \frac{2}{100} = 0.02$$

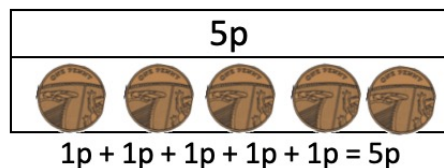
Vocabulary

- Money
- Pence/penny
- Pound (£)
- Value
- Time
- Seconds
- Minutes
- Hours
- Day
- Week
- Month
- Year
- January
- February
- March
- April
- May
- June July August
- September
- October
- November
- December

Value of coins



Adding coins



Children physically use coins to add.



Measurement Y1-3/4



Value of notes



Finding change



What is the change if I pay with £1.98

1. Draw bar model

£1.98		
95p	26p	Change

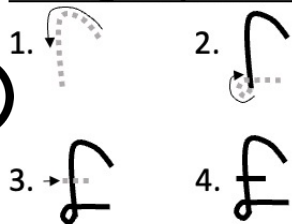
2. Add prices

$$95 + 26 = 121$$

3. Subtract 198p

$$198 - 121 = 77p$$

Writing the pound sign £



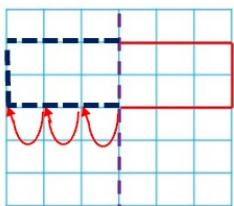
Top tip! Think of a walking stick for the start of the symbol.

[Click here to return to selection page](#)

Vocabulary

- 2D shapes
- 3D shapes
- Square 
- Rectangle 
- Rhombus 
- Quadrilateral (4 sides) 
- Triangle (3 sides) 
- Pentagon (5 sides) 
- Hexagon (6 sides) 
- Heptagon (7 sides) 
- Octagon (8 sides) 
- Angle
- Sides
- Corners
- Edges
- Vertices
- Face/surface
- Sphere 
- Cylinder 
- Cube 
- Cuboid 
- Pyramid 
- Tetrahedron 
- Cone 

Symmetry



Count across from the line of symmetry and count the same on the other side.

Repeat with the rest of the shape.

Making 2D shapes



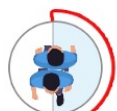
Each stick is a side. Each shape has the same number. Children can also draw them the shapes.

Side
Corner

Angles and turning (children practice turning each of these angles)



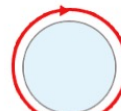
1 right angle
quarter turn
90°



2 right angles
2 quarter turns or half turn
180°



3 right angles
3 quarter turns
270°



4 right angles
4 quarter turns or full turn
360°

Types of lines

https://youtu.be/OQ_JJNXXDzE

Horizontal



Vertical



Perpendicular Lines



Parallel Lines

Geometry

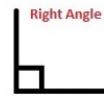
Y3/4



Types of angles



Acute Angle
Less than 90°



Right Angle
Exactly 90°



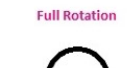
Obtuse Angle
Greater than 90° but less than 180°



Straight Angle
Exactly 180°



Reflex Angle
Greater than 180°

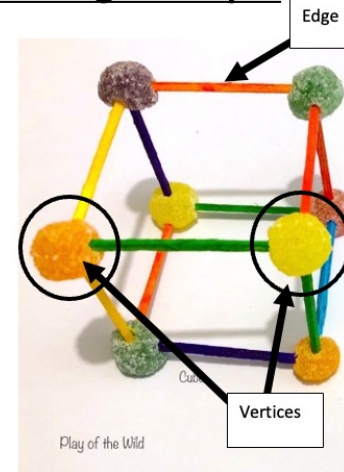


Full Rotation
Exactly 360°

The children would use right angle measurers to help them at first. Then they strive to identify them without thinking.

This angle is less than 90 degrees so it is an acute angle.

Making 2D shapes



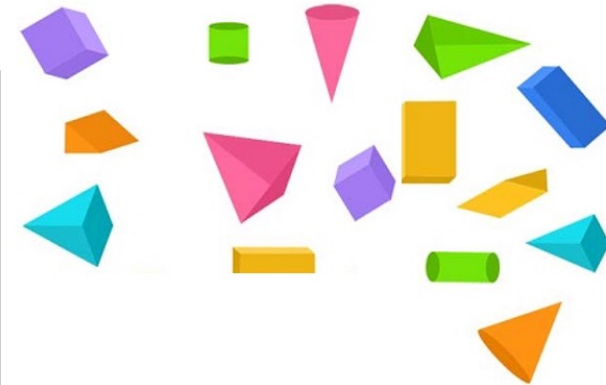
Edges and vertices make a face. This face/surface is a triangle

Square-based pyramid



Children must become familiar with 3D shapes by making and exploring them to understand their properties (what makes them that shape). They then can go onto recognising them in different orientations (see below).

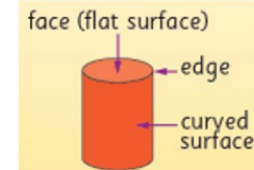
3D shapes in different orientations



Once children know the properties, they can justify how they know what each shape is.

Flat and curved faces/surfaces

A curved surface wraps around
An edge as there is no vertex.



[Click here to return to selection page](#)

Vocabulary

- Bar charts
- Pictograms
- Tables
- Line graphs
- Scale
- X-axis
- Y-axis
- Data

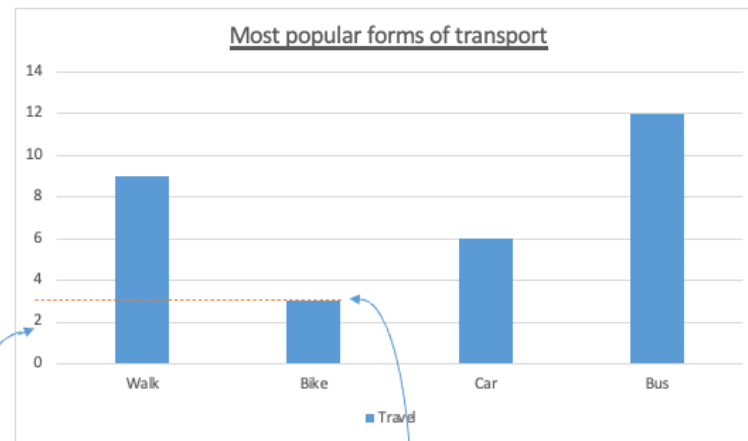
Any graph, chart or table displays data (information)

Tables and tally charts

Method of Travel	Tally	Frequency
Walk		9
Bike		3
Car		6
Bus		12
TOTAL		30

Tally charts are used to organise a value in the table. E.g. ||||| This takes a while to recognise the value; whereas ||| ||| ||| is 13.

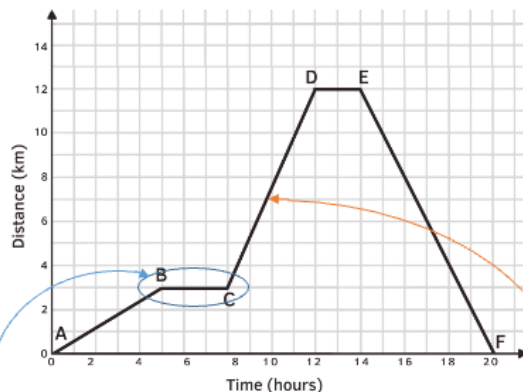
Bar chart



Scale (counting in 2s)

- To interpret a bar chart, children must draw a line to check the value of a bar.
- To draw a bar chart, the children must decide on a suitable scale, make sure the bars are an equal distance apart and the same thickness.

Time graph



- A straight horizontal line means that time is passing but the distance remains the same (no movement).
- A rapid jump up means there is lots of movement as very little time passes but lots of distance is covered.
- Children must understand the more something moves to the right, it impacts the x-axis; the more something rises or falls, the more the y-axis is impacted.

Statistics



Y3/4

Tables and tally charts

Monday



Tuesday



Wednesday



Thursday



Friday



Saturday



Sunday



$$6 \times 5 = 30$$



- Children must decide on a suitable scale (in this case, it is 6)
- Splitting a picture in half means it is half the value (e.g. 🍪 = 3)
- Questions may ask which day was most cupcakes sold. The pictogram shows Saturday was the most.
- Use times tables to calculate the total (e.g. Saturday = $10 \times 6 = 60$)
- Alternatively, a question may ask for the difference between Saturday and Tuesday. Saturday = 60 Tuesday = 6×2 then $+ 3 = 15$
- $60 - 15 = 45$ cupcakes

[Click here to return to selection page](#)

Vocabulary

- Measure
- Compare
- Add
- Subtract
- Mass
- Volume
- Millilitres (ml)
- Litres (l)
- Kilograms (kg)
- Grams (g)
- Metres (m)
- Centimetres (cm)
- Millimetres (mm)
- Perimeter

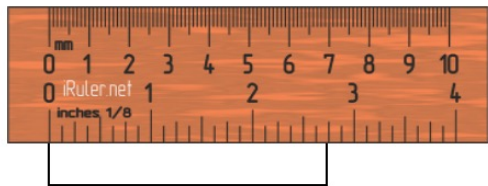
Money

£1.32=132p

Do not write both
£ and p

e.g. ~~£1.32p~~

Using a ruler



1. Place the zero on the ruler in line with the place you are starting
2. Make sure the ruler is straight
3. Count along

Selecting equipment and units

Large spaces you must use trundle wheels to measure in metres

e.g. The playground



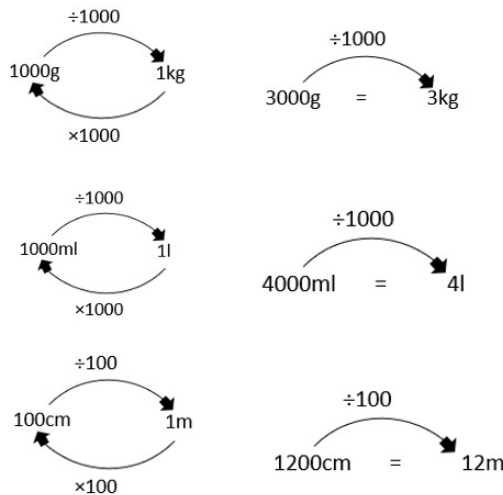
Any object longer than 30cm but shorter than 1m should be measured with a ruler



Anything less than 30cm should be measured with a ruler



Conversion



Measurements

Y3/4



Finding change



What is the change if I pay with £1.98

1. Draw bar model

£1.98		
95p	26p	Change

2. Add prices

$$95 + 26 = 121$$

3. Subtract 198p

$$198 - 121 = 77p$$

Perimeter

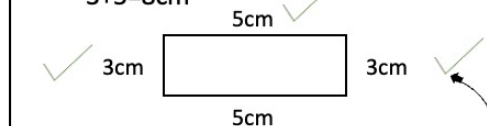
Perimeter is the distance around a shape. You must add up all of the lengths to calculate it

e.g.



1. Add the first 2 numbers

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



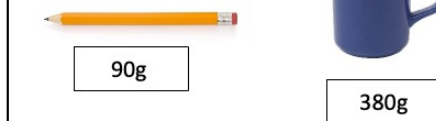
2. Tick off the numbers you have added and add the next number

$$8 + 3 = 11\text{cm}$$

3. Add the final number

$$11 + 5 = 16\text{cm}$$

How much heavier



1. Draw a bar model

380g	
90g	How much bigger

Bigger because it is a much bigger number

2. Subtraction

$$380 - 90 = 290$$

[Click here to return to selection page](#)