

**Support for parents
on Mathematical
methods
Part 2**

Graphs

Pictogram

A Pictogram is a Graph using pictures. There is a key which explains what each colour represents. The pictogram below shows the colours of cars which drove past the school in an hour.

Colour	Number of Cars
Red	
White	
Green	
Blue	
Grey	
Yellow	
	Key=  10 car

The key states that each picture of a car represents 10 cars, therefore a picture of half a car represents 5 cars.

Therefore, if we consider the red cars, there is a picture of 3 whole cars, therefore, $3 \times 10 = 30$ of the cars that drove past were red.

Looking at the white cars, there are 3 and a half cars, therefore there are $10 + 10 + 10 + 5 = 35$ white cars drove past.

To finish the pictogram, Green = 10;

Blue = 20;

Grey = 25;

Yellow = 40

We can analyse from the pictogram that the yellow cars are the most popular in this sample.

We can also see how many cars passed the whole hour.

$$30 + 35 + 20 + 25 + 40 = 150$$

Graphs

Tally chart and Bar Graph

A bar chart or bar graph may be often used to show results collected on the tally table. (Tally marks can be used to mark the amount |)

For example Jac creates a tally chart to count how many people of each different eye colour are in his registration class. He puts a tally next to each correct eye colour on his tally chart for each pupil. This is how his completed tally chart looks.

Eye Colour	Tally marks	Frequency
Brown		7
Blue		10
Green		5
Amber		2
	Total	24

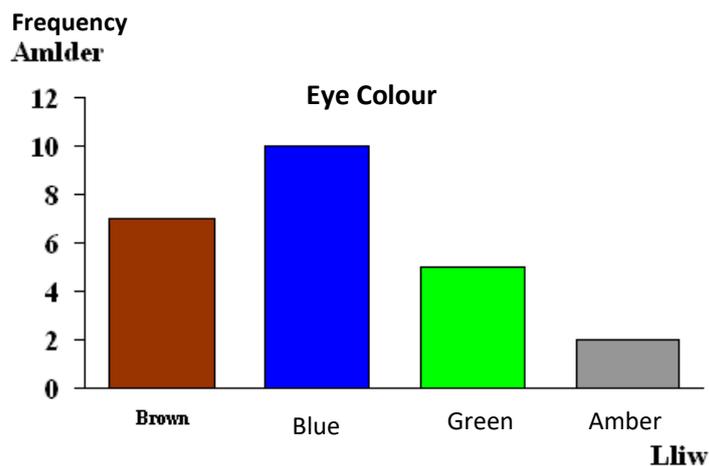
Draw a bar graph of the results.

These are the important things to remember when drawing a bar graph:-

You must leave gaps between bars

The width of the bars should be the same, and the gaps in between should be the same

The graph should have a title and the axes should be labelled.



GRAPHS

Frequency Diagram

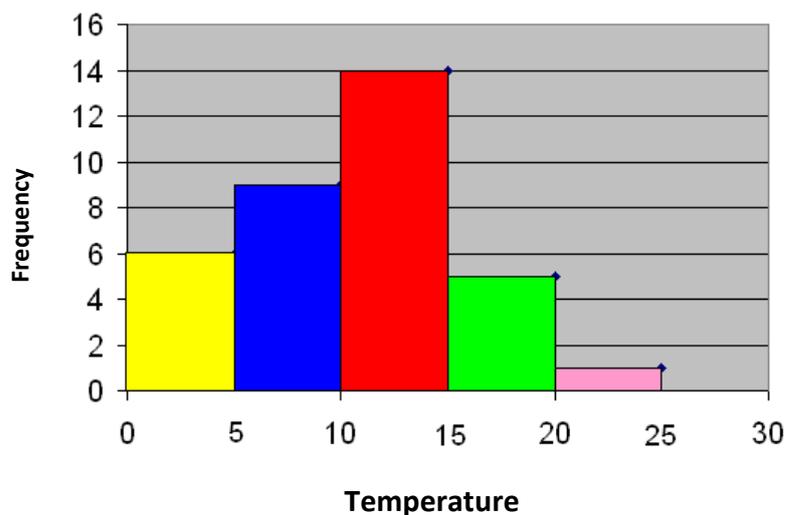
A frequency diagram is used to show continuous data that's been **grouped**

Continuous data is a set of groups where there is no gap between the groups.

Temperature	Frequency
$0 \leq x < 5$	6
$5 \leq x < 10$	9
$10 \leq x < 15$	14
$15 \leq x < 20$	5
$20 \leq x < 25$	1

There are no gaps in a frequency diagram which groups continuous data. However, all the other rules are the same as for a bar graph.

Diagram of a frequency diagram



Make sure you share your groups with a gap of the same size.

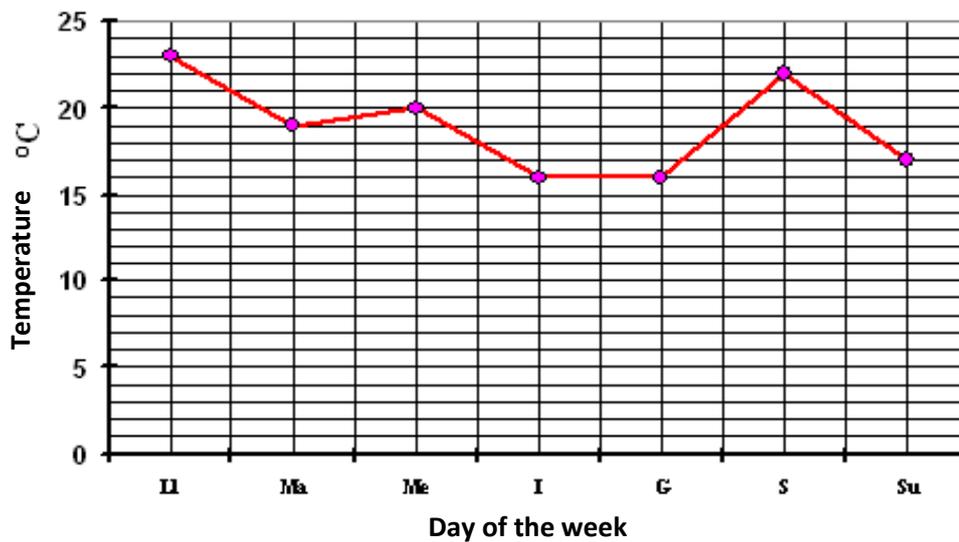
GRAPHS

Line Graph

A line graph can be drawn by plotting points, then connecting them to make straight lines.

Day of the week	Li	Ma	Me	I	G	Sa	S
Temperature °C)	23°	19°	20°	16°	16°	22°	17°

Temperature at midday



GRAPHS

Pie Chart

Before drawing a pie chart, you need a set of results, and reciprocate each result in an angle. To do this, follow these steps:

1. Add all your results in your sample together to find out the size of each sample.
2. For each result, divide its size by the total number of people in the sample.
3. Multiply this answer by 360 (number of angles in the whole circle).

Example In a survey, people were asked which of the 5 musical instruments they played. The answers are shown in the table. Show the information using a pie chart.



Offeryn cerdd	
Gitar	35
Ffidil	10
Recorder	15
Drwm	5
Allweddell	25
Cyfanswm	90

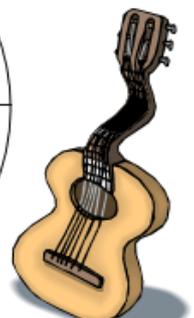
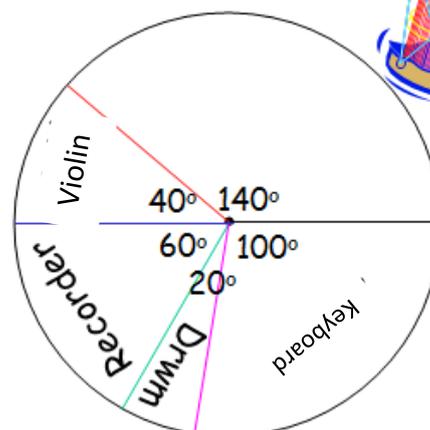
$$= \frac{35}{90} \times 360 = 140^\circ$$

$$= \frac{10}{90} \times 360 = 40^\circ$$

$$= \frac{15}{90} \times 360 = 60^\circ$$

$$= \frac{5}{90} \times 360 = 20^\circ$$

$$= \frac{25}{90} \times 360 = 100^\circ$$





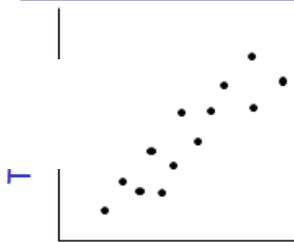
Scatter diagram

Correlation=Cyberthyniad



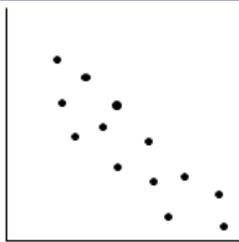
2. **Negative** correlation. One item is increasing while the other is decreasing.

3. **No** correlation. There is no clear pattern between the two items



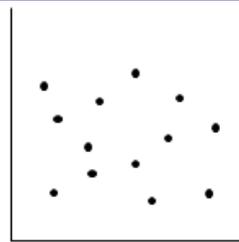
Shoe size

Positive Correlation



Temperature

Negative Correlation



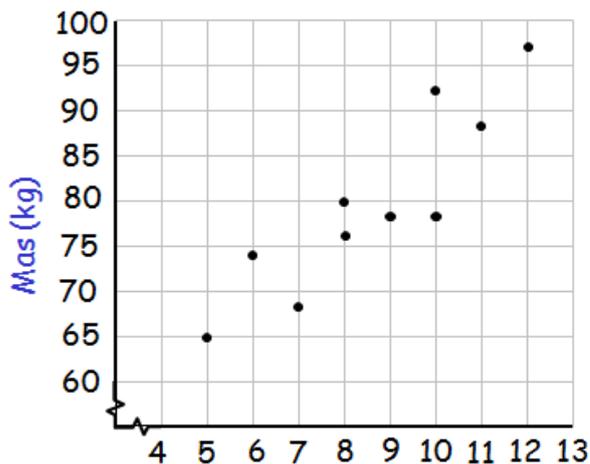
Wage

No Correlation

(1) The table below shows shoe size and mass of 10 men.

(a) Draw a scatter diagram and draw the best fit line

Size	5	12	7	10	10	9	8	11	6	8
Mas	65	97	68	92	78	78	76	88	74	80



GRAPHS

Histogram

A histogram looks like a bar chart, but there are important differences:

- There are no gaps between the bars
- The size of the groups can be equal or unequal
- We measure the area of the bars rather than the height.

To calculate the height of the bars, we must calculate the density frequency.

$$\text{Frequency density} = \frac{\text{Frequency}}{\text{Width of the group}}$$

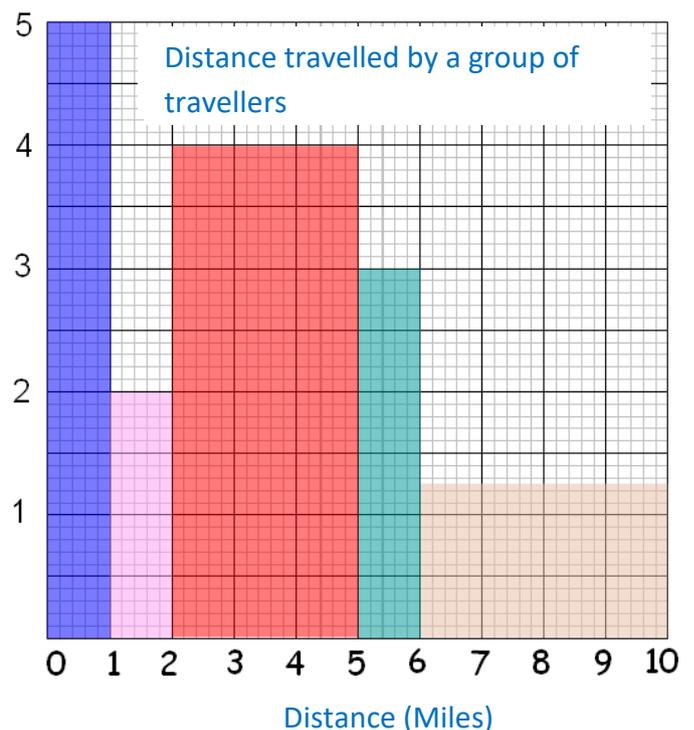
After counting the axes, with consistent scales, plot a bar which has the number of groups across and the frequency density

Example This frequency table shows the distances travelled by a group of walkers on a weekend. Draw a histogram to show this information.

Distance	Frequency	Frequency density
$0 \leq d < 1$	5	$5 \div 1 = 5$
$1 \leq d < 2$	2	$2 \div 1 = 2$
$2 \leq d < 5$	12	$12 \div 3 = 4$
$5 \leq d < 6$	3	$3 \div 1 = 3$
$6 \leq d < 10$	5	$5 \div 4 = 1.25$

This is the data we have in the question.

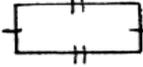
This is the calculations for the frequency density.



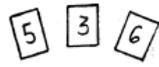
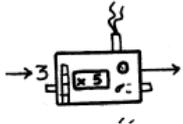
NUMERACY VOCABULARY

Termau Mathemategol

Rhifedd	Symbol/Enghraifft	<i>Numeracy</i>
Adio	+	<i>Add</i>
Benthyg		<i>Borrow</i>
Canfed	0.01	<i>Hundredth</i>
Cannoedd	300	<i>Hundreds</i>
Degau	20	<i>Tens</i>
Degfed	0.1	<i>Tenth</i>
Degolyn	0.287	<i>Decimal</i>
Digid		<i>Digit</i>
Gweddill		<i>Remainder</i>
Lleiaf		<i>Smallest</i>
Lluosi	x	<i>Multiply</i>
Maint		<i>Size</i>
Milfed	0.001	<i>Thousandths</i>
Miloedd	5000	<i>Thousands</i>
Mwyaf		<i>Greatest</i>
Pwynt degol	.	<i>Decimal point</i>
Rhanu		<i>Divide</i>
Rhif	6	<i>Number</i>
Tynnu	-	<i>Subtract</i>
Uned		<i>Unit</i>
Onglau		<i>Angles</i>
Cloewedd		<i>Clockwise</i>
Cyfeiriant		<i>Bearing</i>
Fertig		<i>Vertex</i>
Gradd		<i>Degree</i>
Gwrthgloc		<i>Anti-clockwise</i>
Ongl		<i>Angle</i>
Ongl aflem		<i>Obtuse angle</i>
Ongl atblyg		<i>Reflex angle</i>
Ongl lem		<i>Acute angle</i>
Ongl sgwar		<i>Right angle</i>
Ongl syth		<i>Straight angle</i>
Onglydd		<i>Protractor</i>
Tro		<i>Turn</i>

Y Systemau Metrig Ac Imperial		<i>The Metric and Imperial Systems</i>
Arwynebedd		<i>Area</i>
Centimetr	cm	<i>Centimetre</i>
Hyd		<i>Length</i>
Kilometr	km	<i>Kilometre</i>
Llathen		<i>Yard</i>
Lled		<i>Width</i>
Màs		<i>Mass</i>
Mesur		<i>Measure</i>
Metr	m	<i>Metre</i>
Milimetr	mm	<i>Millimetre</i>
Milltir		<i>Mile</i>
Modfedd	"	<i>Inch</i>
Owens		<i>Ounce</i>
Perimedr		<i>Perimeter</i>
Petryal		<i>Rectangle</i>
Pren mesur		<i>Ruler</i>
Pwys		<i>Pound</i>
Pwysau		<i>Weight</i>
Sgwar		<i>Square</i>
Stôn		<i>Stone</i>
Taldra/Uchder		<i>Height</i>
Troedfedd	'	<i>Foot</i>
Tunnell		<i>Tonne</i>
Ffracsiynau		<i>Fractions</i>
Chwarter		<i>Quarter</i>
Degfed		<i>Tenth</i>
Enwadur		<i>Denominator</i>
Ffracsiwn		<i>Fraction</i>
Ffracsiwn pendrwm		<i>Improper fraction (top-heavy fraction)</i>
Ffracsiynau hafal (Cywerth)		<i>Equivalent fractions</i>
Hanner		<i>Half</i>
Rhif cymysg		<i>Mixed number</i>
Rhifadur		<i>Numerator</i>
Symleiddio		<i>Simplify (cancel down)</i>
Trydydd (Traean)		<i>Third</i>

Trafod Data		Handling Data										
Amhosibl		<i>Impossible</i>										
Amllder		<i>Frequency</i>										
Amlledd cymharol	$\frac{5}{20} = 0.25$	<i>Relative frequency</i>										
Anhebygol		<i>Improbable</i>										
Arolwg		<i>Survey</i>										
Cyfuniad		<i>Combination</i>										
Digwyddiad		<i>Event</i>										
Dosraniad/tabl amledd	<table border="1"> <thead> <tr> <th>Person</th> <th>Person</th> <th>Person</th> <th>Person</th> <th>Person</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>6</td> <td>4</td> <td>3</td> <td></td> </tr> </tbody> </table>	Person	Person	Person	Person	Person	1	6	4	3		<i>Frequency distribution/table</i>
Person	Person	Person	Person	Person								
1	6	4	3									
Echelin		<i>Axis</i>										
Hap	?	<i>Random</i>										
Llinell/Graddfa Tebygolrwydd		<i>Probability line/scale</i>										
Pictogram		<i>Pictogram</i>										
Siart bar		<i>Bar chart</i>										
Siart cylch		<i>Pie chart</i>										
Siart rhibren/tali		<i>Tally chart</i>										
Siawns		<i>Chance</i>										
Sicr		<i>Certain</i>										
Tebygol		<i>Probable</i>										
Tebygolrwydd	$\frac{1}{3}$	<i>Probability</i>										
Teg/Diduedd		<i>Fair/Unbiased</i>										
Tueddol		<i>Biased</i>										
Yr un mor debygol		<i>Equally likely</i>										

Patrymau Rhif		Number Patterns
Allbwn		Output
Cerdyn rhif		Number card
Dilyniant		Sequence
Eilrif	2, 4, 6, 8, 10	Even number
Mewnbwn		Input
Odrif	1, 3, 5, 7, 9	Odd number
Patrwm		Pattern
Peiriant rhif		Number machine
Rheol	$1, 4, 7, 10, 13, \dots + 3$	Rule
Rhif cysefin	2, 3, 5, 7	Prime number
Rhif nesaf	3, 8, 13, 18	Next number
Rhif Sgwâr	1, 4, 9, 16 $1^2, 2^2, 3^2, 4^2$	Square number
Symleiddio	$4a + 3a = 7a$	Simplify
Term	a	Term
Rhif nesaf	3, 8, 13, 18	Next number
Rhif Sgwâr	1, 4, 9, 16 $1^2, 2^2, 3^2, 4^2$	Square number
Symleiddio	$4a + 3a = 7a$	Simplify
Term	a	Term
Termau anghyffelyb	x, 2y, 4z	Unlike terms
Termau cyffelyb	a, 5a, 3a,	Like terms

Cyfesurynnau		Coordinates
Croeslin		<i>Diagonal</i>
Cyfesuryn		<i>Coordinate</i>
Echelin		<i>Axis</i>
Echelinau		<i>Axes</i>
Fertigol		<i>Vertical</i>
Grid		<i>Grid</i>
Lleoli		<i>Locate</i>
Lleoliad		<i>Location</i>
Llorweddol		<i>Horizontal</i>
Negyddol		<i>Negative</i>
Pedranr		<i>Quadrant</i>
Pwynt		<i>Point</i>
Tardd/tarddle		<i>Origin</i>
Cymesuredd		Symmetry
Adlewyrchiad		<i>Reflection</i>
Adlewyrchu		<i>Reflect</i>
Cylchdro		<i>Rotation</i>
Cylchdroi		<i>Rotate</i>
Cymesuredd cylchdro		<i>Rotational symmetry</i>
Drych		<i>Mirror</i>
Llinell/ echelin cymesuredd		<i>Line/Axis symmetry</i>
Trefn		<i>Order</i>
Rhifau Cyfeiriol		Directed Numbers
Amrediad tymheredd		<i>Temperature range</i>
Gorddraft		<i>Overdraft</i>
Is		<i>Lower</i>
Minws/Diffyg	-	<i>Minus</i>
Rhif negyddol/negatif	-2	<i>Negative number</i>
Sero	0	<i>Zero</i>
Sgôr safonol		<i>Par score</i>
Thermomedr		<i>Thermometer</i>
Tymheredd	°c	<i>Temperature</i>
Uwch		<i>Higher</i>
Offer		Equipment
Cwmpas		<i>Compass</i>
Cyfrifiannell		<i>Calculator</i>
Onglydd		<i>Protractor</i>
Papur dargopio		<i>Tracing paper</i>
Pren mesur		<i>Ruler</i>