TYPES OF DATA AND GRAPHS

Key Concepts

Qualitative data: data collected that is described in words **not** numbers.
e.g. race, hair colour, ethnicity.
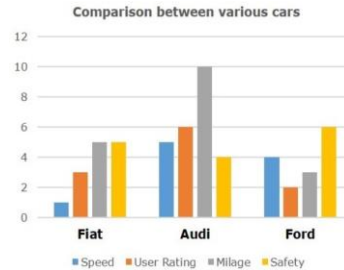
Quantitative data: this is the collection of numerical data that is either <u>discrete</u> or <u>continuous</u>.

Discrete data: numerical data that is categorised into a finite number of classifications.
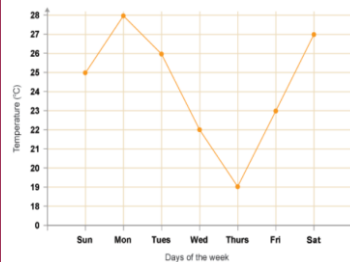e.g. number of siblings in a family, shoe size, .

Continuous data: numerical data that can take any value. This data is usually measured on a large number scale.
e.g. height, weight, time, capacity.
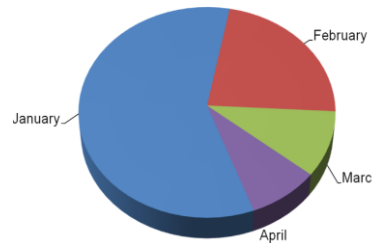
Examples

Comparative bar charts

Comparison between various cars

Fiat   Audi   Ford
■ Speed ■ User Rating ■ Milage ■ Safety

Tally charts

Colour	Tally	Frequency
Red	卌 卌 III	13
Blue	卌 IIII	9
White	卌 卌 卌 卌 卌 IIII	24
Black	卌 卌 II	12
Other	卌 IIII	9

Composite bar charts

■ Iron
■ Carbon
■ Aluminum

Weight (gm)

A   B   C
Sample

Line graphs

Sun Mon Tues Wed Thurs Fri Sat
Days of the week

Pie charts

Sales split month wise

January
February
March
April

Pictograms

Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
Sunday
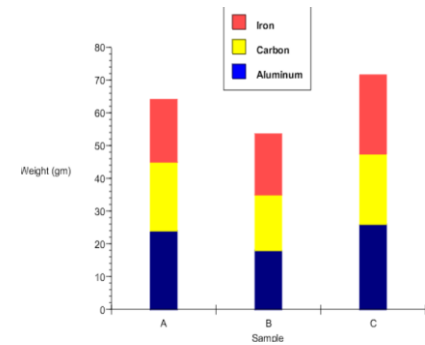
= 6 cupcakes

sparx

U363 U557

U506 U508

U983 U814

Key Words
Data
Discrete
Continuous
Qualitative
Quantitative
Graph

What types of data is each of the following?

1) Eye colour
2) Time it takes to run 100m
3) Number of goals scored in a match
4) Length of a car (to the nearest cm)
5) Number of pets a person owns

PIE CHARTS AND SCATTER-GRAPHS

Key Concepts

Pie charts use angles to represent proportionally the quantity of each group involved.

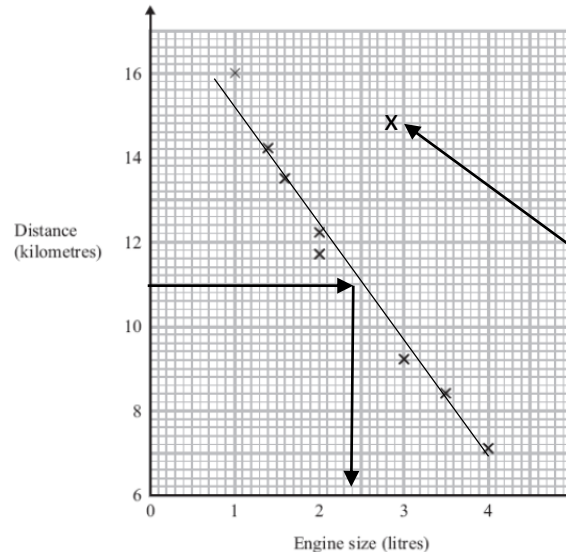Pie charts can only be compared to one another when populations are given.

Scatter-graphs show the relationship between two variables. This relationship is called the **correlation**.

Positive   Negative   No Correlation
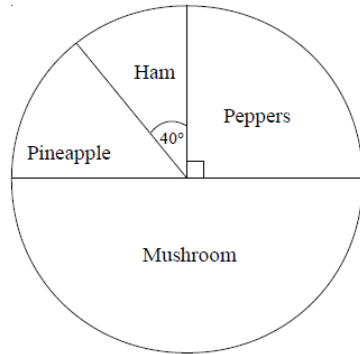
Examples

Topping	Frequency	Angle of Sector
Peppers	18	90º
Mushroom	36	180º
Pineapple	10	50º
Ham	8	40º
	72	360º

$$\frac{360}{72} = 5$$

$\times 5$

A scatter-graph is drawn to show the relationship between the engine size of a car and how far it can travel.

It shows negative correlation.

This is an outlier.

We draw a line of best fit through the middle of the data points to read from to estimate readings. For example, estimating the engine size of a car that can travel 11km would be 2.5 litres.
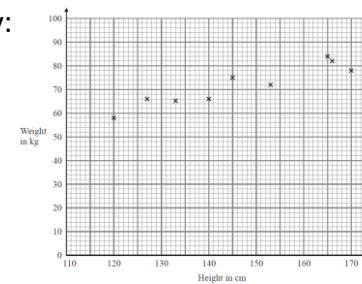
Key Words
Pie chart
Scatter-graph
Correlation
Outlier
Variable

1) Calculate the angle for each category:

Region	Frequency
Southern England	9
London	23
Midlands	16
Northern England	12
Total	60

2a) What type of correlation is shown?
b) Using a line of best fit estimate the weight when the height is 135cm.

ANSWERS: 1) 54, 138, 96, 72   2) a) positive b) 64kg-66kg
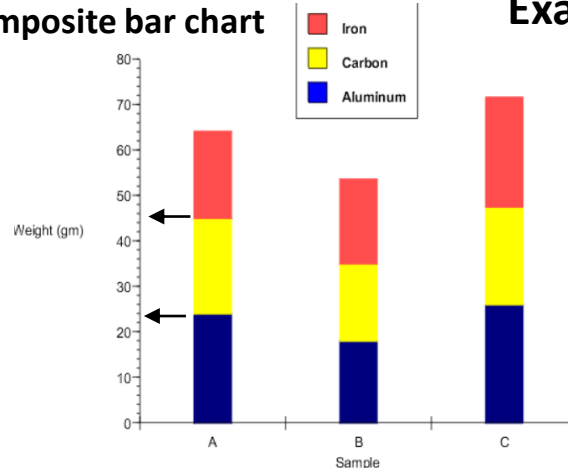
BAR CHARTS AND PICTOGRAMS

Key Concepts

Bar charts are a visual representation of **categorical** data.

Composite bar charts are bar charts that display multiple data points stacked on top of one another.

Pictograms uses an image relating to a physical object to represent an amount. A **key** must be included to show the value of each picture.

Examples

Composite bar chart

Legend: Iron (red), Carbon (yellow), Aluminum (blue)

Weight (gm) — y-axis 0 to 80
Sample A, B, C — x-axis

1) How much aluminium is in sample A? **24g**
2) Hoe much carbon is in sample A?

46 – 24 = 22g

Highest value for carbon in sample A.

Lowest value for carbon in sample A.

Pictogram

Monday
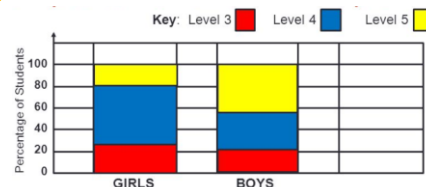Tuesday
Wednesday
Thursday
Friday
Saturday
Sunday

= 6 cupcakes

1) How many cupcakes were sold on Monday?
5 × 6 = 30 cupcakes
2) What does half a cupcake represent on the pictogram?
6 ÷ 2 = 3 cupcakes
3) How many cupcakes were sold on Thursday?
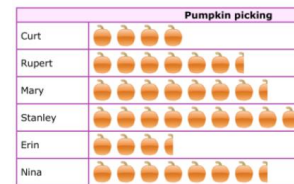**3.5 × 6 = 21 cupcakes**

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Key Words
Bar chart
Composite
Pictogram
Key
Categorical
Data set

Key: Level 3 (red), Level 4 (blue), Level 5 (yellow)

Percentage of Students — y-axis 0 to 100
GIRLS, BOYS — x-axis

1a) What percentage of boys are level 3?
b) What percentage of girls are level 4?

Pumpkin picking

Curt
Rupert
Mary
Stanley
Erin
Nina

Each 🎃 = 2 pumpkins

2a) How many pumpkins were picked by Stanley?
b) What does half a pumpkin represent?
c) How many pumpkins were picked by Erin?

AVERAGES FROM A TABLE

Key Concepts

Modal class (mode)
Group with the highest frequency.

Median group
The median lies in the group which holds the $\frac{total\ frequency+1}{2}$ position. Once identified, use the cumulative frequency to identify which group the median belongs from the table.

Estimate the mean
For grouped data, the mean can only be an estimate as we do not know the exact values in each group. To estimate, we use the midpoints of each group and to calculate the mean we find $\frac{total\ fx}{total\ f}$.

Examples

Length (L cm)	Frequency (f)	Midpoint (x)	fx
$0 < L \leq 10$	10	5	10 × 5 = 50
$10 < L \leq 20$	15	15	15 × 15 = 225
$20 < L \leq 30$	23	25	23 × 25 = 575
$30 < L \leq 40$	7	35	7 × 35 = 245
Total	55		1095

a) Estimate the mean of this data.
step 1: calculate the total frequency
step 2: find the midpoint of each group
step 3: calculate $f \times x$
step 4: calculate the mean shown below

$$\frac{Total\ fx}{Total\ f} = \frac{1095}{55} = 19.9cm$$

b) Identify the modal class from this data set. **" the group that has the highest frequency "**
Modal class is $20 < x \leq 30$

c) Identify the group in which the median would lie. Median $= \frac{Total\ frequency+1}{2} = \frac{56}{2} = 28th\ value$

" add the frequency column until you reach the 28th value " Median is the in group $20 < x \leq 30$

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Key Words
Midpoint
Mean
Median
Modal

Cost (£C)	Frequency	Midpoint	
$0 < C \leq 4$	2		
$4 < C \leq 8$	3		
$8 < C \leq 12$	5		
$12 < C \leq 16$	12		
$16 < C \leq 20$	3		

From the data:
a) Identify the modal class.
b) Identify the group which holds the median.
c) Estimate the mean.

ANSWERS: a) $12 < C \leq 16$ b) $\frac{25+1}{2} = 13^{th}$ value is in the group $12 < C \leq 16$ c) $\frac{294}{25} = £11.76$