

# TYPES OF DATA AND GRAPHS

## Key Concepts

**Qualitative data:** data collected that is described in words **not** numbers.

e.g. race, hair colour, ethnicity.

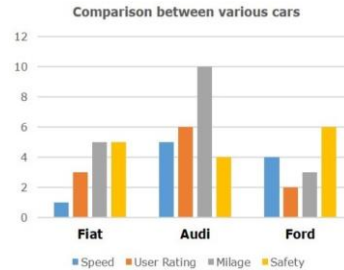
**Quantitative data:** this is the collection of numerical data that is either discrete or continuous.

**Discrete data:** numerical data that is categorised into a finite number of classifications.

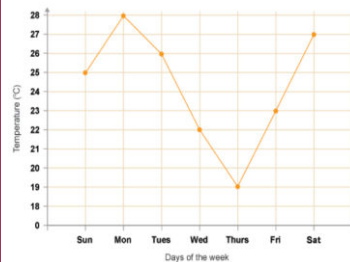
e.g. number of siblings in a family, shoe size, .

**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.

## Comparative bar charts



## Line graphs



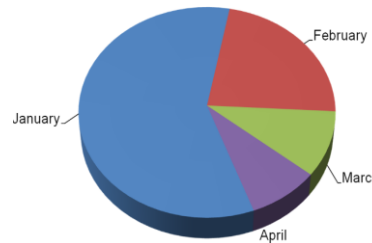
## Examples

### Tally charts

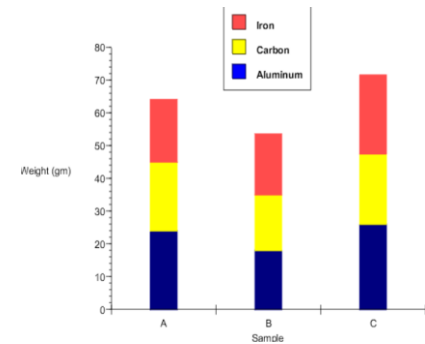
Colour	Tally	Frequency
Red		13
Blue		9
White		24
Black		12
Other		9

### Pie charts

Sales split month wise



## Composite bar charts



## Pictograms



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## 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

ANSWERS: 1) Qualitative 2) Continuous, quantitative 3) Discrete, quantitative 4) Continuous, quantitative 5) Discrete, quantitative

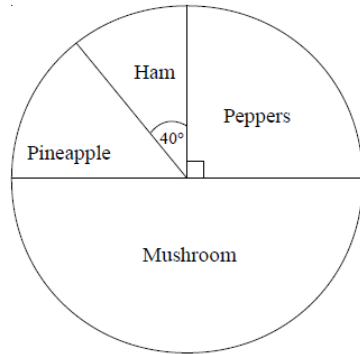
# PIE CHARTS AND SCATTER-GRAPHS

## 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.

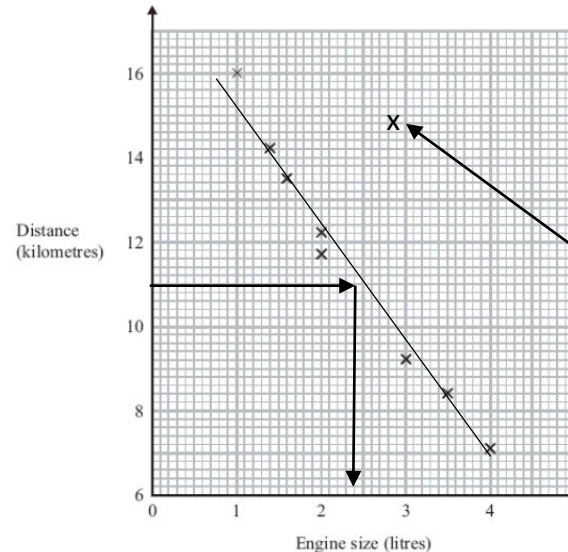
**Scatter-graphs** show the relationship between two variables. This relationship is called the **correlation**.



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

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

## Examples



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.

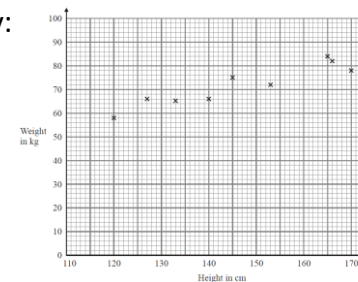
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**Key Words**  
Pie chart  
Scatter-graph  
Correlation  
Outlier  
Variable

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.

# BAR CHARTS AND PICTOGRAMS

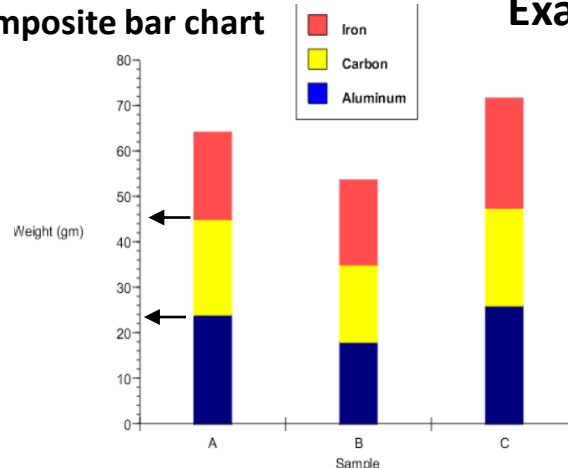
## Key Concepts

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

## Composite bar chart



- How much aluminium is in sample A? **24g**
- How much carbon is in sample A?  
 $46 - 24 = 22g$   
 Highest value for carbon in sample A.      Lowest value for carbon in sample A.

## Examples

## Pictogram



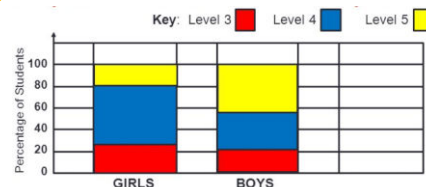
- How many cupcakes were sold on Monday?  
 $5 \times 6 = 30$  cupcakes
- What does half a cupcake represent on the pictogram?  
 $6 \div 2 = 3$  cupcakes
- How many cupcakes were sold on Thursday?  
 $3.5 \times 6 = 21$  cupcakes

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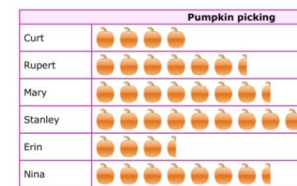
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## Key Words

Bar chart  
Composite  
Pictogram  
Key  
Categorical  
Data set



- What percentage of boys are level 3?
- What percentage of girls are level 4?



- How many pumpkins were picked by Stanley?
- What does half a pumpkin represent?
- 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  $\frac{\text{total frequency}+1}{2}$  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  $\frac{\text{total } fx}{\text{total } f}$ .

## Examples

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

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

- 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 =  $\frac{\text{Total frequency}+1}{2} = \frac{56}{2} = 28\text{th value}$   
 “add the frequency column until you reach the 28<sup>th</sup> value” Median is in the 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)  $\frac{25+1}{2} = 13\text{th value}$  is in the group  $12 < C \leq 16$  c)  $\frac{25}{24} = £11.76$