Statistics is all about collecting, interpreting and representing data (the information which has been collected) in various forms. Some of the simplest ways of interpreting and representing data in the form of graphs and charts are shown in this pack.

BAR CHARTS

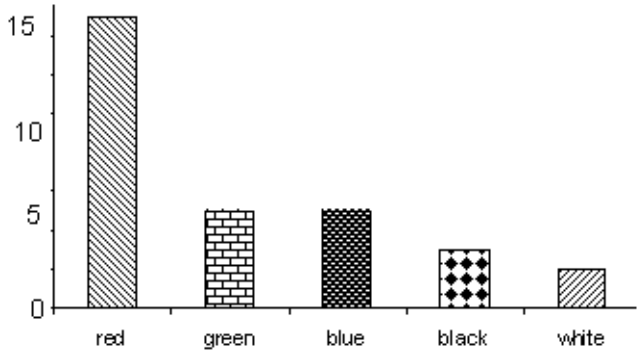
A bar chart uses bars drawn of equal width. The length of the bar is proportional to the amount or quantity it represents.

The simple example below can be used to illustrate the different ways that a bar chart can be drawn. In an exam you will sometimes be asked to draw a bar chart from a set of data. At other times you will be given a bar chart and be asked to obtain some information from it.

E.g. In a class, the colours of students' shirts were noted. 15 were red, 5 were green, 5 were blue, 3 were black and 2 were white. Put this data in bar chart form.

1. A Vertical Bar Chart

Shirt colours in one class

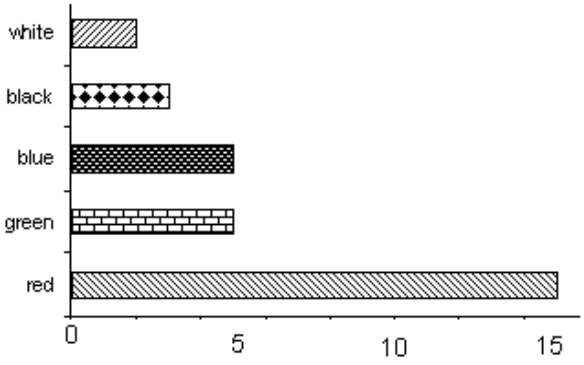


From the bar chart, you can see that there were 30 people in the class
(15 + 5 + 5 + 3 + 2 = 30)

The bars represent the data which was collected.

2. A Horizontal Bar Chart

Shirt colours in one class



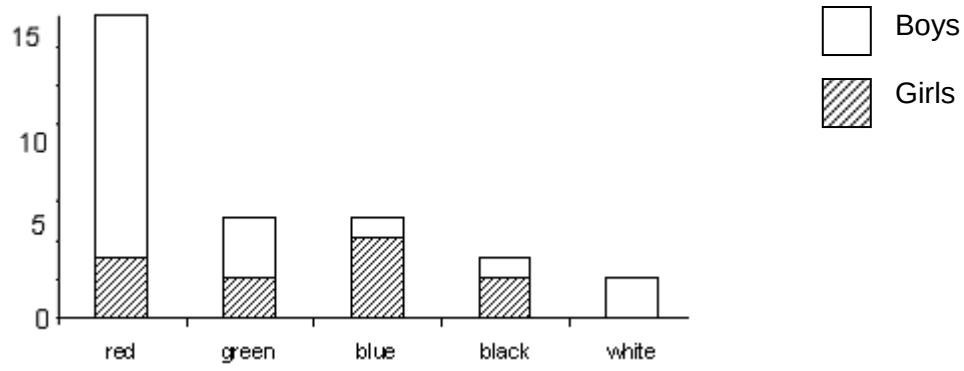
3. A Component Bar Chart

Suppose that when we collected the information about shirt colours we had also distinguished between boys and girls.

Colour	Boys	Girls	Total
Red	3	12	15
Green	2	3	5
Blue	4	1	5
Black	2	1	3
White	0	2	2

Using this information, we could draw a component bar chart as shown below.

Shirt colours in one class

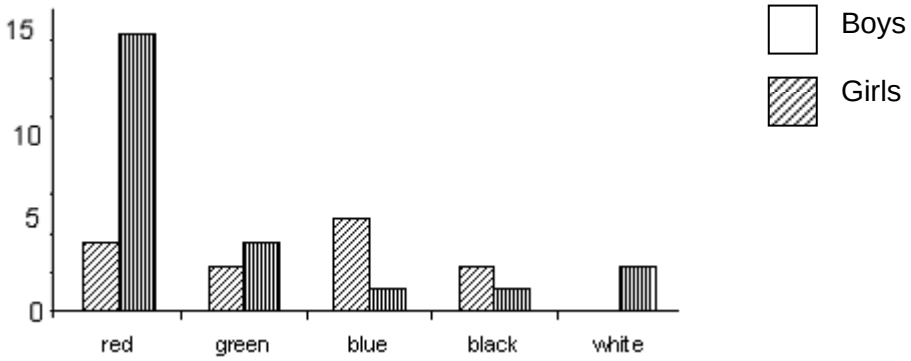


Note The height of each column is equal to the total of the scores for boys and girls.

4. A Comparative Bar Chart

This illustrates the same data as used in 3.

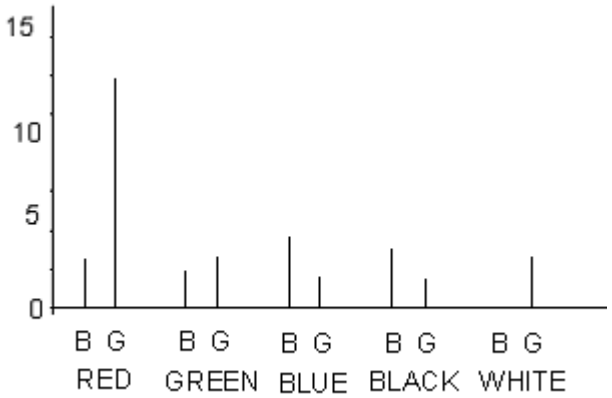
Shirt colours in one class



5. Line Graphs/ Line Charts

These are variants on bar charts where the bars are replaced by lines. They may be vertical or horizontal and are most useful when two or more things are being compared. Looking again at the shirt problem in 4.

Shirt colours in one class



Remember that we can't use different coloured lines in the units. Students can and should do so in their own work. (For example, use a blue pen for boys and a red pen for girls.)

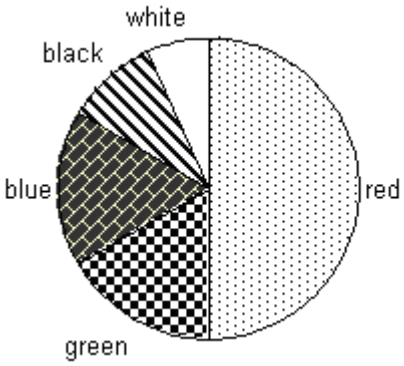
PIE CHARTS

We can work on the same data we have used in bar charts.

Shirt Colours in One Class

Red 15
Green 5
Blue 5
Black 3
White 2
Total 30

Pie Chart Showing Colours in One Class



The size of each slice (sector) depends on the angle at the centre of the circle which in turn depends upon the number that the sector represents.

There are 360° at the centre of a circle and this represents 30 shirts,

so $\frac{360°}{30}$ = 12° represents 1 shirt

so 15 red shirts need	15 x 12° = 180°
5 green shirts need	5 x 12° = 60°
5 blue shirts need	5 x 12° = 60°
3 black shirts need	3 x 12° = 36°
2 white shirts need	2 x 12° = 24°
	Total = 360°

Before you draw the chart check that the angles you have calculated total approximately 360°.

To construct a pie chart

1. Draw a circle.
2. Mark the centre.
3. Draw any radius.
4. Place your protractor so that its centre is on the centre of the circle and the zero line coincides with the radius you have drawn.
5. Mark off the first sector angle and complete this sector.
6. Repeat 4 for each sector using the line you have just drawn as the base radius.
7. Label each sector clearly.

You may add colour if you wish but remember not to waste valuable time colouring in an exam.

PICTOGRAMS

(sometimes called pictographs or ideographs)

Example

Population of Great Britain
Excluding Ireland (figures in millions)

1801	1851	1901	
☺ ☺ ☺☺☺☺		☺☺☺☺☺	
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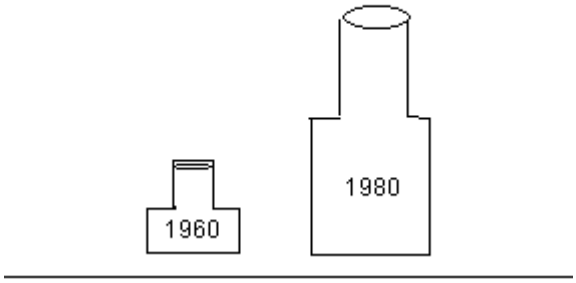
10.5		21.0	37.0

It is often difficult to gather accurate numerical information from a pictogram. In the above example although we know that m represents 1 million, it is more difficult to decide how many m stands for. For this reason, it is advisable to always include the relevant figures in the pictogram. The attraction of pictograms is that they can make a powerful visual impact and for this reason they are often used by newspapers and television. But **beware** pictograms can be misleading. Look at the next example. This is the information that we wish to put across: - Milk sales in the UK were 12 million bottles in 1960 and 36 million bottles in 1980.

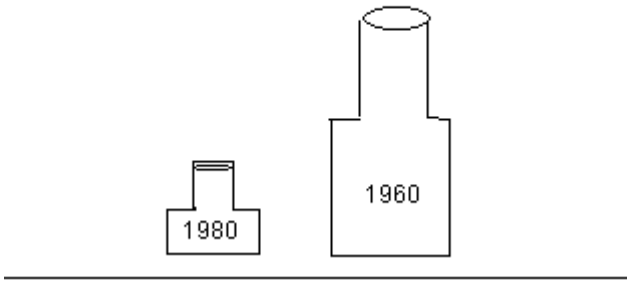
Milk Sales in the UK



Looking at this pictogram alone we cannot be sure of our conclusions. If we compare the heights of the milk bottles we would conclude that milk consumption has increased about three-fold. Whereas if we compared the areas that the pictograms take up on the page (which it is more natural for the eye to do), we would come to the conclusion that milk consumption had increased to more than three times what it was in 1960. There are two ways of avoiding this pitfall:

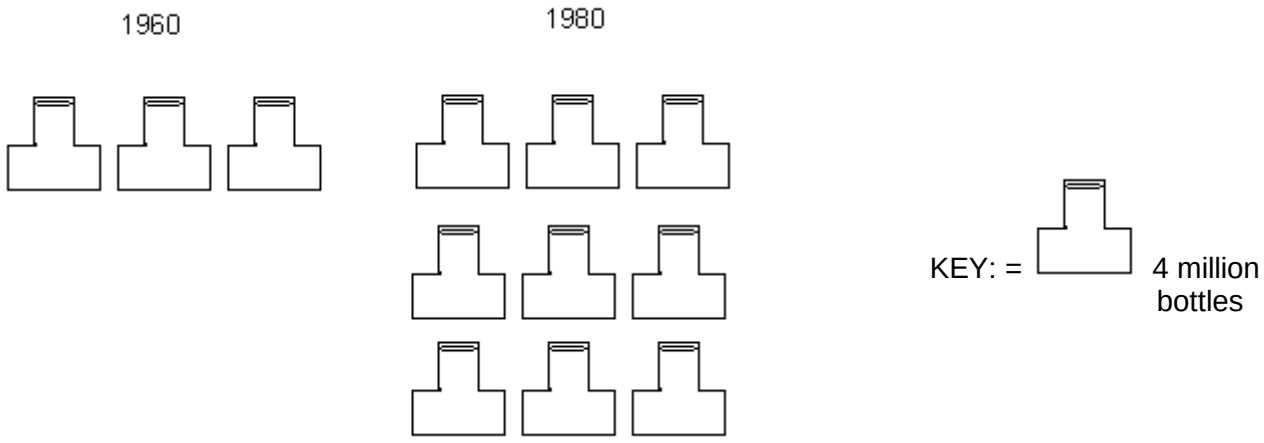
Either: include numerical information with the pictogram:

Milk Sales in the UK



or preferably, use a less ambiguous form of the pictogram.

Milk Consumption in the UK



Exercise 1

3600 people who work in Bradford were asked about the means of transport which they use for daily commuting. The data collected is shown below.

Type of Transport	Number using
Private Car	1800
Bus	900
Train	300
Other	600

Draw a) a vertical bar chart

b) a pie chart

Exercise 2

The figures below show the output of the Duffer Lorry Company in a certain year.

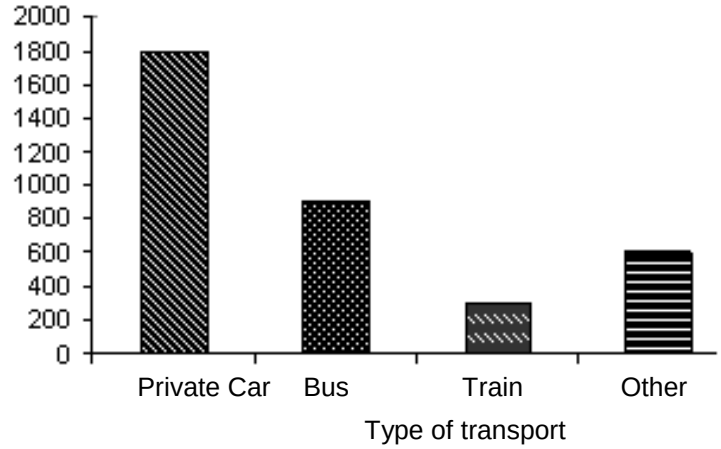
Draw a suitable pictogram to represent this information.

Month	Jan	Feb	Mar	Apr	May
Production (Thousands)	300	450	700	625	500

ANSWERS

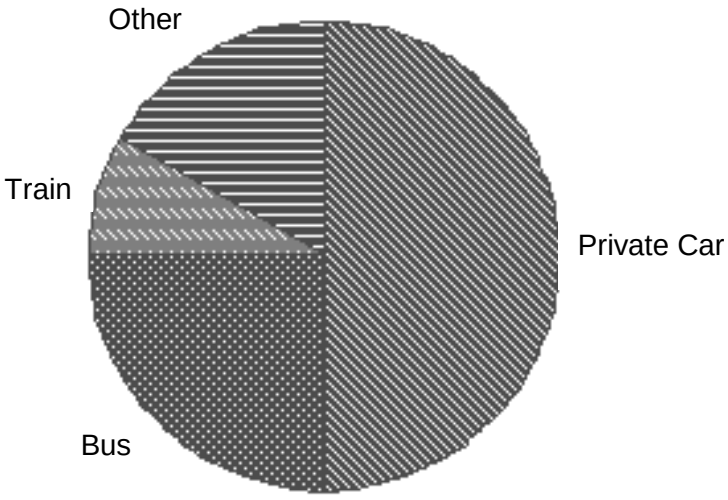
Exercise 1

a) Bar chart to show type of transport used.



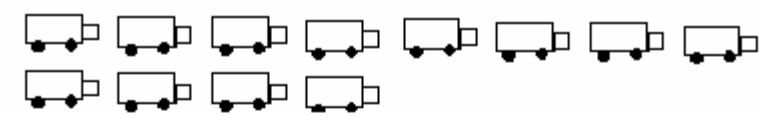
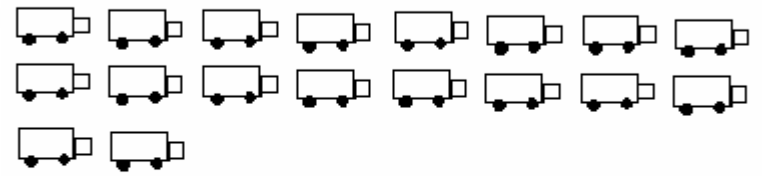
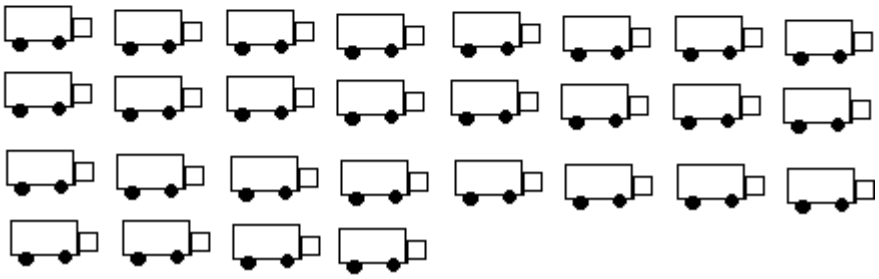
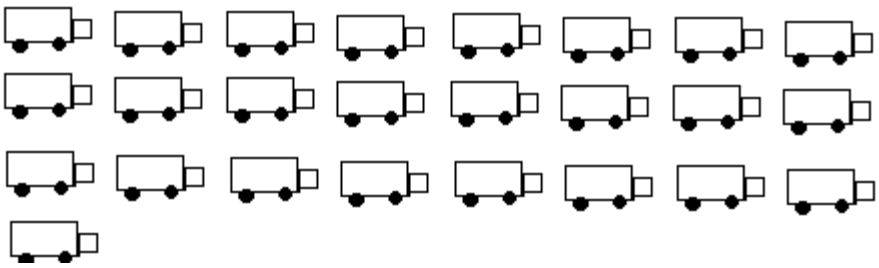
b) Pie chart to show type of transport used

Total number of people = 3600
360° represents 3600



Exercise 2

Let  = 25,000 lorries

MONTH	PRODUCTION
Jan	
Feb	
Mar	
Apr	
May