fs4u

# Collecting & Processing Data

## ‘How To’ Booklet 37

# Collecting & Processing Data

**Data** - information you have obtained or been given.

**Variables** – a variable is something that can change from one item to the next.
It can either be:-

QUANTITATIVE - numerical like the number of people in a class.

QUALITATIVE - non-numerical, like colour.

There are two types of quantitative variables:-

Continuous - a variable which could take all possible values such as the height of a tree.

Discrete - a variable that increases in steps. This could be the number of rooms in a building or it could also be the size of shoes (5, 5½, 6 6½ etc)

You can collect data in any of the following ways:-

Survey using data from books, magazines, by recording things, by counting.

It is often easier to collect data using a tally chart.
An example of one is shown below.

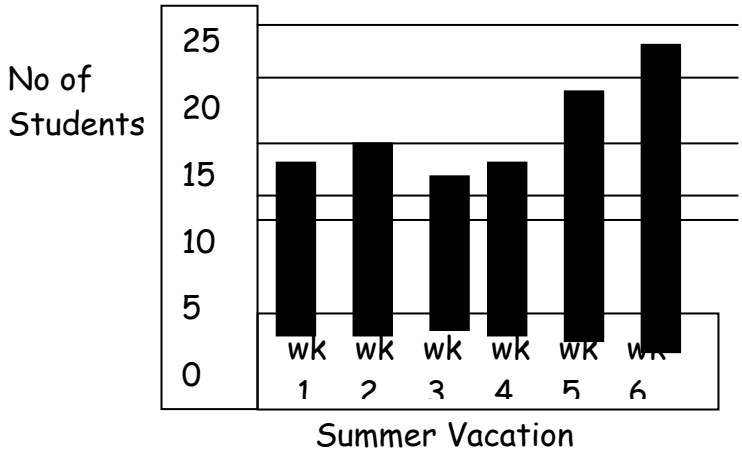
| Number of cars per family | Tally | Frequency |
|---|---|---|
| 0 | III | 3 |
| 1 | 𝍸 III 𝍸 | 14 |
| 2 | 𝍸 𝍸 | 9 |
| 3 | 𝍸 II | 7 |
| 4 | II | 2 |
| | Total | 35 |

When constructing a tally chart the fifth bar goes across the other four. The frequency is a total of the tally for each selection.

When the raw data have already been collected as in the question below: a tally chart is most useful when the data are to be grouped. If the values are to be shown separately (i e data with a small spread) then a frequency table only will suffice.

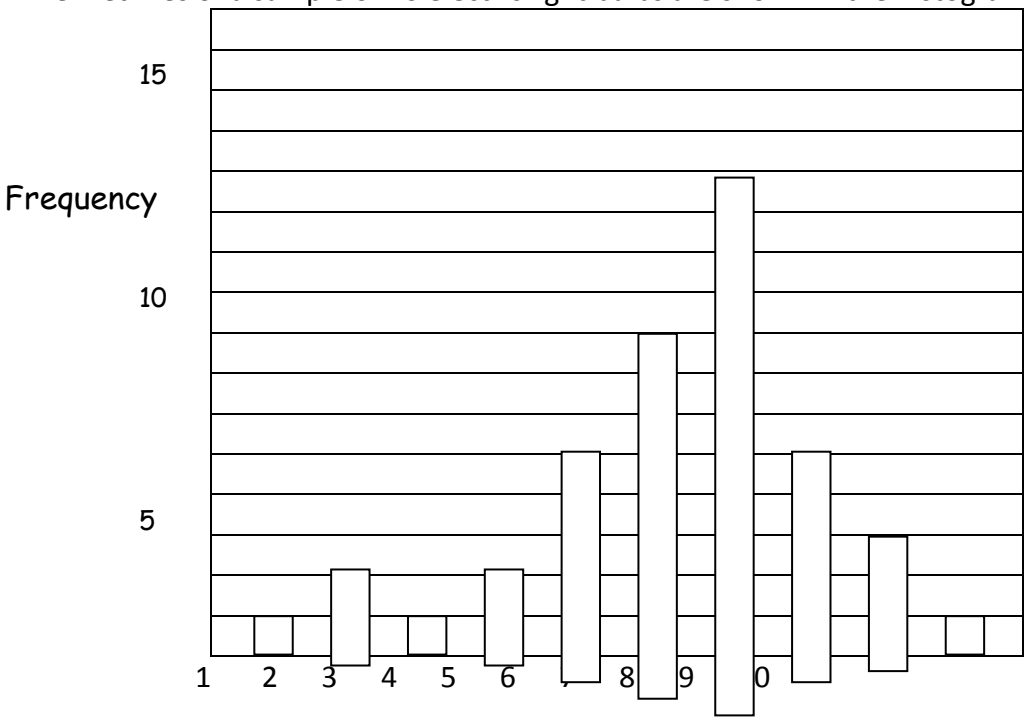
**Bar Charts –** would be used to represent qualitative (non numerical) data and discrete data where each value has been shown separately. It is common to leave gaps between the bars.

## Maths Workshop Drop-In Students




**Histograms** – would be used to represent continuous data and grouped together (including discrete data).

The lifetimes of a sample of 40 electric light bulbs are shown in the histogram below:-




You must put a heading describing what the charts show. Each column must be labelled and the scale must be stated.

### Exercise

| | |
|---|---|
| 1 | In another test the times taken by 30 students to complete it have been recorded and are shown below:- |

| | | | | | |
|---|---|---|---|---|---|
| 25 | 28 | 10 | 15 | 18 | 23 |
| 13 | 21 | 25 | 26 | 16 | 17 |
| 30 | 20 | 16 | 22 | 23 | 26 |
| 24 | 24 | 29 | 21 | 27 | 28 |
| 23 | 27 | 25 | 22 | 24 | 23 |

In this case it would be more useful to group the data according to time:-

| Time in Minutes (to nearest minute) | Tally | Frequency (number of students) |
|---|---|---|
| 10 – 14 | | |
| 15 – 19 | | |
| 20 – 24 | | |
| 25 – 29 | | |
| 30 – 34 | | |
| | | |

Note that the time is to the nearest minute. So the tally for the period 10 – 14 minutes will include all the times from 9.5minutes up to 14.5minutes.

When you have data containing a spread of values a histogram can be used to represent it.

Copy and complete the above tally chart.

2. Draw a histogram using the data from the above tally chart.

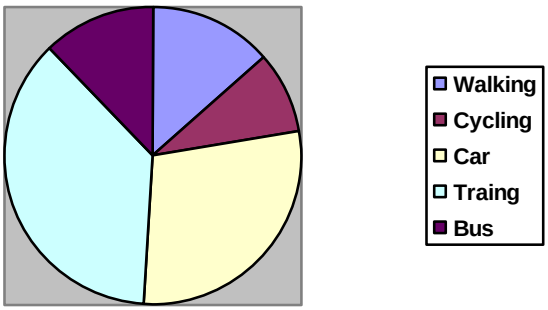
3 Use the information below to draw a bar chart.

| Children in Family | Frequency |
|---|---|
| 0 | 8 |
| 1 | 11 |
| 2 | 17 |
| 3 | 8 |
| 4 | 5 |
| 5 | 1 |

## Pie Charts

Pie charts are another type of diagram that can be used to display information. With this type of chart the bigger the proportion, the bigger the slice of sector.

## Example 1




Data used to create this Pie Chart

Walking 12

Cycling 8

| | |
|---|---|
| Car | 26 |
| Train | 33 |
| Bus | 11 |
| **Total** | **90** |

Formula for creating Pie Chart:
A circle has 360° so the sector for walking will be:-

$$\frac{11}{90} \times 360 = 48°$$

4 Use a pie chart to illustrate the data given below:-

180 sixth form students were asked what they intended to do next year.

| | |
|---|---|
| 54 | going to university |
| 40 | staying at college |
| 62 | going into employment |
| 24 | no firm intention |

5 At a convert the ages of 120 people were recorded as:-

| | |
|---|---|
| Under 20 | 15 |
| 20 – 29 | 30 |
| 30 – 39 | 22 |
| 40 – 59 | 24 |
| 60 and over | 29 |

Draw a Pie Chart using this data