

SCATTER DIAGRAMS

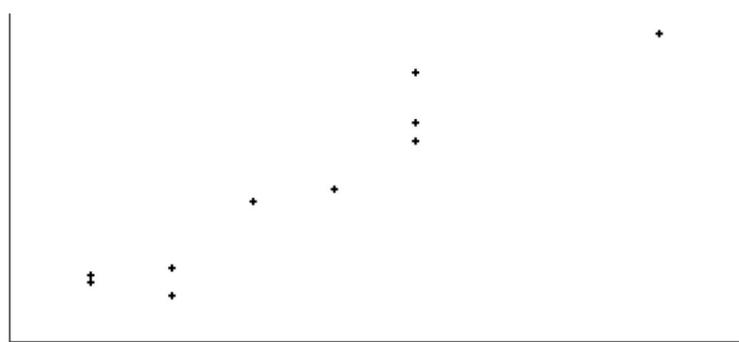
Scatter diagrams are used to see if a relationship exist between two sets of data or variables.

Check first that you:

- understand coordinates and can plot points on a graph
- can understand and read scales on a graph
- know how to find the mean by dividing the total of the all values by the number of values.

Correlation This describes the type of relationship between two sets of data.

Positive Correlation



As values of one set of data increases values of the other set of data also increases. E.g. the time exercising and number of calories burned.

Negative correlation



As values of one set of data increases values of the other set of data decreases. E.g. the value of a car and its mileage.

No Correlation



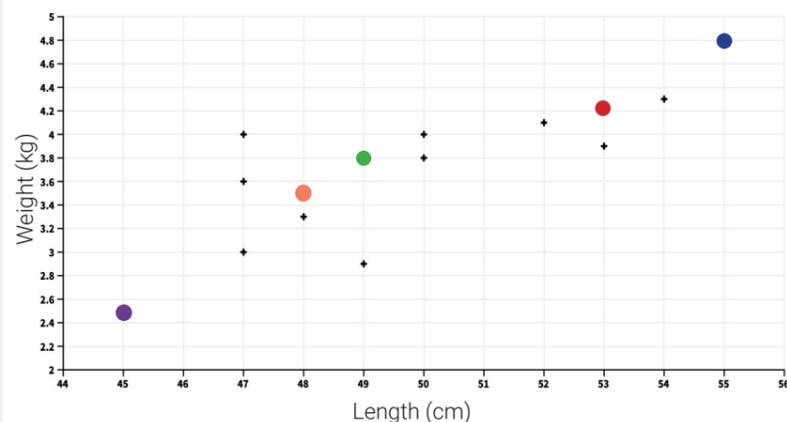
There is no relationship between values of the two sets of data. E.g. the height and salary of employees of a company.

Can you **give** your own examples? Can you **explain** why a scatter diagram does or doesn't show correlation?

Drawing a scatter diagram The table shows the length and corresponding weight of baby boys born at Cwmbran Hospital.

| | | | | | | | | | | | | | | | |
|-------------|-----|-----|-----|-----|-----|-----|-----|----|-----|----|-----|-----|----|-----|-----|
| Length (cm) | 45 | 55 | 49 | 48 | 53 | 49 | 48 | 50 | 53 | 47 | 47 | 50 | 47 | 52 | 54 |
| Weight (kg) | 2.5 | 4.8 | 3.8 | 3.5 | 4.2 | 2.9 | 3.3 | 4 | 3.9 | 4 | 3.6 | 3.8 | 3 | 4.1 | 4.3 |

a) Draw a scatter diagram to display this data.



We plot the length (horizontal axis) against the weight (vertical axis). Here are the first five points highlighted on the diagram:

| | | | | | |
|-------------|-----|-----|-----|-----|-----|
| Length (cm) | 45 | 55 | 49 | 48 | 53 |
| Weight (kg) | 2.5 | 4.8 | 3.8 | 3.5 | 4.2 |

We don't connect the points on a scatter diagram.

b) Describe the relationship between the weight and length of baby boys shown by the scatter diagram.

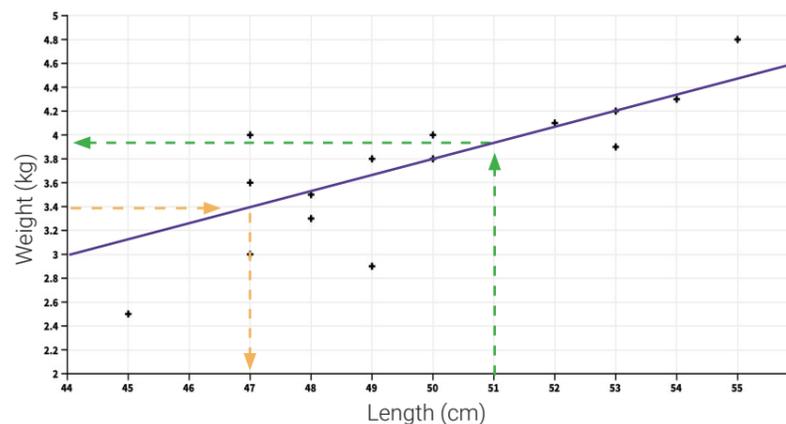
The diagram shows positive correlation between the length and weight of baby boys. As the length of the baby increases the weight also increases.

Take care when reading the scale on each of the axes. They may not be the same!

Line of Best Fit

When there is positive or negative correlation we can draw a line of best fit by eye on the scatter diagram. This line allows us to estimate a value of one variable if we know a value of the other variable.

c) Draw a line of best fit by eye on the scatter diagram for the length and weight of baby boys born at Cwmbran Hospital.



d) Use the line of best fit to estimate the weight of a baby that is 51cm in length.

Draw a straight line from 51cm on the horizontal axis (length) to the line of best fit. Where they meet draw a line across to the vertical axis to read off an estimate for the weight. **3.9kg**

Using a ruler, draw a straight line that follows the trend of the data. You should try and get as many points as possible on the line. You should also try and get an equal number of points lying above the line and lying below the line.

e) Use the line of best fit to estimate the length of a baby that weighs 3.4kg.

Draw a straight line from 3.4kg on the vertical axis (weight) to the line of best fit. Where they meet draw a line down to the horizontal axis to read off an estimate for the length. **47cm**

Take care the line of best fit won't necessarily need to go through the point of intersection of the axes.