**Science Skills**

**Reading Bar Graphs**

**Level 4**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Class: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Bar Graphs**

**Bar graphs** are used to **compare** things. At Level 3 this is usually only one aspect of the things to be compared. At Level 4 you will often find a number of aspects compared in the same chart.

**Example**:
The graph below shows the sales figures for a shop.

A graph is a diagram that shows the relationship of one variable to another.
The relationship here is between **years** and **sales**.

So, **yearly sales** are being compared.

Within the years, sales of books, CDs and magazines/newspapers are also being compared.

The bars show **trends.** Trends are the way that things are going.
The bars show that…
a) Sales of CDs are decreasing / declining (getting less) over the years
b) Overall, sales of books are **decreasing.**
c) Sales of magazines and newspapers are **remaining constant** (staying the same).
d) Sales of CDs are declining more sharply than sales of books.

Graphs are used to **predict**. Predictions are sometimes called **projections**.
We can predict that
a) Sales of CDs in 2013 will probably decrease further, possibly to about £40,000

b) Sales of magazines and newspapers will probably remain at about £12,000 in 2013.
c) Sales of books will probably decline to about £35,000.
d) Unless money can be obtained from other sales, the shop will probably go out of
 business in the next few years.

**Maths**

Also at Level 4, you may be asked to answer questions using more complicated maths than the adding and subtracting you were expected to do at Level 3.

a) For example, you could be asked for the **range** of the sales of CDs
Range is highest minus lowest.

£65,000 down to £48,000 = £17000

b) You could be asked the **average** (**mean)** sales of CDs over the 4 years.

65,000 + 50,000 +54,000 + 48,000 = 217,000
£217,000 ÷ 4 (years) = £54,250

c) You could be asked the **percentage** of something in the chart.
What percentage of all sales in 2009 was for books?

Sales of books =£50,000
All sales = £50,000 + £65,000 + £11,000 = £127,000

50,000 ÷ 127,000 x 100 = 39.4%

**Conclusions**

At Level 4, you will almost certainly be asked to **draw conclusions**.

‘Drawing a conclusion’ means showing what you have learned from the graph.

The conclusion should show what you now know about the **relationship** between the two variables. This means that the two variables must be compared in some way. The two variables here are **years** and **sales** in £s.

a) Each year, sales of CDs decreases.

and

b) Sales of magazines and newspapers remain constant over the years.

1. The diagram shows an investigation into
 judgment of distance.

Volunteers each threw 10 hoops at a peg, 3 metres away. The number of successful throws was recorded. Each volunteer attempted the test three times, once using the right eye only, once using the left eye only and once using both eyes. The results are in the following chart.



a) Calculate the **average number** of successful throws by the volunteers for each trial.

Working: *(Total number of successful throws ÷ number of volunteers)*

Average number of successful throws using the right eye only. \_\_\_\_\_

Average number of successful throws using the left eye only. \_\_\_\_\_

Average number of successful throws using both eyes. \_\_\_\_\_

2. The following bar chart shows the incidence of diabetes in people of different ages.

a) Which group has the highest incidence of diabetes? \_\_\_\_\_\_\_\_\_\_\_ years

b) What is the incidence of diabetes in the following groups?

 a) men aged between 35 and 44 \_\_\_\_\_\_\_\_\_\_\_%

 b) women aged between 55 and 64 \_\_\_\_\_\_\_\_\_\_\_%

c) What age group shows no difference in the incidence of diabetes in men and women?

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_years

3. Sugars left by greenfly on cotton plants cause problems for the cotton industry.
Some wild yeasts can digest some of these sugars.
Researchers tested 3 wild yeasts to see which could digest the sugars without harming the cotton plants.
The results are shown in the chart below.

 **Sugars**

a) Which sugar was completely digested by all the strains (types) of wild yeast?

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) By comparing the results of all three strains of yeast, which **sugar** was the **least** well
 digested?

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. The length of the right foot was measured in a number of people.

The results are shown in the histogram below.

5. The chart below gives information about cholesterol in the blood.



a) What happens to the average cholesterol concentration in the blood as age increases?

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b) What conclusion can be drawn about average cholesterol concentration in males
 compared to females?

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c) Predict the average cholesterol concentration of females aged 50 – 59 years if males of
 that age had an average concentration of 6.8 mmol/l

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ mmol/l

6. A piece of onionskin was examined using a microscope and the lengths of 50 cells
 were measured.

 The bar chart below shows the number of cells of different lengths which were found.



a) Which range of cell lengths contained the most cells?

 From \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ micrometres

b) What percentage of cells had a length of 350 micrometres or more?

Working:

Answer: \_\_\_\_\_\_\_\_\_%

7. A medical researcher is measuring the upper range of hearing of people in different
 age groups.
 The bar graph shows the frequencies of sound detected by these people.



State **two** conclusions which can be made from this bar graph about the hearing of different age groups.

a) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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b) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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8. The distance a car travels using one litre of fuel depends on its speed.

 The bar graph shows the results for two cars using different types of fuel.



1. Draw two conclusions from the bar graph.

 a) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
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 b) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
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2. A car uses one litre of petrol while travelling at a speed of 50 km/h.
 Predict the distance travelled by the car.

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ km.

9. The graph below shows the percentage of cars with rust affecting their wheel arches
 and door sills.



Draw two conclusions from the information shown in the graph.

a) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
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b)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
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