

UNIT 11 *Data Collection and Presentation*

Teaching Notes

Historical Background and Introduction

The British statesman, *Benjamin Disraeli*, once stated, "There are lies, damned lies and statistics." This might have been a bright remark to make in a debate, but the status of statistics was given a quite underrated currency which persists, even today! Disraeli's statement is in fact the reverse of the truth, and a more apt expression would be "There are lies, damned lies and numerical statements made by people ignorant of statistics!"

Statistical analysis makes possible the testing of numerical data for relevance, reliability and validity. Statisticians must present data in such a form that others can utilise the relevant information to enable them to make judgements.

The study of Statistics is reported to have started with the Englishman, *John Graunt* (1620 – 1674), who collected and studied the death records in various cities of Britain. He was fascinated by the patterns he found in the whole population.

For further background information, see

"How to lie with statistics"
by *Darrell Huff, Pelican*,
ISBN 0 14 021300 7

Much of current day statistical analysis is of quite recent development, the availability of cheap computing power acting as a catalyst for the development of appropriate ways of presenting and analysing data. In fact, the more advanced statistical analyses and tests are based on probability theory, developed over the past few centuries, but put into a more modern context by mathematical statisticians such as

"Use and abuse of statistics"
by *W. Reichmann, Pelican*
ISBN 0 14 020707 4

"Figuring and society"
by *Ronald Meek, Fontana*
ISBN 0 00 632560

Karl Pearson (1857 – 1936)

Sir Ronald Fisher (1890 – 1962)

Jerzy Neyman (1894 – 1981).

You can find interesting bibliographies of these people on the internet.

See web site
<http://www-groups.dcs.st-and.ac.uk/~history/>

This is the first unit on this topic in Year 7, in which we look at both collecting and presenting data. Of course, this is only part of the overall strategy needed in statistical work in practice, which can be summarised as

- understanding the problem: postulating hypotheses
- collecting the relevant data
- presenting the data
- analysing the data
- making conclusions related to the original hypotheses.

You might find it useful to have plenty of sources of data available for pupils to use, particularly if they will be undertaking coursework. There is an abundance of data in newspapers, particularly

- sports-related data
- weather data
- financial data.

You might also find it useful to use the internet to obtain various data, although the actual finding of data is an important aspect of the whole of this area of work, and at times students should be encouraged to use their ingenuity and research skills to obtain data for themselves.

Routes

	Standard	Academic	Express
11.1 Types of Data	(✓)	✓	✓
11.2 Collecting Data	✓	✓	✓

Language

• qualitative data	(✓)	✓	✓
• quantitative data	(✓)	✓	✓
• continuous/discrete	(✓)	✓	✓
• pictograms	✓	✓	✓
• bar charts	✓	✓	✓
• pie charts	✓	✓	✓
• hypotheses	(✓)	✓	✓

(✓) denotes extension work for these pupils

Misconceptions

- Confusion between *qualitative* and *quantitative* data.
- Use of parts of diagrams (e.g. $\frac{1}{2}$ or $\frac{1}{4}$) in pictograms.