

## Specifying a problem, planning and collecting data

### As outcomes, Year 8 pupils should, for example:

**Decide which data to collect to answer a question, and the degree of accuracy needed; identify possible sources.**

Relevant data might be obtained from:

- a questionnaire or survey of a sample of people;
- an experiment involving the use of hand-held technology such as **data-loggers** with **graphic calculators** or **computers**;
- secondary sources, such as reference materials, including **websites**, **CD-ROMs**, newspapers, directories, historical records...

For example:

- Plan a questionnaire to find out how often and how people travel to shopping centres, or what their TV viewing habits are.
- Plan an experiment using hand-held data-logging equipment to measure light intensity in different parts of a stream, or to measure cooling rates.
- Plan how to research sports results on the **Internet**, including what to look for and what to record.

Recognise that data from primary sources may take more time and resources to collect than from secondary sources but may give more insight and address more precisely the problem being explored.

Determine the sample size and type, e.g. who and how many to ask, how, where and when the sample should be taken. Recognise that too small a sample may give unrepresentative results, while too large a sample may be expensive in resources and time.

### As outcomes, Year 9 pupils should, for example:

**Discuss how data relate to the enquiry and identify possible sources, including primary and secondary sources.**

Relevant data might be obtained from:

- a questionnaire or survey of a sample of people;
- printed tables and lists;
- the **Internet**;
- other **computer databases**.

For example:

- Plan how to conduct a survey into long jumps or throws with different lengths of run-up.
- Identify magazines and books with information on engine sizes of cars and acceleration times for 0–60 mph.
- Determine a range of countries with different sizes of population, development and income. Search the **Internet**, **CD-ROMs** or printed sources of information for relevant information.
- Visit the library to access census data for the local area, relating to a study of housing.
- Construct a questionnaire to explore attitudes to fairly-traded goods and a survey for shops.

**Identify possible sources of bias and plan how to minimise it.** For example:

- When investigating pupils' aptitudes in PE activities, aim to reduce possible bias due to selection, non-response and timing of the enquiry, by:
  - a. choosing pupils from a range of year groups and with a range of heights;
  - b. making sure that there are equal numbers of girls and boys;
  - c. choosing pupils from the full range of athletic prowess.
- When designing a questionnaire for a survey:
  - a. ensure the sample is representative by choosing it randomly and/or selecting people from particular categories;
  - b. phrase questions in a neutral manner so that they do not bias results by encouraging a particular response.
- When conducting an experiment, vary one factor at a time, keeping other factors constant.