Students consider the difficulties in using real data to answer questions such as 'Which is the most dangerous sport?

Students discuss which types of statistical diagram are most appropriate for displaying the data before setting off to draw them. They may practise drawing statistical diagrams either using Excel or by hand.

Suitability

Level 2 (Intermediate/Higher)

Time

1–2 hours

Resources and equipment

Student sheets
Optional: slideshow, spreadsheet, graph paper, calculators, protractors, rulers

Key mathematical language

Population, representative sample, proportion

Notes on the activity

The student data sheet gives simplified versions of the official statistics for the year 2000, the latest data available.

The data sheet can be used in a class or group discussion about the difficulties encountered when attempting to use real data to answer a question such as 'How dangerous are water sports?'

The data are also provided on a spreadsheet which can be used for practice in drawing statistical diagrams.

During the activity

Ideally students should work in groups to encourage discussion.
Students could use Excel or graph paper to draw the diagrams.

Points for discussion

More information is needed about the data. Discussion should include the importance of using a representative sample and what this means. In this case the data was collected from a sample of 18 hospitals (from different geographical areas, urban and rural, serving different sized populations with different sized A&E units).

The data sheet (and the original source) does not say whether the data includes spectators as well as participants.

Fatal accidents are not fully represented as the data was collected only when sports injuries were treated – this may not have been possible in some cases.

The number of injuries should be studied alongside the number of participants in each sport. Different people are likely to spend different amounts of time on the activity – this could lead to further discussion about methods which could be used to take into account time spent on the activity.

For a particular person, the probability of having an accident would also depend on how careful they are, how much experience they have, and so on. Some people may have more than one accident during the year.

The number of accidents varies from one year to the next, so another year's results might give a different impression.

Before asking students to draw statistical diagrams, discuss with them which are the most appropriate types to use.

Discourage students from using 3D charts, line graphs for qualitative data, and some of the more unusual Excel options such as doughnut charts. The accompanying spreadsheet can be used to illustrate these points.

The 'Try these' section asks students to consider how they can use statistical diagrams to illustrate some of the sports injuries data, and to discuss their plans with their tutor before proceeding.

Problems can be avoided if you discuss with students at this stage the reasons for their choice of diagrams, and what difficulties may arise when working with real data. For example, the small numbers in some of the categories suggests that it will be difficult to illustrate them on bar charts or pie charts. Students may be able to suggest ways of combining categories, perhaps by including all the smaller groups in an 'Other' category.

Extensions

There are further data and worksheets concerning accidents in the Nuffield activity 'A risky business'.

There are much more detailed data showing accidents during leisure and home activities in 2002 at www.hassandlass.org.uk. Learners could be asked to analyse this data and look for trends.

At the end of the activity

Encourage students to discuss any problems they had, and to compare their diagrams with those drawn by others. The last slide could be used to aid class discussion.

Answers

A bar chart of some sort is a useful tool. Students will have to manipulate the spreadsheet to produce a dual bar chart showing the genders in different colours.

A pie chart is easy in Excel, but tricky to draw by hand due to the number of categories.