Gender differences – Teacher notes

Students carry out significance tests on means in order to test hypotheses about the body measurements of boys and girls at different ages.

Suitability and Time

Level 3 (Advanced); 2–3 hours

Resources and equipment

Student sheets, calculators, slideshow (optional), spreadsheet

Key mathematical language

Mean, standard deviation, significance test, null hypothesis, alternative hypothesis, normal distribution, critical values, critical region, significance levels.

Notes on the activity

The slideshow can introduce the activity and demonstrate the methods.

The spreadsheet for students contains anthropometric data from a sample of nearly 4000 children and young adults with ages ranging from 2 years to 16 years. There are separate worksheets for male and female data.

The data can be used to practise using hypothesis tests on mean values or as the basis for an assignment. The large quantity of data means that students can test hypotheses for different age groups and body measurements. The children are numbered so that different samples can be easily identified.

The spreadsheet for teachers also includes the means and standard deviations of the datasets which students will use in the 'Try these' section.

During the activity

Students could work individually or in pairs or small groups, perhaps with some using the spreadsheet and others using calculators.

Points for discussion

It is important that students understand the reasoning behind each of the significance tests.

Discuss the use of the normal distribution, the importance of a large sample, the selection of one-tail and two-tail tests, and the associated critical values.

The slideshow and student sheets include questions to aid class discussion and help students to reflect on the work.

Extensions

If students work on different age groups, they could combine their results and write a report on how gender differences develop at different ages.

Acknowledgement

The original data were collected for a study carried out in the USA in 1977 by the Consumer Product Safety Commission (CPSC).

The full dataset is available from a website set up by the CPSC and the Information Technology Laboratory (ITL) at the National Institute of Standards and Technology (NIST) http://math.nist.gov/~SRessler/anthrokids/