



Activity description

In this activity students will learn about collecting data by stratified sampling and designing a questionnaire.

Suitability and Time

Advanced (Level 3) Worksheet 40 – 60 minutes Task sheet 1 – 1 ½ hours

Resources and equipment

Student information sheet, task sheet and worksheet

Key mathematical language

Data, qualitative, quantitative, discrete, continuous, primary, secondary, population, census, sample, random, bias, representative, stratified sampling, questionnaire

Notes on the activity

The slideshow can be used to generate discussion when the topic of sampling is introduced, or it could be adapted to provide a summary of the main points for revision. The first slide introduces the task of planning how to collect a representative sample of views about a parking permit system.

After giving some definitions of terms used in sampling, the slideshow then shows how a representative sample can be found. Note that the use made of random numbers to select a random sample is simple and easy to understand, but not very efficient in that a large proportion of the random numbers may have to be discarded.

You may like to introduce more efficient methods if time permits. For example, the integer part of $(n \times \text{random decimal} + 1)$ where n is the population size will give a position in the population. The randomness of the positions given by this method depends on the number of digits used in the random decimal – the more digits used in the random decimal, the better.

The following slides list some of the main points to consider when designing a questionnaire, some of the other considerations to bear in mind when planning a survey, and frequently used survey methods.

The final slide has questions you can use at the end of the session to help students reflect on their work.

The main points covered in the slideshow are also given on the information sheet. The ‘Parking permits?’ task sheet could be used in full, or adapted for use with individual students or in whole class or group discussions. This is also true of the worksheet of mixed questions.

During the activity

Students could work in pairs or small groups to encourage discussion and exchange of ideas.

Points for discussion

The slideshow and the 'Parking permits?' task sheet both include 'Think about' sections that could be used to generate class discussion.

Extensions

Students could plan, then carry out, their own survey on a topic of interest to them.

Worksheet answers

(Note that there are many other possible answers.)

1 Use 3 digit random numbers, discarding any above 750 and any repeats.

2 Many possibilities such as the need to decide what age boundaries to use, whether to contact single people or households, and patients may not give honest answers to questions asked by their GP.

3 Area = 600 m^2 . These could be numbered and 10 square metres selected using 3 digit random numbers, discarding any above 600. Could also divide into smaller squares or use coordinates.

4a Relevant characteristics for sub-groups may include age, ethnicity, gender, mode of attendance.

4b, c, d Populations could be divided into sub-groups according to where they live, income, age etc.

5 Many possibilities. Perhaps the best would be to use a list of parents with children under five – this may be available to officials through the local Health Authority. They could then be divided into sub-groups according to where they live (this may also give a reasonably representative sample as regards income and ethnicity), and a sample selected in proportion using random numbers.

6a Total number of employees = 29 101 thousand

Numbers in each sub-group in the sample are given below:

Age (years)	Men	Women
16 – 17	26	33
18 – 24	298	273
25 – 34	613	508
35 – 49	979	861
50 – 64	675	593
65+	86	55

b Many possibilities such as industry, type of work, experience

c Many possibilities such as finding names and addresses of employees and poor return rate from postal surveys.