

Simple Random Sampling:

Every item in the population has an equal chance of being chosen. You could assign a number to each item and then use random number tables, a calculator or computer to choose a sample, ignoring duplicate numbers. You could also pull names from a hat.

This method is more suited to a relatively small population where a complete list of the population to choose the sample from, exists.

Systematic Sampling:

A regular pattern is used to choose the sample. Every item in the population is listed, a starting point is randomly chosen and then every n^{th} item is selected. For example, a mixed (male and female) class could be listed in alphabetical order and every sixth student selected, starting with the 3rd student.

This is a simpler and quicker method to select a (random) sample, but may be unrepresentative if a pattern exists in the list. For example, every sixth student in the above sample may be a girl.

Stratified Sampling:

The population is divided into categories (strata) by age, gender, social class..., and then a random sample is chosen from each category. The size of each sample is in proportion to the size of each category within the population.

For example:

Year Group	Year 7-9	Year 10-11	Sixth Form
Number of Girls	480	320	100

If I want a sample of 30 girls, I would choose the number of people to take part from each year as follows:

$$\text{Year 7-9: } \frac{480}{900} \times 30 = 16$$

$$\text{Years 10-11: } \frac{320}{900} \times 30 = 11 \text{ (nearest whole number)}$$

$$\text{Sixth Form: } \frac{100}{900} \times 30 = 3 \text{ (nearest whole number)}$$

Instruction Card

For each of the following scenarios discuss and consider the following points:

- Who would you sample? – What would your population be?
- Why might the sample be biased?
- Would you use the method of sampling selected; what do you think of their decision?
- Which method of sampling would be better?

Quota Sampling:

The population is divided into groups (gender, age, etc). A given number (quota) is surveyed from each group. This type of sample is not random, but is cheap to carry out and can be done quickly.

How reliable would such samples be?

This type of sampling is often used in market research.

If there are n items in the population, an appropriate sample size is \sqrt{n} .

Convenience Sampling:

The most convenient sample is chosen which, for a sample of size sixty, could mean the first sixty people you meet.

It is highly likely that this sample would be biased and unrepresentative.

Opinion Polls:

Large-scale opinion polls often use a combination of cluster and quota sampling.

An example of this is the accurate estimates of the outcome of general election for the government.

The sample size may be large, but is often based on a very small proportion of the population. The criteria of selection of sample could be geographical area, age... A major disadvantage of conclusions drawn from opinion polls is that opinions may change over time.

Cluster Sampling:

The population is divided into groups or clusters. A random sample of clusters is chosen and every item in the chosen cluster is surveyed.

A large number of small clusters minimises the chances of the being unrepresentative.

This method is used by biologists to study different plants.

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