



SCIENTIFIC SAMPLING

If you wanted to know which clothing store most people in Canada shopped at, how would you do it? You could ask every person in Canada where they shop, but that would be incredibly time consuming. A more practical approach would be to conduct a survey. A survey involves sampling individuals from a population with the goal of making statistical inferences about the population as a whole.

Scientists often collect samples to find answers to questions about the world around us. They may collect samples of water, soil, plants, etc. to name a few. When scientists collect these individual samples, they often do so to understand a larger entity such as a river, a farm field, or an ecosystem. The most important factor to consider when collecting samples is whether the set of samples accurately represents the larger population as a whole. There are a number of factors that scientist have to consider when deciding how many samples to collect and what kinds of samples to collect.

Sample Size

Sample size is one of the most important aspects of scientific sampling and it depends on a number of factors. For example, if you sampled just one individual from a population, could you make any assumptions about the population? Of course not, unless the size of the population was very small. The number of samples collected is generally relative to the size of the population. Large populations require more samples to be gathered than small populations so that an accurate representation of the population occurs. For example, 5 samples collected from a population of 10 could give you a pretty fair idea about the whole population, whereas 5 samples collected from a population of 1000 would not. Small sample sizes can bias or skew results mainly because the sample size is not likely to be representative of the population as a whole.

Bias

A **Bias** is a type of error which occurs when samples do not accurately represent the population or are collected in a way that is unfair, meaning that all samples did not have an equal chance of being selected.

- **Sampling bias** is a type of bias caused by surveying only some of the population rather than surveying all of the population causing some members of the population to be less likely to be included than others. This could occur if you took samples from only one location in an organism's range, or took water samples from only one spot along a river.
- **Inclusive bias** occurs when samples are collected for convenience, such as those organisms that are easier to find, places that are closer to you geographically, etc.
- **Research bias** can occur when the people collecting the samples influence the results (i.e., what samples to collect), in order to obtain a certain outcome.