

SAMPLING METHODS

1) SIMPLE RANDOM SAMPLE: Every measurement in the population has equal probability of being chosen.

Ex: To form a random student committee, assign each student a number and use a calculator's random number generator to select students.

2) STRATIFIED RANDOM SAMPLE: The population is divided into sub-populations, then a random sample is selected from each subpopulation.

Ex: Thirty percent of ball bearings at a factory have 5mm radius and the other 70% have 10mm radius. Say we want a random sample of 50 ball bearings. Take a random sample of 15 of the 5mm ball bearings and a random sample of 35 of the 10mm ball bearings.

Comment: $0.3(50) = 15$ and $0.7(50) = 35$

3) CLUSTER SAMPLE: Divide the population into clusters and take a random sample of the clusters. ALL measurements in the chosen clusters are included in the sample.

Ex: To form a sample of buildings in Victoria, let the city blocks represent the clusters. Take a random sample of the city blocks; all buildings in the chosen blocks are included in the sample.

4) 1-in-k SYSTEMATIC SAMPLE: Randomly select one of the first k measurements in the population and every k-th measurement thereafter.

Ex: Ball bearings #3,23,43,63,... from a production line form a 1-in-20 systematic sample.

Comments: The random starting point makes this a random sample. Avoid patterns when choosing k, e.g. all ball bearings produced by same machine.

Ex: Identify the sampling method:

a) A lightbulb company makes 60W and 100W bulbs; 80% are 60W and the rest are 100W. A random sample of 40 of the 60W bulbs is selected, together with a random sample of 10 of the 100W bulbs.

b) Engineers in a large city want to perform a random check on red-light cameras in 85 different neighbourhoods. A random sample of 10 neighbourhoods is selected and every red-light camera in the chosen neighbourhoods is inspected.

c) A random number generator is used to select 12 of 100 shipments for quality-control testing.

d) Starting with the 11th part, every 25th part coming off the production line is selected for further inspection.