

9.4

Selecting a Sample

FOCUS

- Understand and choose an appropriate sample.

When we cannot survey an entire population, we choose a sample from the population.

When a political party wants to determine if its candidate is likely to win the next territorial election, it may conduct a telephone survey of a sample of voters. How could the party ensure that the sample is representative of the population?

Here are some common sampling methods:

Simple random sampling

Each member of the population has an equal chance of being selected.

For example, to select a random sample of 5 students from your math class, each student is assigned a number and 5 numbers are drawn from a hat.

Systematic or interval sampling

Every n th member of the population is selected.

This method is often used in manufacturing; for example, every 20th product in an assembly line is tested for quality. If the item is destroyed or unusable after being sampled, then the sample is a *destructive sample*.



Cluster sampling

Every member of each randomly chosen group of the population is selected.

For example, each grade represents a group of the school population. One grade in your school is chosen randomly, and all students in that grade are selected.

Self-selected sampling

Only members who are interested and volunteer will participate.

For example, if a radio station conducts a telephone survey, only people who are interested will call.



Convenience sampling

Only members of the population who are convenient to include are selected.

For example, for a survey about grocery shopping habits, people in a grocery store are approached and questioned.

Stratified random sampling

Some members from each group of the population are randomly selected.

For example, 5 randomly chosen students from each grade in a school could be selected, even if each grade has a different number of students.

Example 1 Identifying Appropriate Samples

The student leadership team wants to find out if students would like the cafeteria to have longer hours. Several sampling methods were suggested. Explain whether each sample is appropriate.

- a) Every student's name is put into a box, and 100 names are selected randomly to be surveyed.
- b) Every 5th person entering the school is selected.
- c) Each person on the leadership team asks her or his friends.
- d) An announcement is made asking anyone who wishes to participate to fill in a ballot.

▶ A Solution

Sampling Method	Is the Sample Appropriate?
a) Simple random sampling	The sample is appropriate because every student has an equal chance of being selected.
b) Systematic sampling	The sample may or may not be appropriate depending on when you ask students. If you ask students who arrive early in the morning, then these students may appreciate the cafeteria having longer hours. The opinions of these students would likely not be representative of the entire student population.
c) Convenience sampling	The sample is likely not appropriate because friends often have similar views on issues.
d) Self-selected sampling	The sample is likely not appropriate because only students who have strong opinions about this topic may respond.

Example 2 Choosing Appropriate Samples

A company packages boxes of granola bars. The quality-control manager inspects the first 5 boxes each morning to ensure that each has the same number and types of granola bars.

- a) Is this a good way of ensuring quality control? Explain.
- b) Suggest 2 other methods of sampling that would be appropriate. Explain why each is appropriate.

▶ A Solution

- a) This may not be a good way of ensuring quality control because the people working on the assembly line may be more alert in the morning. So, the boxes filled in the mornings may pass inspection. However, the boxes made later in the day, which may not meet the manager's standards, are never inspected.
- b) Systematic sampling would allow the manager to inspect several boxes throughout the day. For example, each 50th box could be inspected. Simple random sampling throughout the day would also be appropriate because it ensures each box has an equal chance of being selected.

Practice Questions: Pg 448-449 Questions 3, 6, 8, 10