LESSON MAKER PRO

Sampling Smarts

Compare how samples are chosen and how bias can affect results.

HIGH SCHOOL · MA.912.DP.5.3

MA.912.DP.5.3 "Compare and contrast sampling methods."

NAME _____ DATE _____

CHOOSE BY THE METHOD

Use the way people are chosen to identify a sample. In a simple random sample, each possible group of a set size has an equal chance, while a systematic sample uses a random start and a fixed interval. A stratified sample takes people from every subgroup, a cluster sample takes whole groups, and convenience or voluntary-response samples can be biased.

WORKED EXAMPLE

A library wants feedback from 96 cardholders. It randomly starts with cardholder 5 and then surveys every 8th name. Identify the sampling method and list the next two cardholders selected.

1. Begin with cardholder 5.
2. Add 8 to get cardholder 13.
3. Add 8 again to get cardholder 21.

Answer: Systematic sample; the next two cardholders are 13 and 21.

PRACTICE 6 problems

1 A principal puts every student ID into a box and draws 30 IDs without looking. Identify the sampling method.

ANSWER _____

2 A music reviewer randomly chooses a starting song on a playlist, then checks every 12th song. Identify the sampling method.

ANSWER _____

3 A school divides students by grade level and randomly selects 10 students from each grade. Identify the sampling method.

ANSWER _____

4 A researcher randomly chooses 4 entire homerooms and surveys every student in those homerooms. Identify the sampling method.

ANSWER _____

5 A student asks the first 20 people who enter the cafeteria about the lunch menu. Identify the sampling method.

ANSWER _____

6 A school posts an online poll link and lets anyone who wants to respond answer it. Identify the sampling method.

ANSWER _____

APPLY IT Show your work

1 Student council wants to estimate opinions about a new schedule for 1,200 students. Plan A surveys 60 volunteers at a pep rally. Plan B randomly selects 15 students from each grade. Which plan is more likely to represent the whole school? Name its sampling method and explain why.

WORK SPACE

ANSWER _____

2 A gaming club has 90 members on 6 teams. Plan A randomly chooses 2 teams and surveys every member on those teams. Plan B puts all members in random order, starts at a random member, and surveys every third name until 30 members are selected. Identify each method. Which plan is less likely to overrepresent one team, and why?

WORK SPACE

ANSWER _____

CHALLENGE One step up

A school has 900 students: 360 ninth graders, 270 tenth graders, 180 eleventh graders, and 90 twelfth graders. The school wants a proportional sample of 60 students. How many students should be randomly selected from each grade? Name the sampling method and explain why it is better than asking 60 students from the shortest lunch line.

WORK SPACE AND ANSWER

Sampling Smarts

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A principal puts every student ID into a box and draws 30 IDs without looking. Identify the sampling method.	**Simple random sample**
2	A music reviewer randomly chooses a starting song on a playlist, then checks every 12th song. Identify the sampling method.	**Systematic sample**
3	A school divides students by grade level and randomly selects 10 students from each grade. Identify the sampling method.	**Stratified sample**
4	A researcher randomly chooses 4 entire homerooms and surveys every student in those homerooms. Identify the sampling method.	**Cluster sample**
5	A student asks the first 20 people who enter the cafeteria about the lunch menu. Identify the sampling method.	**Convenience sample**
6	A school posts an online poll link and lets anyone who wants to respond answer it. Identify the sampling method.	**Voluntary-response sample**

PART 2 · APPLY IT

1. **Plan B is more likely to represent the whole school. It is a stratified random sample because it includes randomly selected students from every grade, while pep rally volunteers may not represent all students.** Plan B selects students within each grade, so every grade is represented. Plan A is a voluntary-response sample from one event and may be biased.
2. **Plan A is a cluster sample, and Plan B is a systematic sample. Plan B is less likely to overrepresent one team because the randomly ordered list spreads selections across individual members instead of selecting only whole teams.** Plan A selects entire groups, so it is cluster sampling. Plan B uses a random start and a fixed interval on a random order list, so it is systematic sampling.

CHALLENGE

Select 24 ninth graders, 18 tenth graders, 12 eleventh graders, and 6 twelfth graders. This is a stratified random sample because each grade is represented in the same proportion as the school. It is better than the lunch-line sample because a shortest lunch line is a convenience sample and may not represent all grades.

Accept "random sample" for "simple random sample" when the selection description gives every student an equal chance. For explanations, accept equivalent statements that identify representative subgroup coverage or possible bias.