LESSON MAKER PRO

Polls Under Pressure

Compare rates, then question how the data were collected.

HIGH SCHOOL · S.DC.2.1

S.DC.2.1 "Explain how randomization and sources of bias impact the results of a study."

NAME _____ DATE _____

RATES AND RANDOMNESS

Divide yes responses by total responses to find each rate. Subtract the rates to compare them in percentage points. Random selection helps a sample represent a population, while random assignment helps make treatment groups comparable. Volunteers and missing replies can bias results.

WORKED EXAMPLE

A school asks students about a mural. Find each yes rate and the difference in percentage points. Which sample is more likely to represent the whole school?

MURAL POLL

Sample	Students	Yes
Randomly selected from school roster	25	5
Leaving art club	25	15

1. Roster rate: 5/25 = 20%.
2. Art club rate: 15/25 = 60%.
3. Difference: 60% - 20% = 40 percentage points.

Answer: The rates differ by 40 percentage points. The random roster sample is more likely to represent the whole school.

PRACTICE 4 problems

1 In an online poll, 6 of 8 students who responded favor a later start time. Find the yes rate and name a possible source of bias.

ANSWER _____

2 At a game, 6 of 8 students surveyed prefer a new logo. In a random roster sample, 2 of 8 do. Find the difference in yes rates and name a possible bias in the game sample.

ANSWER _____

3 A random roster sample invites 16 students to answer a poll. Only 8 reply, and 6 favor longer lunch. Find the yes rate among respondents and name a possible bias.

ANSWER _____

4 Athletes choose a practice plan. Of 8 using a new plan, 6 improve. Of 8 using the usual plan, 4 improve. Find both rates. Why is it unclear whether the new plan caused the difference?

ANSWER _____

APPLY IT Show your work

1 Your school is considering a smoothie station. Find the difference in yes rates shown below. Which poll gives a more reliable estimate for the whole school, and why?

SMOOTHIE STATION POLLS

Poll	Responses	Yes
Random roster sample	24	18
Social media poll	24	21

ANSWER _____

2 A music club recruits 32 volunteers. It randomly assigns 16 to study with music and 16 to study in silence. Scores improve for 12 with music and 8 in silence. Find both improvement rates. What does random assignment help prevent, and why might the results not apply to all students?

WORK SPACE

ANSWER _____

CHALLENGE One step up

A school randomly selects the students shown below for a poll. Find the lowest and highest possible yes rates among those selected. Explain why the rate among students who replied might be misleading.

SCHOOL POLL

Selected	Replied	Yes among replies
48	24	18

WORK SPACE AND ANSWER

Polls Under Pressure

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	In an online poll, 6 of 8 students who responded favor a later start time. Find the yes rate and name a possible source of bias.	**75%; voluntary-response bias.**
2	At a game, 6 of 8 students surveyed prefer a new logo. In a random roster sample, 2 of 8 do. Find the difference in yes rates and name a possible bias in the game sample.	**50 percentage points; students who did not attend the game were excluded.**
3	A random roster sample invites 16 students to answer a poll. Only 8 reply, and 6 favor longer lunch. Find the yes rate among respondents and name a possible bias.	**75%; nonresponse bias.**
4	Athletes choose a practice plan. Of 8 using a new plan, 6 improve. Of 8 using the usual plan, 4 improve. Find both rates. Why is it unclear whether the new plan caused the difference?	**75% for the new plan and 50% for the usual plan. Athletes chose their plans, so the groups may have differed before practice began.**

PART 2 · APPLY IT

1. **12.5 percentage points. The random roster sample is more reliable because students chose whether to answer the social media poll.** The rates are 18/24 = 75% and 21/24 = 87.5%, a difference of 12.5 percentage points. The social media poll risks voluntary-response bias.
2. **75% with music and 50% in silence. Random assignment helps prevent preexisting differences from favoring one group. Club volunteers may not represent all students.** Calculate 12/16 = 75% and 8/16 = 50%. Random assignment makes the groups more comparable, but recruiting only volunteers from the club limits generalization.

CHALLENGE

The lowest possible rate is 18/48 = 37.5%. The highest is 42/48 = 87.5% if all 24 nonrespondents would say yes. The respondent rate is 18/24 = 75%, but nonresponse could make it unrepresentative.

Accept equivalent fractions or percentages for rates. For bias explanations, accept a specific description of who was left out or how groups could have differed.