LESSON MAKER PRO

Sample Smart

Use random samples to make fair estimates.

GRADE 7 · 7.PAR.4.11

7.PAR.4.11 "Analyze sampling methods and conclude that random sampling produces and supports valid inferences."

NAME _____ DATE _____

THE BIG IDEA

A random sample gives every member of a population an equal chance to be chosen. Use results from a random sample to estimate the whole population, but do not make a broad inference from a convenience or voluntary-response sample.

WORKED EXAMPLE

A town has 48 skateboarders. A random sample of 12 skateboarders is chosen, and 9 say they wear helmets. Estimate how many of all 48 skateboarders wear helmets.

1. Write the sample proportion: 9/12.
2. Simplify the proportion: 9/12 = 3/4.
3. Find 3/4 of 48: 3/4 x 48 = 36.

Answer: About 36 skateboarders wear helmets.

PRACTICE 6 problems

1 A librarian puts the ID numbers of all 80 students into a box and draws IDs without looking. Is this a random sample?

ANSWER _____

2 At lunch, Mia asks the first 16 students who enter the cafeteria about school lunches. What type of sample is this?

ANSWER _____

3 A random sample of 25 out of 175 seventh graders finds that 10 walk to school. Estimate how many of the 175 seventh graders walk to school.

ANSWER _____

4 In a random sample of 28 students, 21 say they read for fun each week. What percent of the sample reads for fun each week?

ANSWER _____

5 A student posts an online poll asking, "Do you want longer recess?" and uses only the people who choose to respond. What type of sample is this?

ANSWER _____

6 A random sample of 30 books from a library of 150 books finds that 8 books are checked out. Estimate how many of the 150 books are checked out.

ANSWER _____

APPLY IT Show your work

1 The student council wants to estimate how many of 200 youth center members would join a weekend art club. It randomly selects 40 member IDs, and 26 members say they would join. Estimate how many members would join. Explain why this estimate can be used for the whole youth center.

WORK SPACE

ANSWER _____

2 The school is considering a new after-school gaming room. The media club posts a poll in the gaming club's chat. Of 30 replies, 27 support the room. Can the club use 27/30 to estimate support among all students? Explain.

WORK SPACE

ANSWER _____

CHALLENGE One step up

To estimate support for a later school start, two groups collect data from a school of 500 students. Group A randomly selects 50 students, and 35 support a later start. Group B asks 50 students at morning study hall, and 45 support a later start. Which group should the school use to estimate support from all students? Estimate how many students support a later start and explain your reasoning.

WORK SPACE AND ANSWER

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A librarian puts the ID numbers of all 80 students into a box and draws IDs without looking. Is this a random sample?	**Yes. Each student ID has an equal chance of being drawn.**
2	At lunch, Mia asks the first 16 students who enter the cafeteria about school lunches. What type of sample is this?	**Convenience sample.**
3	A random sample of 25 out of 175 seventh graders finds that 10 walk to school. Estimate how many of the 175 seventh graders walk to school.	**70 seventh graders.**
4	In a random sample of 28 students, 21 say they read for fun each week. What percent of the sample reads for fun each week?	**75%.**
5	A student posts an online poll asking, "Do you want longer recess?" and uses only the people who choose to respond. What type of sample is this?	**Voluntary-response sample.**
6	A random sample of 30 books from a library of 150 books finds that 8 books are checked out. Estimate how many of the 150 books are checked out.	**40 books.**

PART 2 · APPLY IT

1. **About 130 members would join.** The sample was random, so it can support an inference about all 200 members. Use 26/40 of 200: (26/40) x 200 = 130. Randomly selecting member IDs makes the sample appropriate for estimating the full membership.
2. **No.** This is a voluntary-response sample from a gaming club chat, so it likely overrepresents students who want a gaming room. The respondents chose to reply, and they came from a group already interested in gaming. The sample is not random, so it does not support a valid inference about all students.

CHALLENGE

Use Group A. Its random sample shows 35/50 = 70% support, so 70% of 500 = 350 students. Group B is not a random sample because students at morning study hall may not represent all students.

Accept equivalent proportion setups and estimates stated as "about" when appropriate. For explanations, accept any clear statement that random selection supports an inference and that convenience or voluntary-response sampling can create bias.