LESSON MAKER PRO

Sample to School

Use several random samples to predict a population count.

GRADE 7 · 7.DSP.A.10.d

7.DSP.A.10.d "Use data from a random sample to draw inferences about a population with an unknown characteristic of interest, generating multiple samples to gauge variation and making predictions or conclusions about the population."

NAME _____ DATE _____

FROM SAMPLE TO POPULATION

To estimate how many people in a population have a trait, multiply the count in a random sample by population size / sample size. Do this for several samples. The estimates may differ, so compare them before making a prediction.

WORKED EXAMPLE

A library has 144 members. Three random samples of 12 members show how many borrowed a mystery book last month. Estimate how many library members borrowed a mystery book using the middle of the three estimates.

LIBRARY SAMPLES

Sample	Borrowed a mystery book
A	3
B	7
C	9

1. The population is 144 / 12 = 12 times the size of each sample.
2. Multiply each count by 12: 3 × 12 = 36, 7 × 12 = 84, and 9 × 12 = 108.
3. The middle estimate is 84.

Answer: About 84 library members

PRACTICE 6 problems

1 A school has 200 students. Each random sample includes 10 students. Use the middle sample estimate to predict how many students bring a packed lunch.

PACKED LUNCHES

Sample	Students with packed lunches
A	2
B	4
C	8

ANSWER _____

2 A school has 400 students. Each random sample includes 20 students. Use the middle sample estimate to predict how many students walk to school. Why use more than one sample?

WALKING TO SCHOOL

Sample	Students who walk
A	6
B	10
C	14

ANSWER _____

3 A school has 300 students. Each random sample includes 10 students. Estimate the number of students who play a musical instrument from each sample. Then find the mean of the three estimates.

PLAYING AN INSTRUMENT

Sample	Students who play
A	4
B	6
C	8

ANSWER _____

4 A school has 500 students. Each random sample includes 25 students. Both groups of samples estimate how many students ride a bike for fun. Which group gives estimates with a smaller spread? Show how you know.

STUDENTS WHO RIDE A BIKE

Sample	Group A count	Group B count
1	10	14
2	15	15
3	20	16

ANSWER _____

5 A school has 600 students. Each random sample includes 20 students. Find the lowest and highest estimates of how many students play a team sport. Then find the difference between those estimates.

PLAYING A TEAM SPORT

Sample	Students who play
A	8
B	10
C	16

ANSWER _____

6 A school has 800 students. Each random sample includes 20 students. Estimate how many students visit the public library from each sample. Then find the mean of the three estimates.

PUBLIC LIBRARY VISITS

Sample	Students who visit
A	4
B	10
C	16

ANSWER _____

APPLY IT Show your work

1 Your school has 900 students and is deciding whether to host a video game tournament. Three random samples of 30 students each found that 10, 16, and 20 students would enter. Use the middle sample estimate to predict how many students would enter.

WORK SPACE

ANSWER _____

2 A streaming club wants to know how many of the 1,000 students at a school would listen to a student-made playlist. Three random samples of 25 students each found that 15, 18, and 20 students would listen. Use the middle sample estimate to make a prediction.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A school has 500 students. Three random samples of 20 students found that 6, 10, and 18 students would join an after-school art event. A student uses only the largest sample count and predicts that 450 students would join. In two sentences, give a prediction using the middle sample estimate and explain why the student's prediction may be less reliable.

WORK SPACE AND ANSWER

ANSWER KEY

Sample to School

GRADE 7 · 7.DSP.A.10.d

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A school has 200 students. Each random sample includes 10 students. Use the middle sample estimate to predict how many students bring a packed lunch.	**About 80 students**
2	A school has 400 students. Each random sample includes 20 students. Use the middle sample estimate to predict how many students walk to school. Why use more than one sample?	**About 200 students. The samples give different estimates, so using more than one shows how much the results vary.**
3	A school has 300 students. Each random sample includes 10 students. Estimate the number of students who play a musical instrument from each sample. Then find the mean of the three estimates.	**Sample estimates: A, 120 students; B, 180 students; C, 240 students. Mean estimate: 180 students.**
4	A school has 500 students. Each random sample includes 25 students. Both groups of samples estimate how many students ride a bike for fun. Which group gives estimates with a smaller spread? Show how you know.	**Group B. Its estimates are 280, 300, and 320, a spread of 40 students. Group A's estimates are 200, 300, and 400, a spread of 200 students.**
5	A school has 600 students. Each random sample includes 20 students. Find the lowest and highest estimates of how many students play a team sport. Then find the difference between those estimates.	**Lowest estimate: 240 students. Highest estimate: 480 students. Difference: 240 students.**
6	A school has 800 students. Each random sample includes 20 students. Estimate how many students visit the public library from each sample. Then find the mean of the three estimates.	**Sample estimates: A, 160 students; B, 400 students; C, 640 students. Mean estimate: 400 students.**

PART 2 · APPLY IT

1. **About 480 students** The population is 900 / 30 = 30 times each sample. The estimates are 300, 480, and 600 students, so the middle estimate is 480.
2. **About 720 students** The population is 1,000 / 25 = 40 times each sample. The estimates are 600, 720, and 800 students, so the middle estimate is 720.

CHALLENGE

The three estimates are 150, 250, and 450, so the middle estimate predicts about 250 students would join. The samples vary widely, and the prediction of 450 uses only one of them.

Accept estimates labeled as approximate. For written explanations, accept any accurate comparison that uses the variation among samples.