LESSON MAKER PRO

Sample Snapshot

Use repeated samples to make careful population estimates.

GRADE 6 · NY-6.SP.1.c

NY-6.SP.1.c "Understand that the method and sample size used to collect data for a particular question is intended to reduce the difference between a population and a sample taken from the population so valid inferences can be drawn about the..."

NAME _____ DATE _____

THE BIG IDEA

A random sample chosen from across a population is more likely to represent the whole group. Repeat samples of the same size can give different estimates, so use the variation to make a reasonable prediction.

WORKED EXAMPLE

Three random samples of 25 students were asked whether they bring a reusable water bottle. The yes counts were 11, 14, and 16. Find each percent and the range of the estimates.



1. 11/25 = 44%, 14/25 = 56%, and 16/25 = 64%.
2. The lowest estimate is 44%.
3. 64% - 44% = 20 percentage points.

Answer: 44%, 56%, and 64%; range: 20 percentage points

PRACTICE 4 problems

1 A school has 420 students. Which sample is more likely to represent the school: 7 friends chosen by one student, or 35 names chosen randomly from the school roster? Explain.

ANSWER _____

2 Samples of 18 students have 6, 9, and 12 students who prefer online homework. What is the range of the three estimates?

ANSWER _____

3 Three random samples of 60 students have 27, 33, and 30 students who want a game room. Use the lowest and highest estimates to predict how many of 220 students may want one.

ANSWER _____

4 To estimate favorite school lunch, choose the better method: A, survey 28 students in art club; B, starting at a random name, survey every fourth student on the full roster until 28 students are chosen. Explain.

ANSWER _____

_____

APPLY IT Show your work

1 A student council takes three random samples of 60 students about a school dance. The table shows how many would attend. Use the lowest and highest estimates to predict attendance out of 300 students.

STUDENTS WHO WOULD ATTEND

Sample	Would attend
A	22
B	28
C	25

ANSWER _____

2 Lena asks 13 friends about a new club, and 9 say they would join. Omar randomly selects 50 students from the school roster, and 32 say they would join. Which result should the principal use to estimate interest for all 500 students? What is that estimate?

WORK SPACE

ANSWER _____

3 Run four random samples of the same model population. Your teacher provides 20 identical folded cards: 12 YES and 8 NO. Mix them in an opaque bag. For each sample, draw 5 cards without looking and without replacement; record all five responses. Count YES, find the percent YES, and estimate the number YES in a similar population of 200. Return all cards and remix before each new sample. Record the four results in the table. Find the range in percentage points and explain your observed variation (or matching estimates).

ACTUAL SAMPLES: RECORD FIVE RESPONSES AND CALCULATE

Sample	Five responses	YES count	YES % / estimate of 200
1			
2			
3			
4			

ANSWER _____

CHALLENGE One step up

Four random samples of 30 students are asked whether they would use a quiet study room. The yes counts are 8, 10, 15, and 17. Use the lowest and highest estimates to predict how many of 240 students may use the room. Explain why one exact prediction is not certain.

WORK SPACE AND ANSWER

ANSWER KEY **Sample Snapshot** **GRADE 6 · NY-6.SP.1.c**

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A school has 420 students. Which sample is more likely to represent the school: 7 friends chosen by one student, or 35 names chosen randomly from the school roster? Explain.	**The 35 randomly chosen names, because the sample is larger and is selected from across the school.**
2	Samples of 18 students have 6, 9, and 12 students who prefer online homework. What is the range of the three estimates?	**1/3, or 33 1/3 percentage points**
3	Three random samples of 60 students have 27, 33, and 30 students who want a game room. Use the lowest and highest estimates to predict how many of 220 students may want one.	**99 to 121 students**
4	To estimate favorite school lunch, choose the better method: A, survey 28 students in art club; B, starting at a random name, survey every fourth student on the full roster until 28 students are chosen. Explain.	**B, because it selects students from the full roster instead of only one club.**

PART 2 · APPLY IT

1. **110 to 140 students** The sample estimates are 22/60, 28/60, and 25/60. Multiply the lowest and highest estimates by 300 to get 110 and 140.
2. **Use Omar's sample; about 320 students.** Omar's sample is randomly selected from the school roster. Since 32/50 = 64%, 64% of 500 is 320.
3. **Results vary. For each sample with k YES: YES percent = 20k%, estimate= 40k out of 200; range=20(maximum k-minimum k) percentage points.** Prepare 20 indistinguishable folded cards (12 YES, 8 NO) and an opaque bag; learners actually draw 5 without replacement, restore all 20 and remix between four trials. Check each recorded response/count. Example only: counts 2,3,4,3 give 40%,60%,80%,60%, estimates 80,120,160,120, range 40 percentage points. Do not require these invented example results; equal observed estimates are possible. Compare with known model population 12/20=60%, explaining why small random samples can vary and why a sample is not an exact population count.

CHALLENGE

64 to 136 students. Equal-size random samples give different estimates, so the exact population number is not known.

Accept equivalent forms for the range in problem 2, including 33 1/3% or 1/3. For explanations, accept statements that identify random selection from the full population and larger, less biased samples. For Apply 3 supply the cards/bag before class and observe all four generated samples. Check recorded responses, constant sample size, restoration/remixing, calculated estimates and the actual range; a supplied or imagined set alone is incomplete. Percent estimates may match by chance.