LESSON MAKER PRO

Can We Generalize?

Use samples to make estimates you can trust.

GRADE 7 · 7.SP.1c

7.SP.1c "Solve real-world and mathematical problems involving: Understand that generalizations from a sample are valid only if the sample is representative of the population."

NAME _____ DATE _____

CHECK THE SAMPLE

A sample can support an estimate for a whole population only if the way people are chosen gives different parts of that population a fair chance to be included. Multiply the fraction in a representative sample by the population size, and treat the result as an estimate, not an exact count.

WORKED EXAMPLE

A camp has 180 campers. Of 15 campers randomly chosen from the whole camp, 9 want to go kayaking. Estimate how many campers want to go kayaking.

1. Find the sample fraction: 9/15 = 3/5.
2. Apply it to the camp: 3/5 × 180 = 108.
3. The campers were chosen from the whole camp, so this sample can support a campwide estimate.

Answer: About 108 campers.

PRACTICE 6 problems

1 A school has 240 students. Of 30 students randomly chosen from the whole school, 12 want a longer lunch period. Estimate how many students want a longer lunch period.

ANSWER _____

2 Each of four homerooms has 80 students. Ten students are randomly chosen from each homeroom. Of the 40 students surveyed, 25 want a new lunch option. Estimate how many students in the four homerooms want it.

ANSWER _____

3 A school has 450 students. A survey of 50 robotics club members finds that 35 enjoy coding. What fraction of the surveyed students enjoy coding? Can you use that fraction to estimate how many students in the whole school enjoy coding? Explain briefly.

ANSWER _____

4 A town has 600 teens. At a skate park, 60 teens are surveyed and 21 say they want a new ramp. If you use this sample, what is the estimate for all teens in town? Explain why it may not be reliable.

ANSWER _____

5 A school has 360 students. The table shows two surveys about starting a video game club. Which survey gives the better schoolwide estimate, and what is that estimate?

VIDEO GAME CLUB SURVEYS

Students surveyed	Sample size	Want the club
Randomly chosen from the whole school	36	12
Chosen from a gaming club	36	30

ANSWER _____

6 A school has 400 students. The table shows two surveys about holding a chess tournament. Find the estimate from each survey. Which estimate is more reliable?

CHESS TOURNAMENT SURVEYS

Students surveyed	Sample size	Want the tournament
Chosen from the chess club	20	16
Randomly chosen from the whole school	40	10

ANSWER _____

APPLY IT Show your work

1 Your school has 720 students and is considering outdoor lunch seating. The table shows two surveys. Use the more representative sample to estimate how many students prefer outdoor seating. Why might the other survey give an estimate that is too high?

OUTDOOR SEATING SURVEYS

Students surveyed	Sample size	Prefer outdoor seating
Randomly chosen from the whole school	72	45
Surveyed in the courtyard	72	63

ANSWER _____

2 A school has 540 students. The cafeteria randomly surveys 54 students from the whole school, and 24 say they would choose a vegetarian wrap. If the cafeteria makes 250 wraps, is that enough to meet the estimated demand? How many wraps would be left?

WORK SPACE

ANSWER _____

CHALLENGE One step up

A school is planning an esports tournament. Students were randomly chosen within each grade, but a different fraction of each grade was surveyed. Use the table to estimate how many students in both grades would join. A student instead calculates 18/36 × 560 = 280. Explain why your estimate is different.

ESPORTS TOURNAMENT SURVEY

Grade	Students in grade	Students surveyed	Would join
7	160	16	12
8	400	20	6

WORK SPACE AND ANSWER

ANSWER KEY

Can We Generalize?

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A school has 240 students. Of 30 students randomly chosen from the whole school, 12 want a longer lunch period. Estimate how many students want a longer lunch period.	**About 96 students.**
2	Each of four homerooms has 80 students. Ten students are randomly chosen from each homeroom. Of the 40 students surveyed, 25 want a new lunch option. Estimate how many students in the four homerooms want it.	**About 200 students.**
3	A school has 450 students. A survey of 50 robotics club members finds that 35 enjoy coding. What fraction of the surveyed students enjoy coding? Can you use that fraction to estimate how many students in the whole school enjoy coding? Explain briefly.	**7/10; no, robotics club members may be more likely than other students to enjoy coding.**
4	A town has 600 teens. At a skate park, 60 teens are surveyed and 21 say they want a new ramp. If you use this sample, what is the estimate for all teens in town? Explain why it may not be reliable.	**About 210 teens; teens at the skate park may be more likely to want a ramp than other teens.**
5	A school has 360 students. The table shows two surveys about starting a video game club. Which survey gives the better schoolwide estimate, and what is that estimate?	**The randomly chosen schoolwide survey; about 120 students.**
6	A school has 400 students. The table shows two surveys about holding a chess tournament. Find the estimate from each survey. Which estimate is more reliable?	**Chess club estimate: 320 students. Schoolwide random-sample estimate: 100 students, which is more reliable.**

PART 2 · APPLY IT

1. **About 450 students. Students in the courtyard may be more likely to prefer outdoor seating.** Use the schoolwide random sample: 45/72 × 720 = 450. The courtyard sample may overrepresent students who already like being outdoors.
2. **Yes. The estimate is 240 wraps, so 10 wraps would be left.** Estimate demand with 24/54 × 540 = 240. Since 250 − 240 = 10, the supply exceeds the estimated demand by 10 wraps.

CHALLENGE

About 240 students. Grade 7 contributes an estimate of 12/16 × 160 = 120, and grade 8 contributes 6/20 × 400 = 120. The calculation 18/36 × 560 = 280 treats the surveyed grades as if they were sampled in proportion to their sizes, but grade 7 makes up a larger share of the sample than it does of the school.

Accept equivalent fractions and explanations that identify why a sample does or does not represent the whole population. Estimated counts are not guaranteed actual counts.