

AP Statistics · Collecting Data: Sampling and Experiments · Worksheet Answer Key

Common Core AP Statistics Unit 1 (2026-27) · mathovore.fr

This ap statistics collecting worksheet answer key solves all 23 problems of the collecting data: sampling and experiments worksheet step by step.

Every problem is solved in full below. For the written problems, check that your explanation names the method or the source of bias and refers to the context of the problem, because AP free-response scoring requires both.

AP StatisticsCommon Core: AP Statistics Unit 1 (2026-27)

AP Statistics Collecting Worksheet Answer Key: problems 1-5

Problem 1: Population and sample

The population is all 1,850 students at the school. The sample is the 120 students surveyed.

$\hat{p} = \frac{54}{120} = 0.45$, so **45% of the sample ride the bus**. Because it describes a sample, $\hat{p}$ is a statistic.

Problem 2: Statistical questions

A statistical question expects variability in the answers and needs data from many individuals.

- a. Not statistical: one person, one answer.
- b. **Statistical**: the number varies by student.
- c. Not statistical: one day, one count, one answer.
- d. **Statistical**: compares two groups whose sleep times vary.

Problem 3: Name the sampling method

- a. **Systematic sample**: random start, then every 8th name. ($400/8 = 50$ students.)
- b. **Convenience sample**: whoever is easiest to reach.
- c. **Voluntary response sample**: listeners choose themselves.
- d. **Cluster sample**: whole schools are the clusters.

Problem 4: Voluntary response bias

This is a voluntary response sample: people with strong opinions are the most likely to respond, and people who like an app they use are the most likely to click on the website that

offers it.

The 92% probably overstates the real approval rate. The 600 respondents are not a random sample of all users, and 600 is large but cannot fix the bias.

Problem 5: Random digit table

Read left to right and keep only numbers from 01 to 40 that have not already appeared. Numbers like 00 or any value above 40 are skipped, and a repeat is skipped.

Line	1	2	3	4	5	6	7	8	9	10
101	41	65	79	01	33	19	96	25	33	11
102	25	65	07	76	24	64	03	88	67	46

Highlighted cells are the selected members.

The sample is members **01, 33, 19, 25, 11**.

AP Statistics Collecting Worksheet Answer Key: problems 6-10

Problem 6: Systematic sample

The interval is $k = \frac{120}{10} = 12$. Start at 7 and add 12 each time.

1-12 7	13-24 19	25-36 31	37-48 43	49-60 55
61-72 67	73-84 79	85-96 91	97-108 103	109-120 115

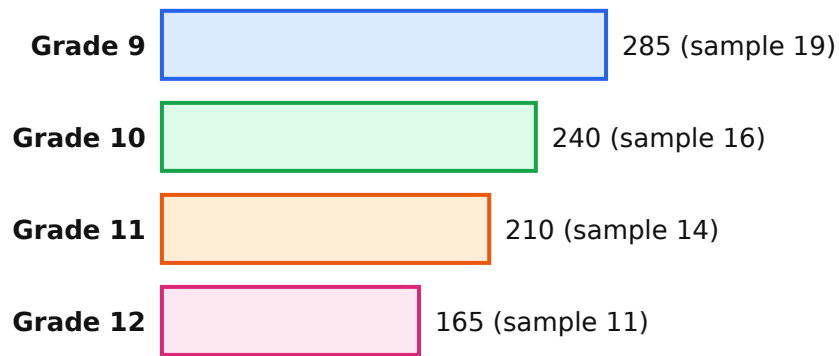
One locker in each block, at the same position.

The sample is **7, 19, 31, 43, 55, 67, 79, 91, 103, 115**.

Problem 7: Stratified sample

The sampling fraction is $\frac{60}{900} = \frac{1}{15}$.

$\frac{285}{15} = 19$, $\frac{240}{15} = 16$, $\frac{210}{15} = 14$, $\frac{165}{15} = 11$.



Sample sizes by grade.

19, 16, 14 and 11 students (total $19+16+14+11=60$). Each group is then sampled with an SRS.

Problem 8: Stratified versus SRS

An SRS could, by chance, contain very few students from one grade. A stratified sample **guarantees every grade is represented in the right proportion**. If opinions differ by grade, the stratified estimate varies less from sample to sample than the SRS estimate.

Problem 9: Sources of bias

- Undercoverage**: some households have no chance of selection.
- Nonresponse**: only $\frac{420}{3000} = 14\%$ responded, and responders may differ from non-responders.
- Response bias**: the setting pressures students to answer untruthfully.

Problem 10: Question wording

The words “wouldn’t you agree” and “waste” push the respondent toward answering yes. This is **response bias from question wording**.

A neutral version: **“Should the school spend more, the same, or less on football than it does now?”**

AP Statistics Collecting Worksheet Answer Key: problems 11-15

Problem 11: Study or experiment

- Observational study**. Explanatory: sleep hours. Response: GPA.
- Experiment**: treatments are imposed by random assignment. Explanatory: walking or not. Response: resting heart rate.
- Observational study**: players chose their own cleats, so no treatment was imposed. Explanatory: type of cleats. Response: sprint time.

Problem 12: Experiment vocabulary

Experimental units: the **24 tomato plants**. Factors: **fertilizer** (2 levels) and **watering schedule** (2 levels). Response: **yield**.

Treatments are the combinations: $2 \times 2 = 4$. With equal groups, $\frac{24}{4} = 6$, so **4 treatments with 6 plants each**.

Problem 13: Random assignment

Reading the list in order and skipping repeats gives Group A: **3, 10, 2, 5, 8, 11** (the repeated values are skipped).

Group B is everyone else: **1, 4, 6, 7, 9, 12**. Each group has 6 volunteers, and the random assignment makes the groups comparable on average.

Problem 14: Placebo and blinding

The placebo group is the **control**. It shows how much reaction time changes just because people expect a drink to help, so any extra improvement can be credited to the drink.

Double-blind: another person prepares identical, coded cups, so neither the participants nor the staff who measure reaction times know who got the real drink until the data are collected.

Problem 15: Completely randomized design

1. Label the plants 01 to 30.
2. Use random digits to choose 10 plants for fertilizer A, then 10 more of the remaining plants for B. The last 10 plants get C.
3. Grow all plants under the same light, water and soil.
4. Measure the yield of each plant and compare the three groups.

Each fertilizer is replicated on 10 plants, and random assignment spreads other differences among the groups.

AP Statistics Collecting Worksheet Answer Key: problems 16-20

Problem 16: Randomized block design

Block by experience. Within each block, randomly assign 6 runners to shoe A and 6 to shoe B (for example, by drawing labels at random), then compare times within each block.

Experience strongly affects speed. **Blocking removes that variation from the comparison**, so the difference between shoes is easier to see.

Problem 17: Matched pairs

For each sprinter, flip a coin to decide whether shoe A or shoe B is used first, so that any order effect (such as fatigue) is balanced.

Each sprinter is compared to himself or herself, so **differences between sprinters cancel out** and the shoe comparison is more precise.

Problem 18: Confounding variable

This is an observational study. A possible confounder is **a regular family routine**: it could lead to both a daily breakfast and more study time.

Because the students chose their own habits, the breakfast effect is mixed up with the effect of the confounder, so **only an association can be claimed, not causation**.

Problem 19: Scope of inference

- Random sample, no treatment: **generalize to all voters** in the population, but no cause and effect.
- Random assignment, but volunteers: **the diet caused the difference** for volunteers like these; generalizing to everyone is not justified.
- Random sample and random assignment: **cause and effect for the whole population** the adults were chosen from.

Problem 20: Town survey

The sampling fraction is $\frac{200}{5000} = 0.04$.

North: $2000 \times 0.04 = 80$. Center: $1750 \times 0.04 = 70$. South: $1250 \times 0.04 = 50$.

The total is $80 + 70 + 50 = 200$. **Sample 80, 70 and 50 residents; each resident has a 0.04 (4%) chance of being selected.**

AP Statistics Collecting Worksheet Answer Key: problems 21-23

Problem 21: Study app experiment

- Treatments: use the app for two weeks, or no app. Response variable: score on the same quiz given to everyone.
- Label the students 01 to 40, use random digits to choose 20 distinct labels for the app group. The other 20 form the control group.
- Control other variables: same quiz, same study time, same teacher, same room.
- Compare the mean quiz scores of the two groups.

Random assignment lets a significant difference be credited to the app; because the students

are volunteers, **the conclusion applies only to students like them.**

Problem 22: Stratified estimate

North: $\frac{32}{80} = 0.40$. Center: $\frac{21}{70} = 0.30$. South: $\frac{10}{50} = 0.20$.

Overall: $\hat{p} = \frac{32+21+10}{200} = \frac{63}{200} = 0.315$.

Prediction: $0.315 \times 5000 = 1575$. **About 1,575 residents support the library.** (Check by area: $800+525+250=1575$.)

Problem 23: Chance of selection

Each student is equally likely to be chosen: $P(\text{Priya}) = \frac{5}{40} = 0.125$.

For both, multiply: $\frac{5}{40} \times \frac{4}{39} = \frac{20}{1560} = \frac{1}{78} \approx 0.0128$.

0.125 for Priya alone and about 0.0128 for both.

How to use this ap statistics collecting worksheet answer key

Read this ap statistics collecting worksheet answer key after trying each problem yourself, and redo any problem you missed.

