

Data collection and conclusions



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1. A researcher wants to conduct a survey to gauge United States (U.S.) voters' opinions about the U.S. Congress. Which of the following should NOT be a component of this survey?

- A. The researcher collects data from the survey takers.
- B. The researcher analyzes data from the survey takers.
- C. The researcher distributes the survey to 10,000 randomly selected U.S. citizens aged 18 and older.
- D. The researcher distributes the survey to 10,000 residents of a Washington D.C. neighborhood.

2.A scientist wants to collect data about the effects of gravity on the growth of soybean plants. To test her hypothesis that soybeans grow better in a zero-gravity setting, she randomly assigns the plants into one of two groups. The first group is grown in typical soybean growing conditions in a greenhouse on earth, and the second group is grown in a zero-gravity, yet otherwise identical greenhouse in a space station. Which of the following is the best description of the research design for this study?

- A. Controlled experiment
- B. Observational study
- C. Sample Survey
- D. None of the above

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3. A researcher representing a city government wants to measure public opinion about recycling by asking 1,000 randomly selected residents a series of questions on the subject. Which of the following is the best description of the research design for this study?

- A. Observational study
- B. Sample Survey
- C. Controlled experiment
- D. None of the above

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The Effect of Sodium Chloride on the Boiling Temperature of Water

Tablespoons of sodium chloride added to one quart of water	Boiling temperature in degrees Fahrenheit
0	211.90°
1	214.60°
2	217.30°
3	220.00°

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4. The table above shows the results of a controlled experiment designed to determine the effect that adding sodium chloride to water has on the boiling point of water at sea level. Based on the results of this experiment, what conclusion is NOT valid when up to three tablespoons of sodium chloride are added to one quart of water?
- A. The more sodium chloride that is added to boiling water, the higher the water's boiling temperature becomes.
 - B. The more sodium chloride that is added to water, the longer the water will take to boil.
 - C. There is an association between adding sodium chloride to water and an increase in the boiling temperature of water.
 - D. There is a linear relationship between sodium chloride added to water and the water's boiling temperature.

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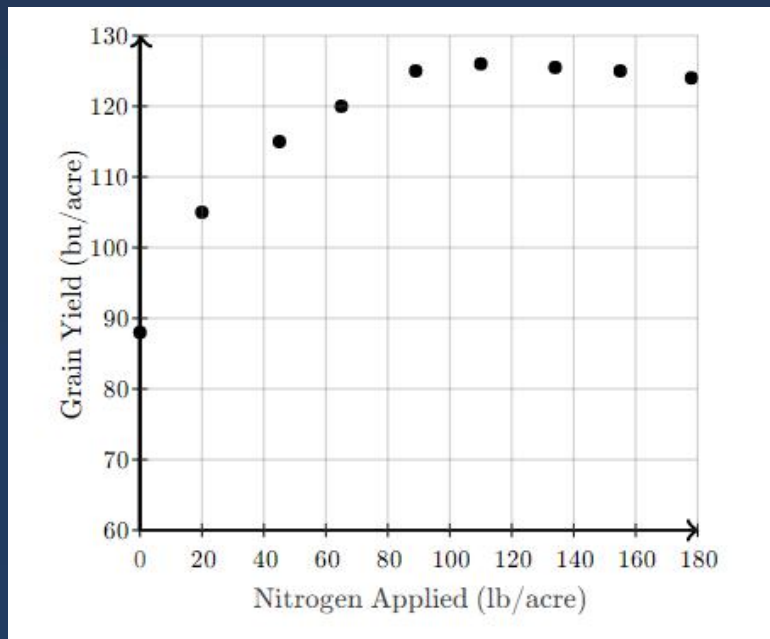
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5.A writer for a high school newspaper is conducting a survey to estimate the number of students that will vote for a particular candidate in an upcoming student government election. All students at the high school are eligible to vote in the election, and the writer decides to select a sample of students to take the survey. Which of the following sampling methods is most likely to produce valid results?

- A. Survey every fifth student to enter the school library.
- B. Survey every fifth student to arrive at school one morning.
- C. Survey every fifth senior to arrive at school one morning.
- D. Survey every fifth student to enter the school stadium for a football game.

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6.The graph shown above shows the results of an observational study of corn grain yield, in bushels per acre, versus rate of nitrogen fertilizer solution, in pounds per acre, applied to crops. Based on the results of this study, which conclusion is best supported by the data?

- A. Using nitrogen in the soil causes greater grain yield.
- B. There is evidence of a linear association between the amount of nitrogen applied to the soil and the grain yield.
- C. There is evidence of an association between the amount of nitrogen applied to the soil and the grain yield, but the association does not appear to be linear.
- D. Low levels of nitrogen in the soil leads to poor grain yield.

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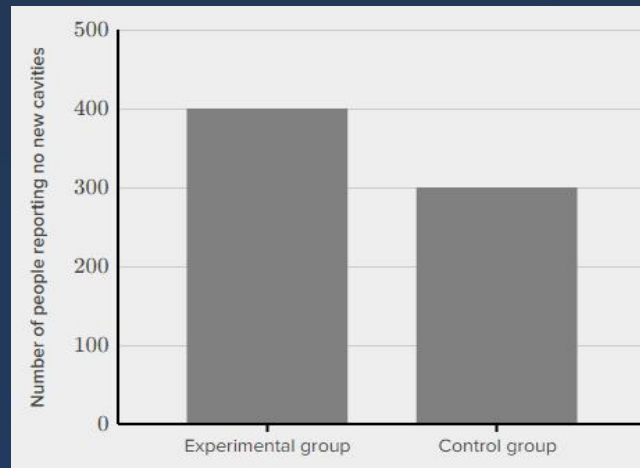
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7. The graph to the left shows the results of a controlled experiment designed to determine how effective a new toothpaste is at preventing cavities. A researcher randomly selected 1,000 healthy adults with comparable dental habits and records to participate and randomly assigned participants to either the experimental or control group. In the experimental group, 500 participants were asked to use the new toothpaste for a 6 month period. In the control group, the remaining 500 participants were asked to continue using their normal toothpaste during the same 6 month period. Based on the results of this experiment, which conclusion is NOT valid?

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- A. There is an association between the participants brushing their teeth every day and not developing new cavities.
- B. There is an association between using the new toothpaste and not developing new cavities.
- C. Four hundred members of the experimental group reported no new cavities during the study.
- D. Members of the control group were more likely to develop cavities than members of the experimental group.



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9. A local tv news station wants to determine how often and through which medium their viewers check the weather. Which of the following survey methods is most likely to produce valid results?

- A. Ask a random sample of their viewers how much they enjoy the weather portion of the local news.
- B. Ask a random sample of their viewers whether they own a smartphone.
- C. Ask a random sample of members of the local meteorological society whether they watch the local news.
- D. Ask a random sample of their viewers how often and when they use various sources to obtain weather information.

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Thanks

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