

### S.IC.B.3: Analysis of Data

- 1 In which method of data collection does the researcher intentionally intervene to arrange for a comparison of results?
  - 1) taking a survey
  - 2) making observations
  - 3) filling out a questionnaire
  - 4) conducting a controlled experiment
  
- 2 Which investigation technique is most often used to determine if a single variable has an impact on a given population?
  - 1) observational study
  - 2) random survey
  - 3) controlled experiment
  - 4) formal interview
  
- 3 A doctor wants to test the effectiveness of a new drug on her patients. She separates her sample of patients into two groups and administers the drug to only one of these groups. She then compares the results. Which type of study *best* describes this situation?
  - 1) census
  - 2) survey
  - 3) observation
  - 4) controlled experiment
  
- 4 A market research firm needs to collect data on viewer preferences for local news programming in Buffalo. Which method of data collection is most appropriate?
  - 1) census
  - 2) survey
  - 3) observation
  - 4) controlled experiment
  
- 5 A school cafeteria has five different lunch periods. The cafeteria staff wants to find out which items on the menu are most popular, so they give every student in the first lunch period a list of questions to answer in order to collect data to represent the school. Which type of study does this represent?
  - 1) observation
  - 2) controlled experiment
  - 3) population survey
  - 4) sample survey
  
- 6 A researcher randomly divides 50 bean plants into two groups. He puts one group by a window to receive natural light and the second group under artificial light. He records the growth of the plants weekly. Which data collection method is described in this situation?
  - 1) observational study
  - 2) controlled experiment
  - 3) survey
  - 4) systematic sample
  
- 7 A sociologist reviews randomly selected surveillance videos from a public park over a period of several years and records the amount of time people spent on a smartphone. The statistical procedure the sociologist used is called
  - 1) a census
  - 2) an experiment
  - 3) an observational study
  - 4) a sample survey

- 8 A veterinary pharmaceutical company plans to test a new drug to treat a common intestinal infection among puppies. The puppies are randomly assigned to two equal groups. Half of the puppies will receive the drug, and the other half will receive a placebo. The veterinarians monitor the puppies. This is an example of which study method?
- 1) census
  - 2) observational study
  - 3) survey
  - 4) controlled experiment
- 9 A researcher wants to determine if room-darkening shades cause people to sleep longer. Which method of data collection is most appropriate?
- 1) census
  - 2) survey
  - 3) observation study
  - 4) controlled experiment
- 10 In watching auditions for lead singer in a band, Liem became curious as to whether there is an association between how animated the lead singer is and the amount of applause from the audience. He decided to watch each singer and rate the singer on a scale of 1 to 5, where 1 is the least animated and 5 is the most animated. He did this for all 5 nights of auditions and found that the more animated singers did receive louder applause. The study Liem conducted would be best described as
- 1) experimental
  - 2) observational
  - 3) a sample survey
  - 4) a random assignment
- 11 A cafeteria food manager studied the lunchtime eating habits of a group of employees in their office building. The purpose of the study was to determine the proportion of employees who purchased lunch in the cafeteria, brought their lunch from home, or purchased lunch from an outside vendor. This collection of data would best be classified as
- 1) a census
  - 2) an experiment
  - 3) an observational study
  - 4) a simulation
- 12 Which task is *not* a component of an observational study?
- 1) The researcher decides who will make up the sample.
  - 2) The researcher analyzes the data received from the sample.
  - 3) The researcher gathers data from the sample, using surveys or taking measurements.
  - 4) The researcher divides the sample into two groups, with one group acting as a control group.

- 13 Which scenario is best described as an observational study?
- 1) For a class project, students in Health class ask every tenth student entering the school if they eat breakfast in the morning.
  - 2) A social researcher wants to learn whether or not there is a link between attendance and grades. She gathers data from 15 school districts.
  - 3) A researcher wants to learn whether or not there is a link between children's daily amount of physical activity and their overall energy level. During lunch at the local high school, she distributed a short questionnaire to students in the cafeteria.
  - 4) Sixty seniors taking a course in Advanced Algebra Concepts are randomly divided into two classes. One class uses a graphing calculator all the time, and the other class never uses graphing calculators. A guidance counselor wants to determine whether there is a link between graphing calculator use and students' final exam grades.
- 14 Which statement about data collection is most accurate?
- 1) A survey about parenting styles given to every tenth student entering the library will provide unbiased results.
  - 2) An observational study allows a researcher to determine the cause of an outcome.
  - 3) Margin of error increases as sample size increases.
  - 4) A survey collected from a random sample of students in a school can be used to represent the opinions of the school population.
- 15 Which statement about statistical analysis is *false*?
- 1) Experiments can suggest patterns and relationships in data.
  - 2) Experiments can determine cause and effect relationships.
  - 3) Observational studies can determine cause and effect relationships.
  - 4) Observational studies can suggest patterns and relationships in data.
- 16 According to a study, 45% of Americans have type O blood. If a random number generator produces three-digit values from 000 to 999, which values would represent those having type O blood?
- 1) between 000 and 045, inclusive
  - 2) between 000 and 444, inclusive
  - 3) between 000 and 449, inclusive
  - 4) between 000 and 450, inclusive
- 17 Describe how a controlled experiment can be created to examine the effect of ingredient X in a toothpaste.
- 18 Howard collected fish eggs from a pond behind his house so he could determine whether sunlight had an effect on how many of the eggs hatched. After he collected the eggs, he divided them into two tanks. He put both tanks outside near the pond, and he covered one of the tanks with a box to block out all sunlight. State whether Howard's investigation was an example of a controlled experiment, an observation, or a survey. Justify your response.

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**Answer Section**

- 1 ANS: 4 REF: 081606a2  
2 ANS: 3 REF: 012015aai  
3 ANS: 4 REF: 061101a2  
4 ANS: 2 REF: 061301a2  
5 ANS: 4 REF: 011406a2  
6 ANS: 2 REF: 081802aai  
7 ANS: 3 REF: 061901aai  
8 ANS: 4 REF: 081906aai  
9 ANS: 4 REF: 062216aai  
10 ANS: 2 REF: 082204aai  
11 ANS: 3 REF: 012401aai  
12 ANS: 4 REF: 011127a2  
13 ANS: 2 REF: 081717aai  
14 ANS: 4 REF: 012314aai  
15 ANS: 3 REF: 011706aai  
16 ANS: 3

between 000 and 449, inclusive  $\rightarrow \frac{450}{1000} = 45\%$

REF: 012024aai

17 ANS:

Randomly assign participants to two groups. One group uses the toothpaste with ingredient  $X$  and the other group uses the toothpaste without ingredient  $X$ .

REF: 061626aai

18 ANS:

Controlled experiment because Howard is comparing the results obtained from an experimental sample against a control sample.

REF: 081030a2