

S.IC.B.3: Analysis of Data 2

- 1 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.
- 2 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
- 3 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
- 4 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
- 5 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
- 6 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.

- 7 Four hundred licensed drivers participated in the math club's survey on driving habits. The table below shows the number of drivers surveyed in each age group.

Ages of People in Survey on Driving Habits	
Age Group	Number of Drivers
16-25	150
26-35	129
36-45	33
46-55	57
56-65	31

Which statement best describes a conclusion based on the data in the table?

- 1) It may be biased because no one younger than 16 was surveyed. 3) It would be fair because the survey was conducted by the math club students.
- 2) It would be fair because many different age groups were surveyed. 4) It may be biased because the majority of drivers surveyed were in the younger age intervals.
- 8 High school officials wanted to assess the need for a new diving board. They created a survey and distributed it to a large, diverse crowd at the State Swim Meet held at their school. Which characteristic of the survey is most likely to create a bias?
- 1) the number of participants 3) the way the set of data from the survey was analyzed
- 2) the height of the participants 4) the way the participants were selected to take the survey
- 9 A survey completed at a large university asked 2,000 students to estimate the average number of hours they spend studying each week. Every tenth student entering the library was surveyed. The data showed that the mean number of hours that students spend studying was 15.7 per week. Which characteristic of the survey could create a bias in the results?
- 1) the size of the sample 3) the method of analyzing the data
- 2) the size of the population 4) the method of choosing the students who were surveyed
- 10 A survey is to be conducted in a small upstate village to determine whether or not local residents should fund construction of a skateboard park by raising taxes. Which segment of the population would provide the most unbiased responses?
- 1) a club of local skateboard enthusiasts 3) a group opposed to any increase in taxes
- 2) senior citizens living on fixed incomes 4) every tenth person 18 years of age or older walking down Main St.
- 11 A principal is concerned about the decline in the number of students who purchase food from the cafeteria. A survey was developed to assist the principal. The most appropriate method would be for the principal to randomly select 100 students from
- 1) the junior class
- 2) the student directory
- 3) the Algebra 2/Trigonometry classes
- 4) the students who are eating during fourth period lunch in the cafeteria

- 12 A school wants to add a coed soccer program. To determine student interest in the program, a survey will be taken. In order to get an unbiased sample, which group should the school survey?
- 1) every third student entering the building
 - 2) every member of the varsity football team
 - 3) every member in Ms. Zimmer's drama classes
 - 4) every student having a second-period French class
- 13 A survey is being conducted to determine which types of television programs people watch. Which survey and location combination would likely contain the most bias?
- 1) surveying 10 people who work in a sporting goods store
 - 2) surveying the first 25 people who enter a grocery store
 - 3) randomly surveying 50 people during the day in a mall
 - 4) randomly surveying 75 people during the day in a clothing store
- 14 Erica is conducting a survey about the proposed increase in the sports budget in the Hometown School District. Which survey method would likely contain the most bias?
- 1) Erica asks every third person entering Hometown Grocery Store.
 - 2) Erica asks every third person leaving Hometown Shopping Mall this weekend.
 - 3) Erica asks every fifth student entering Hometown High School on Monday morning.
 - 4) Erica asks every fifth person leaving Saturday's Hometown High School football game.
- 15 A survey is being conducted to determine which school board candidate would best serve the Yonkers community. Which group, when randomly surveyed, would likely produce the most bias?
- 1) 15 employees of the Yonkers school district
 - 2) 25 people driving past Yonkers High School
 - 3) 75 people who enter a Yonkers grocery store
 - 4) 100 people who visit the local Yonkers shopping mall
- 16 A survey is being conducted to determine if a cable company should add another sports channel to their schedule. Which random survey would be the least biased?
- 1) surveying 30 men at a gym
 - 2) surveying 45 people at a mall
 - 3) surveying 50 fans at a football game
 - 4) surveying 20 members of a high school soccer team
- 17 A school newspaper will survey students about the quality of the school's lunch program. Which method will create the *least* biased results?
- 1) Twenty-five vegetarians are randomly surveyed.
 - 2) Twenty-five students are randomly chosen from each grade level.
 - 3) Students who dislike the school's lunch program are chosen to complete the survey.
 - 4) A booth is set up in the cafeteria for the students to voluntarily complete the survey.
- 18 A local government is planning to increase the fee for use of a campsite. If a survey were taken, which group would be most biased in their *opposition* to the increase?
- 1) teachers
 - 2) soccer players
 - 3) postal workers
 - 4) campers

- 19 A cell phone company is conducting a survey to determine the cell phone features that its customers use. Which survey is *least* biased?
- 1) The company conducts the survey on teenagers.
 - 2) The company conducts the survey on all age groups.
 - 3) The company conducts the survey on retired females.
 - 4) The company conducts the survey on middle-aged males.
- 20 The yearbook staff has designed a survey to learn student opinions on how the yearbook could be improved for this year. If they want to distribute this survey to 100 students and obtain the most reliable data, they should survey
- 1) every third student sent to the office
 - 2) every third student to enter the library
 - 3) every third student to enter the gym for the basketball game
 - 4) every third student arriving at school in the morning
- 21 Which method of collecting data would most likely result in an unbiased random sample?
- 1) selecting every third teenager leaving a movie theater to answer a survey about entertainment
 - 2) placing a survey in a local newspaper to determine how people voted in the 2004 presidential election
 - 3) selecting students by the last digit of their school ID number to participate in a survey about cafeteria food
 - 4) surveying honor students taking Mathematics B to determine the average amount of time students in a school spend doing homework each night
- 22 Four surveys are described below. Which survey methodology would lead to the *least* biased conclusion?
- 1) One hundred randomly chosen heart surgeons were polled by telephone about how to get children to eat healthier foods.
 - 2) A country and western radio station asked one hundred of its listeners to call a telephone number and answer a question about rap music.
 - 3) From calls made to one hundred randomly generated telephone numbers, people replied to a question about television shows they watch.
 - 4) The first one hundred people who left the World of Baseball Bookstore replied to a question about the importance of baseball to society.
- 23 Which survey is *least* likely to contain bias?
- 1) surveying a sample of people leaving a movie theater to determine which flavor of ice cream is the most popular
 - 2) surveying the members of a football team to determine the most watched TV sport
 - 3) surveying a sample of people leaving a library to determine the average number of books a person reads in a year
 - 4) surveying a sample of people leaving a gym to determine the average number of hours a person exercises per week
- 24 Which statement regarding biased sampling is *false*?
- 1) Online sampling is biased because only the people who happen to visit the web site will take the survey.
 - 2) A radio call-in survey is biased because only people who feel strongly about the topic will respond.
 - 3) A survey handed to every third person leaving a library is biased because everyone leaving the library was not asked to participate.
 - 4) Asking for experts to take a survey is biased because they may have particular knowledge of the topic.

S.IC.B.3: Analysis of Data 2**Answer Section**

- 1 ANS: 4 REF: 011127a2
- 2 ANS: 4 REF: 061101a2
- 3 ANS: 2 REF: 061301a2
- 4 ANS: 4 REF: 011406a2
- 5 ANS: 4 REF: 081606a2
- 6 ANS:
Controlled experiment because Howard is comparing the results obtained from an experimental sample against a control sample.
- REF: 081030a2
- 7 ANS: 4 REF: 061022ia
- 8 ANS: 4
The crowd includes people who are not connected with the high school.
- REF: 081603a2
- 9 ANS: 4
Students entering the library are more likely to spend more time studying, creating bias.
- REF: fall0904a2
- 10 ANS: 4 REF: 011601a2
- 11 ANS: 2
To determine student interest, survey the widest range of students.
- REF: 061610a2
- 12 ANS: 1
To determine student interest, survey the widest range of students.
- REF: 060803ia
- 13 ANS: 1
Everyone eats, can shop in malls and wear clothes. People who work in a sporting goods store probably watch more sports television than most.
- REF: 010923ia
- 14 ANS: 4
Surveying persons leaving a football game about a sports budget contains the most bias.
- REF: 080910ia
- 15 ANS: 1
Asking school district employees about a school board candidate produces the most bias.
- REF: 061107ia
- 16 ANS: 2
People at a gym or football game and members of a soccer team are more biased towards sports.
- REF: 061202ia

17 ANS: 2
To determine student opinion, survey the widest range of students.

REF: 011313ia

18 ANS: 4 REF: 061407ia

19 ANS: 2
To determine customer use, survey the widest range of customers.

REF: 061610ia

20 ANS: 4 REF: 011201a2

21 ANS: 3
(1) would result in a survey about entertainment in general skewed with too many movie-goers. (2) would result in a survey about an election skewed with too many newspaper-readers. (4) would result in a survey about study habits skewed with too many upperclassmen.

REF: 010815b

22 ANS: 3 REF: 011702a2

23 ANS: 1 REF: 061401a2

24 ANS: 3 REF: 011404ia