# **Algebra 2B Unit Test Guide**

## Statistical Studies & Randomization Unit Test

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Item** | **Lesson Coverage** | **Objective** | **Mathematical Practice Standard** | **Lesson Page** | **Assessment Item** |
| 1 | Lesson 2: Observational Studies | In this section, you will describe the types of statistical questions that are best answered by observational studies. | Make sense of problems and persevere in solving them. | p. 1-5 | Determine whether the following scenario fits an observational study. Your teacher is trying to find the best way to teach fractions, and so they teach half the class using a traditional method and the other half of the class using hand-held fraction representations.  Option #1: Yes, an observational study is the best.  Option #2: No, an observational study is not the best.  Correct answer: 2 |
| 2 | Lesson 2: Observational Studies | In this section, you will define random selection and explain its importance in observational studies. | Identify, brain-storm, and execute appropriate techniques to solve problems. | p. 6-10 | For a biology project, a student wants to research whether the ice at her local coffee shop is clean and free from impurities. She decides to test 15 ice samples from randomly selected coffee drinks. Determine whether her sample is an appropriate, random sample and a good representation of the population.  Option #1: Yes, her sample is an appropriate, random sample. It is a good representation of the population.  Option #2: No, her sample is not an appropriate, random sample. It does not represent the whole population.  Correct answer: 2 |
| 3 | Lesson 2: Observational Studies | In this section, you will decide when it may be reasonable to generalize the results of an observational study to a larger population. | Discuss and analyze different arguments for using an observational study to learn more about a population. | p. 11-15 | For the upcoming school year, Jordan Elementary School is deciding among the aquarium, natural history museum, or science museum for their school field trip. The school sent out a survey to the homes of 40 randomly selected students who participated in the school science club. Is it reasonable to use the results of this survey to decide where the field trip should be?  Correct answer: No, because the sample is biased toward students who are interested in science. |
| 4 | Lesson 3: Surveys | In this section, you will describe statistical questions that would best be answered by surveys. | Analyze different statistical problems and use appropriate techniques to solve. | p. 1-6 | Which of the following is an example of a loaded question?  Question #1: Which candidate do you support for city council?  Question #2: What is your favorite candy flavor?  Question #3: Do you prefer this beloved fantasy series or that less acclaimed mystery novel?  Question # \_ is an example of a loaded question.  Correct answer: 3 |
| 5 | Lesson 3: Surveys | In this section, you will explain why random selection is necessary when conducting surveys. | Make sense of problems and persevere in solving them. | p. 7-12 | An in-person survey was given to students at the end of a semester course to determine their satisfaction with the instructor. The instructor asked every other student to rate their satisfaction of the course’s teaching in a one-on-one interview. Which bias is exhibited in the survey?  Correct answer: response bias |
| 6 | Lesson 3: Surveys | In this section, you will decide when it is reasonable to apply the results of a survey to a larger population. | Construct viable arguments and critique the reasoning of others. | p. 13-19 | In addition to random sampling and adequate sample size, what else must be considered when deciding if the results of a survey can be generalized to a larger population?  Correct answer: question bias |
| 7 | Lesson 4: Experiments | In this section, you will identify and describe statistical questions that can best be answered using experiments to gather data. | Make sense of problems and persevere in finding solutions. | p. 1-5 | Which of the following questions would best be answered by an experiment?  Question #1: Does reducing screen exposure two hours before bedtime decrease the time it takes to fall asleep?  Question #2: Do people in their 20s fall asleep faster than people in their 30s?  Question #3: What is the average time it takes for an individual to fall asleep?  Question #\_ is best answered by an experiment.  Correct answer: 1 |
| 8 | Lesson 4: Experiments | In this section, you will explain the importance of random assignment when using experiments. | Make sense of problems and persevere in solving them. | p. 6-11 | Hiya wants to study the effect of diet on the activity level of dogs. Which population will allow for an appropriately randomized experiment?  Population #1: dogs in California  Population #2: golden retrievers in Omaha, Nebraska  Population #3: poodles in the United States  Correct answer: 2 |
| 9 | Lesson 4: Experiments | In this section, you will decide when a cause-and-effect conclusion about the relationship between two variables in an experiment can be reached. | Construct viable arguments and critique the reasoning of others. | p. 12-17 | A researcher is interested in studying the effects of a new natural sleeping aid on children ages 5–10. She will randomly assign half of the participants to take the sleeping aid an hour before their bedtime, while the other half will not take the sleeping aid. She will have parents record the number of hours their child slept each night over the course of four months. Which of the following elements is the dependent variable in this study?  Option #1: the natural sleeping aid  Option #2: the age of the participant  Option #3: the number of hours slept  Option #\_ is the dependent variable.  Correct answer: 3 |
| 10 | Lesson 5: Modeling Statistical Studies | In this section, you will differentiate between observational studies, surveys, and experiments. | Use appropriate tools and strategies. | p. 1-6 | Which of the following study designs can determine a cause-and-effect relationship?  Option #1: an observational study  Option #2: an experimental study  Option #3: a survey  Option #\_ can determine a cause-and-effect relationship.  Correct answer: 2 |
| 11 | Lesson 5: Modeling Statistical Studies | In this section, you will model statistical studies in several different ways, including simulations. | Use appropriate tools strategically. | p. 7-13 | A researcher builds a statistical model to determine how many credit card charges are fraudulent. Use the model *y* = 1 + 0.02*x* to estimate how many credit card charges are fraudulent out of 200 charges.  \_ fraudulent charges  Correct answer: 5  [Statistical Studies & Randomization Unit Test Item #11 - GeoGebra](https://www.geogebra.org/calculator/bubhrgr4) |
| 12 | Lesson 5: Modeling Statistical Studies | In this section, you will make adjustments to statistical models, as study data suggests. | Use appropriate tools strategically. | p. 14-19 | Which of the following is the best definition of outlier?  Definition #1: a value that exceeds the number of suitable data points needed for the model  Definition #2: a value that skews results because it is much higher or lower than the other data  Definition #3: a value that must be excluded from the data because it is inaccurately calculated  Correct answer: 2 |
| 13 | Lesson 2: Observational Studies | In this section, you will define random selection and explain its importance in observational studies. | Identify, brain-storm, and execute appropriate techniques to solve problems. | p. 6-10 | For her statistics project, Freda wants to find the proportion of high school students who believe learning math is necessary, regardless of their future majors. She conducts a survey on her statistics classmates and finds that 82% of them believe it is necessary to learn math. Is Freda’s sample a random sample and a good representation of the population in her study? If so, what can Freda conclude about the proportion of high school students who believe learning math is necessary? If not, propose a random sample on which Freda should be conducting her survey.  Correct answer: The student should explain that Freda’s sample is not a random sample. It is not a good representation of the population of all high school students because not all high school students take statistics. Therefore, Freda cannot generalize the results of her survey to all high school students. A proposed sample could be randomly selected students from each course offered at her high school. This sample is a good representation of the population. Freda can use the data collected from this sample to draw valid conclusions about the population. |
| 14 | Lesson 3: Surveys | In this section, you will explain why random selection is necessary when conducting surveys. | Make sense of problems and persevere in solving them. | p. 7-12 | A coffee shop wants to collect customer satisfaction data about their new beverage. In 3-5 sentences, design an unbiased survey to gather the data.  Correct answer: The student should explain that the coffee shop could give a short, written survey to random customers who purchase the new beverage. For example, every third customer who purchases the beverage is asked to rate their satisfaction with it on a scale from one to five. |
| 15 | Lesson 4: Experiments | In this section, you will explain the importance of random assignment when using experiments. | Make sense of problems and persevere in solving them. | p. 6-11 | Explain in 1-2 sentences how an experiment must be written so that the participants can be randomly assigned.  Correct answer: Student answers should explain that in order to ensure that participants can be randomly assigned in a study and that enough of a population can be sampled, it is important to limit or narrow the population that is being studied. |