

M111: Modeling with Data: One-Variable Measurement Data Post-Badge Task

Reflecting on Badge Learning

Now that you have learned more about modeling with one-variable measurement data, respond to the questions that follow. These are the same questions you responded to before the start of this badge.

The Task

QUESTION 1

Amber and Stevie learned the following information during a discussion about the importance of sleep and took the following notes:

- Teens need 9 to 9½ hours of sleep per night
- Teenagers are going through a second developmental stage of cognitive maturation. Additional sleep supports their developing brain, as well as physical growth spurts.
- Chronic sleep deprivation in teenagers leads to cognitive impairments, including poor memory, concentration difficulties, and decreased ability to problem-solve
- Inadequate sleep has been linked to a range of long-term health issues, such as obesity, cardiovascular problems, and weakened immune systems
- Sleep issues in teens have been shown to increase the risk of developing mood disorders, while mental health challenges can also make it harder for teens to fall asleep or stay asleep

As you read through their notes, what comes to mind for you? What is a question that surfaced for you?



Answers will vary. Students may make a personal connection to any of the points shared.

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QUESTION 2

Amber and Stevie decide to put together a series of informational posts on social media to raise awareness about the importance of sleep. They decide to conduct a survey of students at their school.

As they brainstorm questions for their survey, Amber offers the following question: *How many hours of sleep did you get last night?*

Stevie offers the following question: *What is your favorite way to wind down before going to bed?*

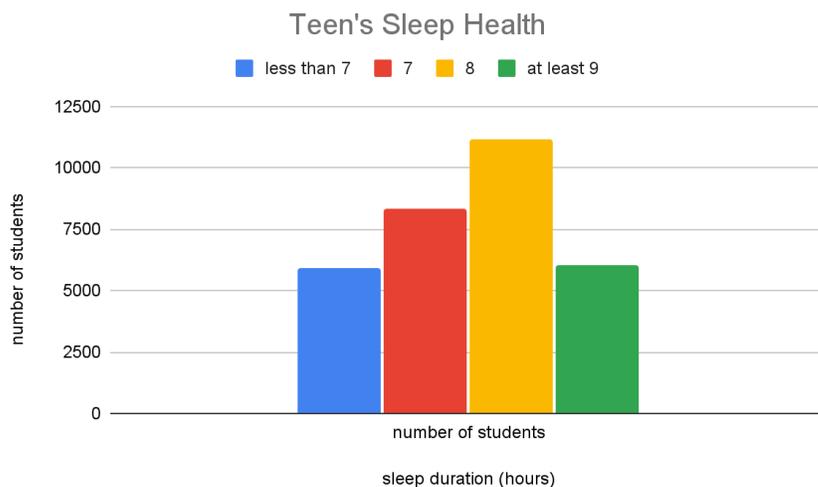
What makes these questions **statistical questions**? How are the questions different?



Answers will vary. Possible student response: These are both statistical questions because the answers people give will vary. People will answer Amber's question with a number, and they will answer Stevie's question with a description of something they like to do.

QUESTION 3 The recommended amount of sleep for teens ages 13-18 is 9-9 ½ hours per night. In a 2017 article on sleep published in the Journal of Adolescent Health, a group of 33,000 students were asked how much sleep they typically get.

Based on the data from this study, shown below, what percentage of students are not getting the recommended amount of sleep? Why do you think this result is the way it is?



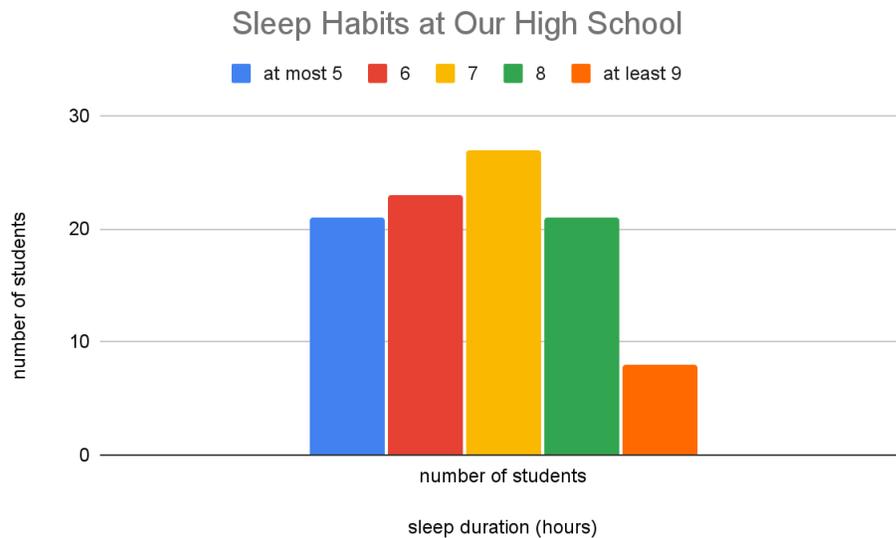
Answers will vary. Possible student response: There's about 6,000 teens that get at least 9 hours of sleep out of 33,000 that were surveyed. That's about 19%. I think not a lot of teens get enough sleep because there's too much homework and other activities we do after school like sports.

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QUESTION 4

Amber and Stevie surveyed 100 classmates about their sleep habits. One question they posed is, *how many hours of sleep did you get last night?* The results are shown in the graph below.

Based on Amber and Stevie's survey results, what would you say is the typical number of hours of sleep this group of students gets? How much variation do you see in the data?



Answers will vary. Possible student response: The typical number of hours students slept is about 7 because 7 is the median of this data set. If we were to make a list of the data, the 50th number is going to be a 7, since there's about 44 data points represented in the first 2 bars and about 26 sevens in the middle bar. The spread is kind of close to 1 when we calculate the interquartile range. The first quartile is somewhere between 5 and 6 on one side and the third quartile is somewhere between 8 and 9 on the other side. I know this because the 25th value is going to be in the second bar, and the 75th value is going to be in the fourth bar.

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QUESTION 5 Amber and Stevie surveyed 100 classmates at their school.

Based on what you know about their work so far, what feedback would you give them about their survey design to inform their future studies?



Answers will vary. Possible student response: The advice I would give to my friends, Amber and Stevie, is to think about a way to get a more accurate measure of a student's typical sleeping habits. They posed a question about one night of a student's life. The answer the student gives may not accurately capture what is typical for that student.

QUESTION 6 What else did you learn that was not reflected in Questions 1-5?



Answers will vary.

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QUESTION 7 Compare your answers to these questions now to your answers from the earlier attempt. What do you notice about your progress?



Answers will vary. Look for students to explain what they know now compared to what they knew when responding to the pre-test.