Bias and Random Samples

NAME_____

Sample – part of the population chosen to represent the entire group.

Random Sample – A sample in which every person, object, or event has an equal chance of being selected.

Biased Sample – A sample that does not accurately represent the population.

1. Paul and his friends average their test grades and find that the average is 95. The teacher announces that the average grade of all of her classes is 83. Why are the averages so different?

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2. Nancy hears a report that the average price of gasoline is $2.82. She averages the prices of stations near her home. She finds the average price of gas to be $3.03. Why are the averages different?

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Determine whether each sample is a random sample or a biased sample. Explain your reasoning.

3. Carol wants to find out the favorite foods of students at her middle school. She asks the boys' basketball team about their favorite foods.

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4. Dallas wants to know what elective subjects the students at his school like best. He surveys students who are leaving band class.

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5. A manager samples the receipts of every fifth person who goes through the line. Out of 50 people, 4 had a mispriced item. If 600 people go to this store each day, how many people would you expect to have a mispriced item?

6. Jerry randomly selects 20 boxes of crayons from the shelf and finds 2 boxes with at least one broken crayon. If the shelf holds 130 boxes, how many would you expect to have at least one broken crayon?
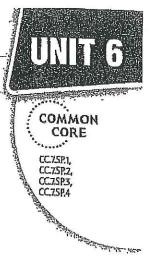
Problem Solving Connections ⊕

Happy Birthday! Abby is planning a big birthday party. She has invited everyone in her grade and has sent 80 invitations. Unfortunately, she forgot to include an RSVP on the invitation, and she wants to know how many people are coming to the party. On the invitation, Abby requested no gifts. Instead, she is asking everyone to make a donation to her favorite charity.

How much money can Abby make for her charity at her birthday party?

1 Using a Sample to Make a Prediction

A Abby asks 10 of her closest friends, and 9 of them will be attending the party. Based on this survey, how many people should Abby expect to come to the party? Show your work below.

B Who is the population in this event?

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C Who is the sample in Abby's survey?

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D Is the sample random? Explain.

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E Explain why Abby's sample could be biased.

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F Do you think that Abby's results are too high or too low? Explain.

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2 Using a Random Sample to Make a Prediction

A Why is it important for a sample to be random in order to make an accurate prediction?

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B How might Abby obtain a random sample?

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C What can Abby do to increase the accuracy of her random sample?

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D Abby has a list of everyone in her class. She numbers all the names on the list from 1 to 80. Then, Abby uses her graphing calculator to generate 20 random numbers. She e-mails each of the people who correspond to the randomly generated numbers and asks whether or not he or she plans to attend the party. Of the 20 people surveyed, 6 are not able to come to the party. Based on this sample, predict the total number of people who will attend the party. Show your work below.

E How does this random sample provide a more accurate count of who might not attend the party than the first sample?

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F Why might this still not be an accurate prediction?

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