CC Investigation 5: Variability

DOMAIN: Statistics and Probability

You can collect data from a random sample of a given population and use that data to make inferences about the population as a whole. Inferences will be valid only if the sample is representative of the population.

A sample is **representative** if every member of the population has an equal chance of being included in the sample. Random sampling is the best way to produce a representative sample that will support valid inferences.

Problem 5.1

A. The owners of the Casual Café and the Bountiful Bistro want to know more about the types of customers that dine at their restaurants. They each conduct a survey to find their customers' ages and the price they would expect to pay for an entrée.

1. Suppose the owners took their samples by surveying the first fifteen women dressed in business attire. Do you think this sample is representative of the population? Explain.
2. Suppose the owners took their samples by surveying every fifth customer at lunch. Do you think this sample is representative of the population? Explain.
3. Describe a survey method that would give the restaurant owners a representative sample of the population. Explain how you decided on your method.

B. The table shows age data the owners gathered from a representative sample at each restaurant.

Casual Café	34	41	45	67	23	19	45	34	32	35	34	56	63	23	25
Bountiful Bistro	29	17	23	18	14	28	21	24							

1. What is the mean age for each restaurant's customers? What do the mean ages tell you about the customers that each restaurant attracts?
2. The owners are deciding how to advertise their restaurants. They want to advertise to the group of customers that they expect will want to dine with them. Give some recommendations to each owner about how and where they should advertise.

C. Diners at Casual Café can make their own sandwiches starting with 1 of 6 fillings.

Make-Your-Own Sandwiches

1. Roast beef
2. Ham
3. Turkey
4. Grouper
5. Veggie
6. Hummus

1. If the sandwiches are randomly chosen, how many turkey sandwiches do you expect there will be in the next 10 sandwich orders? Explain how you found your answer.

2. Do an experiment to test your conclusion. Toss a number cube 10 times and record the outcomes in a table. Did the number of times you tossed a 3 match your prediction for the number of turkey sandwiches ordered? Explain why or why not.

3. How many turkey sandwiches would you expect out of the next 50 random sandwich orders? Do another experiment to test this conclusion. Toss a number cube 50 times and record the outcomes in a table.

4. Repeat the experiment for another 50 tosses. Record the outcomes in a separate table.

5. Were the experiments' outcomes closer to your predictions for 10 orders or for 50 orders? Explain why that might be so.