Drawing Inferences from Random Sampling

Statistics is math that deals with collecting, analysing, interpreting, and presenting data

- Population - entire group
- Sample - part of the population
- Random sample - part of the population that mimics the population

Lesson Goals (Academic)

- We will use random sampling to draw inferences about a population.(7.SP.A)
  - We will answer real-world questions to understand that statistics can be used to
    - gain information about a population by examining a sample of the population
    - make generalizations about a population from a sample and that they are valid only if the sample is representative of the population
  - We will answer real-world questions to understand that random sampling tends to produce representative samples and support valid inferences

Lesson Goals (Socio-Emotional)

- We will work in learning teams to
  - Make sense of problems and persevere in solving them (SMP.1)
  - Construct viable arguments and critique the reasoning of others (SMP.3)
  - Attend to precision (SMP.6)

Three Reads Protocol

Each person will read their card 3 times *before* everyone begins to solve

1st Read
   Goal: Comprehend Text

2nd Read
   Goal: Analyze and discuss
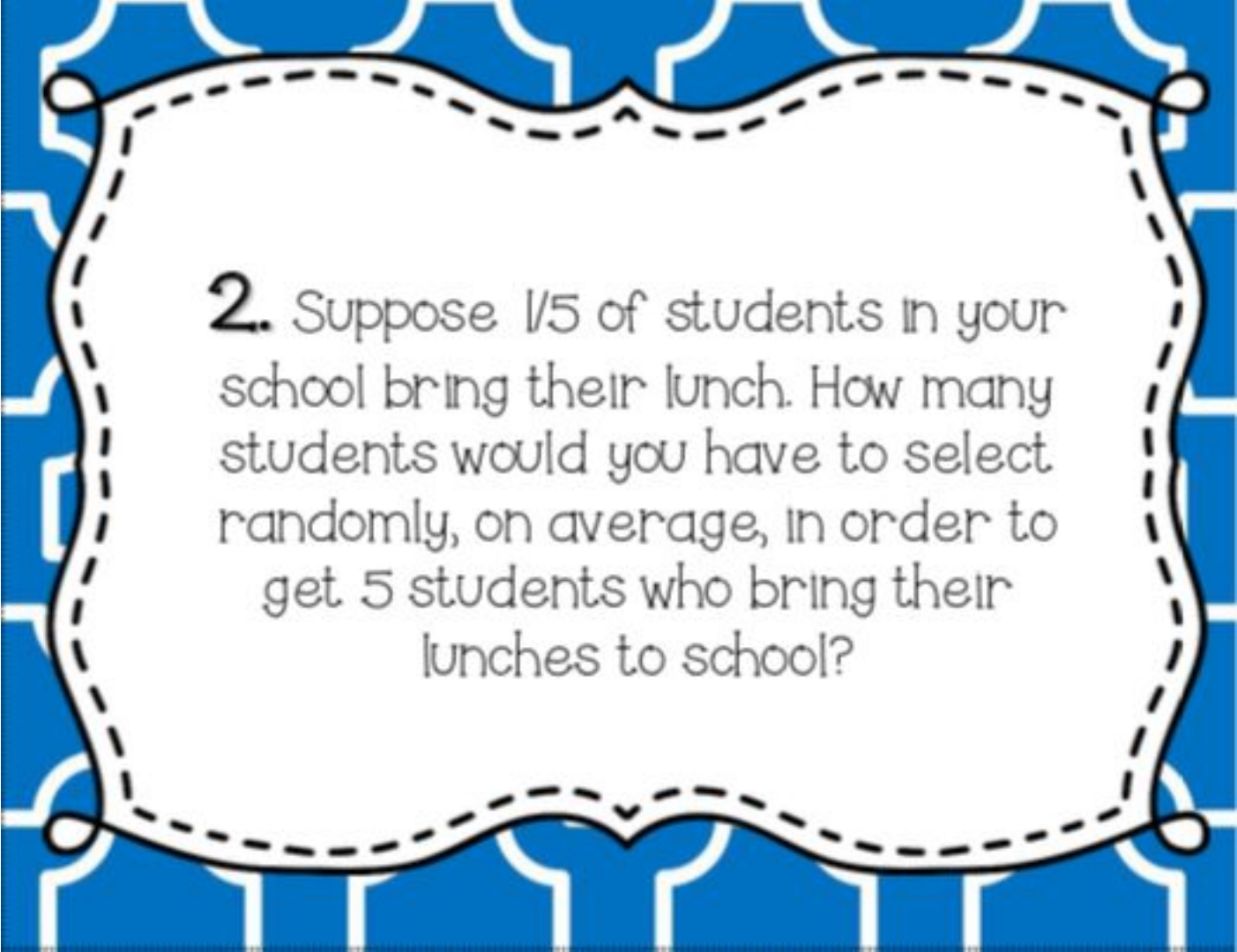
3rd Read
   Goal: Brainstorm ways to solve

Recognizing Valid Samples

You can create and recognize valid samples of larger populations by making sure the sample meets 3 criteria.

Random	Representative	Adequate
A *random survey* ensures that every item/person has an equal chance of being chosen.	A *representative* sample selects data and/or members from the population to be represented.	An *adequate* sample size includes a sufficient number of data points/participants.
Example: drawing a number out of a hat Non-Example: Choosing the 1st 3 people you see	Example: surveying students about opinions of cafeteria food Non-Example: surveying a group of girls about what boy sports should be added to your school	Example: The sample is approximately 20% or larger of the population Non-Example: The sample size is about 5% of the population

Team Member B

- You are responsible for reading and sharing cards 2, 5, 8, 11, 14, 17
- When it is your turn, you will:
  - 1 - Share your screen
  - 2 - Read the card aloud and ask for any word clarifications from the team
  - 3 - Read again and summarize the card in your own words with support from the team if needed
  - 4 - Read once more and lead the discussion on how to solve the problem (what is needed, where to start)
  - 5 - Give time for everyone to solve the problem, and lead the discussion for the solution

2. Suppose 1/5 of students in your school bring their lunch. How many students would you have to select randomly, on average, in order to get 5 students who bring their lunches to school?

5. In Cyprus City there are 12,000 adults. 7,500 of the adults in the town are registered voters. In a poll to predict who will be the next mayor, a statistician asks 500 registered voters who they plan on voting for mayor. How many people are in the population of registered voters? And how many people are in the sample taken by the statistician?

8. Hanna is a statistician for a very prominent soda company that markets to the entire US. However, she is currently in trouble because her latest prediction was not accurate. Identify the problem area of her survey.

1. She randomly selected people from each state where their products are sold.
2. She asked them to rate 10 products on a scale of 1-10 (1 being least favorite and 10 being most favorite)
3. She selected a total of 5 people from each state.

11. Which group would NOT be a good random sample of students in a middle school?

A. Every 5th student in a line of all the students arranged by height

B. The tallest two students (one boy and one girl) in each homeroom

C. Every 12th student to arrive to school on Monday morning

14. Suppose 7/10 of people surveyed agree that dogs are the best pets to own. How many people would you have to select randomly, on average, in order to get 30 people who DO NOT think dogs are the best pets to own?

17. A girl scout wants to gather information about the favorite type of cookie. She decided to survey every 4th person who exits the grocery store. Which word best describes the survey she conducts?

sample

prediction

data

census

population