Topic 3.3: Random Sampling and Data Collection

How do we collect data that represents a population?

Video Follow-Along Worksheet (Daily Video 1)

Learning Objective (DAT-2.C): Identify a sampling method, given a description of a study.

Essential Knowledge: A simple random sample (SRS) gives every group of a given size an equal chance of being chosen. Stratified samples divide a population into homogeneous groups and sample within each. Cluster samples divide a population into heterogeneous groups and sample entire groups.

Key Vocabulary

Census	Collecting data from *all* individuals in a population
Simple Random Sample	Every group of n individuals has an equal chance of selection
Cluster Sample	Divide into groups; randomly select *entire* groups
Stratified Sample	Divide into groups; randomly sample *within* each group
Systematic Sample	Random start point, then sample at fixed intervals

Part 1: Why Sample? [0:00–2:24]

1. In this video, we will describe various methods for collecting a _____.

2. San Antonio is one of the most economically _____ cities in the United States. This means households in the same neighborhood tend to have _____ incomes.

3. Due to the right-skewed nature of most income data, the _____ is usually the preferred measure of center instead of the mean.

4. A **census** collects data from _____ individuals in the population. The problem is that censuses are _____.

5. If done well, a random sample should be _____ of the general population.

Part 2: Simple Random Sample (SRS) [2:24–5:00]

6. A **Simple Random Sample** is a sample in which every _____ of a given size has an _____ chance of being chosen.

Name: _____ Period: _____

7. **How to conduct an SRS:**
   - Number all homes 1 through _____ (the population size)
   - Use a _____ to select numbers without _____

8. In San Antonio, income is consistent _____ regions and varies a lot _____ regions. This is called income segregation.

9. Is an SRS representative? _____ Difficulty to collect? _____

10. The median of the SRS sample was **$**_____.

Part 3: Cluster Random Sample [5:00–6:13]

11. In a **Cluster Random Sample**, you divide the population into _____ that are near one another.

12. Then you take an SRS of entire _____, and sample _____ individuals within each selected cluster.

13. San Antonio is divided into 100 regions. Two clusters are randomly selected, and all _____ homes in those clusters are sampled.

14. How difficult to collect a cluster sample compared to SRS? _____

15. The median of the cluster sample was **$**_____.

Part 4: Stratified Random Sample [6:13–7:20]

16. In a **Stratified Random Sample**, the population is divided into _____ based on a _____ characteristic.

17. Then you take an SRS _____ each stratum and combine all selected individuals into your sample.

18. For San Antonio: Within each of the 100 regions, an SRS of _____ homes is selected, giving a total sample of 10,000 homes.

19. The median of the stratified sample was $_____.

Cluster vs. Stratified: Key Differences

	Cluster Sample	**Stratified Sample**
Ideal grouping	Groups are _____ (mixed)	Groups are _____ (similar)
How you sample	SRS of _____; sample _____ in selected groups	SRS _____ each group

Part 5: Systematic Random Sample [8:09–8:48]

20. In a **Systematic Random Sample**, you randomly choose a _____, then sample at a fixed _____ interval.

21. **Example:** To sample students in a lunch line, number the first 20 people, randomly select a number 1–20, then sample every _____ person after that.

22. The primary advantage is that systematic sampling is _____, especially when individuals are "lined up."

Part 6: Key Takeaways [8:48–9:24]

23. Random samples, when well-executed, tend to provide _____ samples of the population.

24. An SRS gives every group of n individuals an _____ chance of selection.

25. **Cluster** sampling creates groups, then randomly samples _____ groups.

Name: _____ Period: _____

26. **Stratified** sampling creates groups, then randomly samples _____ each group.

Part 7: Post-Video Reflection

27. **Comparing Results:** The three sampling methods produced different median estimates:

SRS	Cluster	Stratified
$50,500	$110,350	$51,025

Which estimate do you trust the most? Why might the cluster sample estimate be so different?

28. **Identifying the Method:** A researcher wants to study exercise habits. She divides a city into 50 neighborhoods, then randomly selects 20 people from each neighborhood. What type of sampling method is this?

29. **Real-World Application:** Your school wants to survey students about cafeteria food. Describe how you would use *stratified* sampling, and explain why stratification might be better than a simple random sample.

(Hint: Think about what characteristic you would use to create strata.)

Exit Ticket

In your own words, explain the key difference between cluster sampling and stratified sampling. When might you choose one over the other?

Name: _____ Period: _____