3 Sampling Techniques (9.4)

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Math 9 Date: _____

Section 9.4 – Sampling Techniques

Learning Outcomes Covered:

9D: I can understand and use different **sampling methods.**

Which party will win the next election? *Should the cafeteria reduce their prices?*

For some questions, the answer can be found using a Survey, which is a way of collecting data. It is usually impossible to carry out a " by collecting data from all the people who could be surveyed. When every person cannot be asked, the answer to a question is found using a part, or sample (some people), of the population.

The procedure used for collecting info from the sample is called the **SAMPLING TECHNIQUE.**

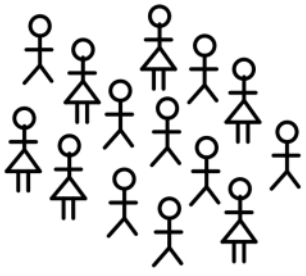
To collect reliable data, statisticians use techniques designed to eliminate bias, an unwanted influence that prevents a sample from being truly representative of the population from which it is selected. Recall, bias can be eliminated by use of language in the questions asked.

Once a survey is ready to be used, people must be selected to participate in the survey. Here are the most common sampling techniques:

1. Simple Random Sample (best)

- All items in the population have an equal chance of being included.

Population



Example:

- You want a sample of students in your class, each student picks a slip of paper from a hat, and the 5 students who picked a slip of paper with a checkmark on it will participate in the survey.

Methods:

- ✓ Drawing names from a hat.
- ✓ Numbering each item and then using a random number generator.

2. Systematic Random Sample

- Every n^{th} item of the population is selected. ex. every 3rd person

Example:

- You want to do a survey on who people will vote for in the next Burnaby election. You get a list of all the phone numbers of eligible voters in Burnaby and call every 500^{th} person.

This technique is especially used in manufacturing for quality control. Every n^{th} item produced may be tested for quality control. → taste the pop!

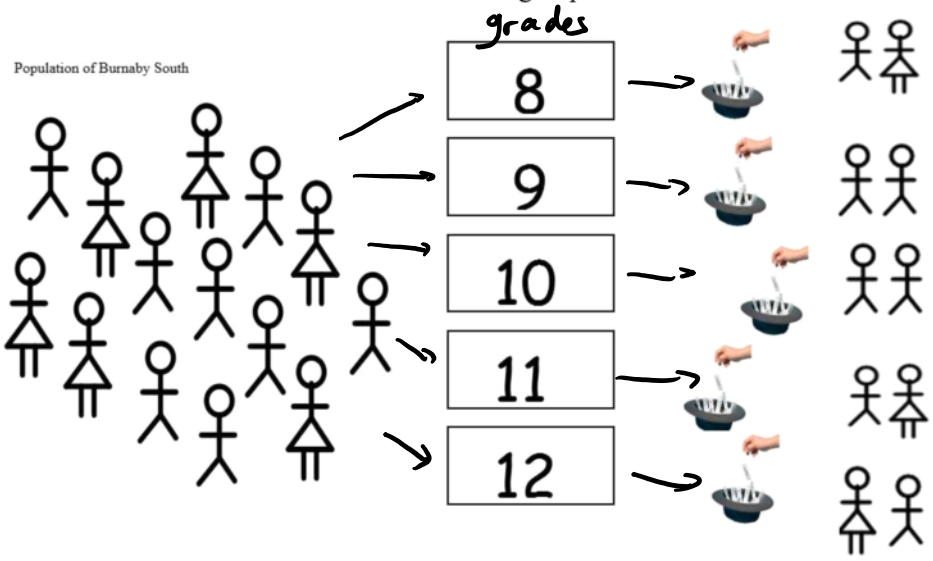
If an item is destroyed or unusable after being sampled, then the sample is a **destructive sample.**

Example:

- Pepsi samples every 2000^{th} can for quality control. Once opened, the item cannot be returned, it is unusable and would be considered a destructive sample.

3. Stratified Random Sample

- Uses natural or pre-existing groups (strata) within the population. A simple random sample method is then used to select items from each group.



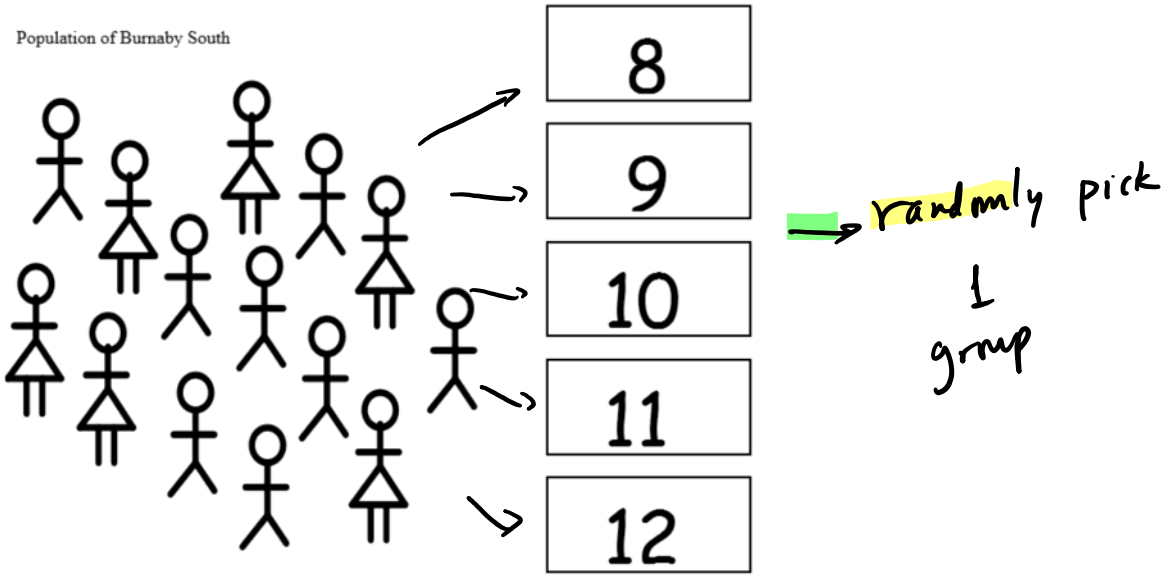
Natural strata's include age , gender , etc.
Example:

- 5 players from each team in a football league are surveyed to find out how satisfied they are with the practice facilities.

4. Clustered Sampling

group

- Uses natural or pre-existing groups within the population. A group is chosen randomly and each member of that group is selected.



Problem: Your group may not be a good representation of the target population
⇒ bias

Example:

- A school has 7 grade 9 classes; 2 out of the 7 classes are randomly selected to participate in the survey.

Now for the "bad" methods…..

There are 2 other sampling techniques that could lead to invalid conclusions. The main advantages of the sampling techniques are that they are cheap and easy to set-up. The disadvantage is that it everyone does not have an equally likely chance of being selected.

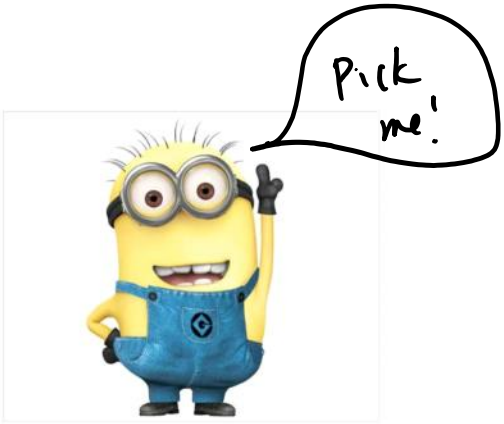
5. Convenience Sample

- Every convenient member of the population is selected. Little planning is involved.

Examples:

- You are interested in the eating habits of students at Burnaby South, so you collect information in the cafeteria.
- You ask the first 50 people entering the school a question about study habits.

6. Self-Selected Sample



- Only interested members of the population respond to the survey. The member selects him/herself to respond. This technique can result in a very biased sample. Generally, people with a strong opinion for or against an issue will volunteer themselves to participate in the survey.

– very opinionated

Example:

- A radio station conducts a top-10 list of most requested songs of the day.
- A new law about increasing the driving age to 20 is considered. People are asked to go to a website to give their opinion.

PRACTICE

Example 1:
In order to decide if a new recreation centre is viable for their town, the town council decides to conduct a survey of 300 people to see if the population will support the project. Six different methods are considered for selecting 300 citizens to survey.

IDENTIFY THE SAMPLING METHOD USED:

1. Every 5th person at the local movie theater is surveyed.

   systematic random sample

2. 300 Spectators at a local hockey game are surveyed.

   convenience sample

3. The citizens of the town are divided into groups according to age. Under 20, 20 – 35, 36 – 55, over 55. From each group 75 people are surveyed.

   stratified random sample

4. The town used their data bank to generate a list of 300 people currently living in their town.

   random
   simple random

5. The town posts the survey on their web site; the first 300 respondents are used for the sample.

   self-selected

6. the citizens of the town are divided into groups according to age. Under 20, 20 – 35, 36 – 55, over 55. Then 300 of the 20 – 35 year olds are selected for the survey.

   cluster sample

7. Which of numbers 1 – 6 would generate the most biased results? Explain.

   self-selected ☹ ☹
   Convenience ☹