



# Sampling Techniques

## Student Activity

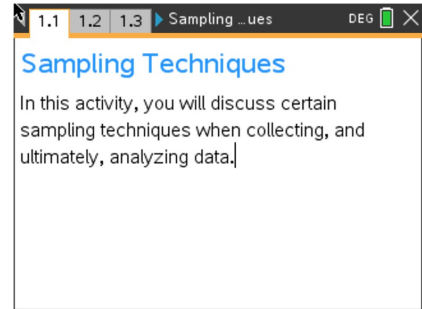


Name \_\_\_\_\_

Class \_\_\_\_\_

Open the TI-Nspire document *Sampling\_Techniques.tns*.

The goal of this activity is to practice selecting and discuss certain sampling techniques when collecting, and ultimately, analyzing data. Further investigation into not only selecting the most appropriate technique, but also applying it to real world data. Ultimately, you will try to make a connection with how to understand these topics in IB Mathematics courses and on their final assessments.



**Move to page 1.2.**

At times, it is a challenge to analyze the entire **population**, the whole group from which you may collect data. When this happens, taking a **sample**, a small group chosen from the population, of the data would be an easier approach. The following questions will provide real world examples where you will be discussing and using the following sampling techniques:

**Simple random sample; systematic sample; convenience sample; biased sample; quota sample; and stratified sample.**

**Move to page 1.3.**

1. Using the list from page 1.2, name the technique used in collecting the following sample of data and explain why this is your choice.

**Example:**

In a high school of 1000 students, a random sample is to be taken on one's happiness based on how many pets they own. The sample requires as close as possible 25% of the students chosen to be Freshmen, 24% to be Sophomores, 23% to be Juniors, and 28% to be Seniors.



**Move to page 1.4.**

- Using the list from page 1.2, name the technique used in collecting the following sample of data and explain why this is your choice.

**Example:**

A company of 20,000 employees wants to select a sample of 500 to survey about work place moral. From a randomly generated list of the employees, they selected every 40th person to survey.

**Move to page 1.5.**

- Using the list from page 1.2, name the technique used in collecting the following sample of data and explain why this is your choice.

**Example:**

A school of 400 students contains 230 males and 170 females. The student government wants to interview students to help decide what the theme of the school dance should be. They will wait outside of the cafeteria and select as participants the first 23 males and first 17 females to enter.

**Move to page 1.6.**

- Using the list from page 1.2, name the technique used in collecting the following sample of data and explain why this is your choice.

**Example:**

A school of 500 students needs to select a sample of 25 randomly to fill out a questionnaire from the head of the school. All 500 names are placed into a bucket and 25 names are selected.

**Move to page 1.7.**

- Using the list from page 1.2, name the technique used in collecting the following sample of data and explain why this is your choice.



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### Example:

A student wanted to survey his school of 600 students to see how many hours they sleep at night. The student hands out his survey to only his first period classmates to get his sample.

### Extension

Move to page 1.8.

6. Given the previous five examples, discuss with one another and explain why or why not for the following:
  - (a) which technique(s) is/are the best;
  - (b) which technique(s) might/may be biased;
  - (c) can more than one technique be used for each situation;
  - (d) sampling is an approved method compared to using the entire population.

### Application

7. The population of Charleston, SC is 411,406. A company trying to improve on the sanitation in the city conducted a random sample survey of 1500 residents of Charleston to ask for comments on what they think needs to be improved on the most. 712 of the sample chosen were male.
  - (a) Find an estimate for the number of males in Charleston.
  - (b) The company decided to repeat their survey, this time with a different sampling process. Explain why a systematic sample might not be the best choice for this situation.



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(c) The company ultimately chooses to use a stratified sample. Name two types of strata (apart from gender) that would be logical for the company to use.

8. A student in IB Applications and Interpretations SL has decided to focus on statistics for their Internal Assessment. She wanted to see how many students used their smart phones during the school day and how often. She created a survey and asked the students if they used their smart phones and in what period they used them. The data is below:

<b>Class Period in which the smart phone was used</b>	1	2	3	4	5	6	7
<b>Number of Students</b>	5	6	$m$	8	7	4	9

The mean number of times the students used their smart phone in a particular class period was 6.

- (a) State whether the data is discrete or continuous.
- (b) Find the value of  $m$ .
- (c) The student could not survey the entire school of 300, so she stood outside of the library at the beginning of school and between each class period and handed the survey to the first 42 student that entered. Identify the sampling technique used for the survey.