ST. JEAN DE BREBEUF
MATHEMATICS

CHAPTER 3.1 SAMPLING TECHNIQUES

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KEY CONCEPTS

In many situations it is not practical or possible to survey an entire population, so a representative **sample** of the **population** is selected.

POPULATION
→All individuals or items that belong to a group being studied

SAMPLE
→A group of individuals or items that are representative of the population from which they are taken

There are a variety of sampling techniques, each with its strengths and weaknesses.

The choice of sampling technique **depends on the population** and the **type of survey** being conducted.

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KEY CONCEPTS

When the results of a survey do not reflect the population, the survey is said to contain **bias** .

→**Bias** may be introduced by selecting a sample that is not representative of the population, by the wording of the survey question, or by the presentation of the results of the survey.

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EXAMPLE 1 *Population and Sample*

Mitchell wants to know which music group Ontario high school students think is the best. Mitchell's friend Cindy goes to a different school, so they each survey students at their own school. Mitchell uses the completed surveys from both schools to draw conclusions.

a) Identify the **population** and the **sample**.

POPULATION:

Ontario high school students

SAMPLE:

Students from Mitchell's school
and
Students from Cindy's school

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EXAMPLE 1 *Population and Sample*

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(b) Is the sample representative of the population?

(i) If it *is* representative, explain why.

Only high school students were asked to complete the survey

(ii) If it is *not*, suggest how the sample could be improved.

Only <u>two</u> high schools were surveyed
→Sample size too small

Should visit more high schools in *different* areas to obtain more accurate data

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CHAPTER 3.1 SAMPLING TECHNIQUES

KEY CONCEPTS

There are many different ways to choose a sample. They are listed below.

SAMPLE TYPE	*DESCRIPTION*
Simple Random Sample	Each member of the population has an **equal chance** of being selected.
Stratified Random Sample	The population is **divided into subgroups** (for example, by gender, age, nationality) and a random sample is selected from each subgroup in proportion to its size in the population.
Voluntary-Response Sample	The sample contains those members of the population who have **chosen to respond** to the survey.
Cluster Sample	The population is **divided into clusters** and a **certain number of clusters are chosen**. Every member of these clusters is part of the sample.
Convenience Sample	The sample contains those members of the population from which data are most **easily collected.**
Systematic Sample	**Every *n*th member** of the population is selected.

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EXAMPLE 2 *Choosing a Sampling Technique*

Determine the **best sampling technique** for each survey. Describe one method of selecting the sample. Identify any problems with using the sampling technique.

	SAMPLING TECHNIQUE	PROBLEMS?
The school newspaper wants to determine which presidential candidate in the upcoming student council elections is supported by the majority of students.	**Stratified random sample** →Randomly select students from <u>each grade</u>	Number of students surveyed might not be a representative *proportion* of the school population
A laptop manufacturer wants to determine the lifespan of the power supply, in hours.	**Systematic sampling** →choosing *nth* item	Must have a large number to choose from
The Parent–Teacher Association wants to determine the average number of hours per week that students spend on homework.	**Stratified random sample** →Randomly select students from <u>each grade</u>	Different grades have different amounts of homework

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CHAPTER 3.1 SAMPLING TECHNIQUES

EXAMPLE 2 *Choosing a Sampling Technique*

Determine the **best sampling technique** for each survey. Describe one method of selecting the sample. Identify any problems with using the sampling technique.

	SAMPLING TECHNIQUE	PROBLEMS?
The producers of "So You Think You Can Dance" want to determine which of the two remaining dancers should be the winner.	**Voluntary response sample** →Viewers can call/text/vote online	Slight inconvenience to some viewers →Not a reflection of the actual viewing population
Retailers from a mall want to collect data on the spending habits of its customers	**Convenience sample** →Survey customers passing by	Not everyone is willing to participate Not all people in a mall buy stuff

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Homework

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