

## 2.2 Sampling Principles

## **DO IT NOW!**

King's Christian Collegiate wants to get a mascot for sporting events. They want the mascot to appeal to all of the students in the school. The school administration wants to ask student's what they want but they are unsure how to decide fairly. Should they:

- a) Ask all of the grade 9 students
- b) Let the first 100 students who arrive at school fill out a survey
- ☒ c) Ask 6 students from every period 1 class
- d) Ask all students whose last name starts with A,D, or Y
- e) Let Mr. Jensen decide, he will think of something awesome

Which one did you pick and why?

**This sample best represents the entire school body. It will have the least amount of bias**

## Definitions

Population - The whole group of people or items being studied.

Sample - Any group of people or items selected from a population.

Census - A survey of all members of a population.

Why is the whole population not always surveyed when a hypothesis about the population is to be verified?

Populations being studied are often very large. It would take too long to do a census in most cases.

**For which of the following is a sample suitable?**

**a.** Find the most common make of car in the school parking lot.

**b.** Find your family's favourite food.

**c.** Find the most popular video game among grade 9 students in your class.

**d.** Find the favourite video game among grade 9 students in Canada.

## Types of Sampling

**Random Sample** - a sample in which all members of a population have an equal chance of being chosen

Example: Drawing names from a hat

**Non-random sampling** - using a method that is not random to choose a sample from a population

Example: Asking only your best friends

## Types of Random Sampling

**Simple Random Sampling** - choosing a specific number of members randomly from the entire population

**Example:** Having a computer randomly choose 100 students from our school population

**Systematic Random Sampling -**  
choosing members of a population at fixed intervals from a randomly selected member.

**Example:** Using a list of all students at the school, pick a random starting point and then choose every 8th student until you have 100 students for the survey.

**Stratified Random Sampling** - dividing a population into distinct groups and then choosing the same fraction of members from each group

**Example:** The principal chooses to survey 10% of the students from each grade.



**Classify the sampling technique used in each survey as simple random, systematic random, stratified random, or non-random sampling.**

**a)** The principal selects people that work in the cafeteria to interview about the quality of cafeteria food.

non-random.

**b)** A computer is programmed to randomly select 100 names from a club's membership list.

simple random

**c)** Students are selected at random, with the number of students in each age group selected proportional to the size of the age group.

stratified random

**d)** To select 100 people who can buy concert tickets, the ticket agent randomly selects one wristband number and then every 10th number after that.

systematic random

**Hobson's Company surveyed its 2000 customers by generating 200 random numbers between 1 and 2000, and then selecting names from the customer list corresponding to these numbers. This is an example of:**

- a. systematic random sampling
- c. non-random sampling
- b. stratified random sampling
- ☒ d. simple random sampling

**Which of the following is not an example of random sampling?**

- a. Use a random number generator to pick 10% of the players in each division of a hockey league.
- b. Use a randomly generated number between 1 and 10 to pick a name on a list, and then select every 8th person on the list.
- ☒ c. Ask every 10th person entering a mall for an opinion on government spending on health care.
- d. Write names on slips of paper, and then pick the names out of a hat, making sure the pieces of paper are well mixed.

**Which of the following is a systematic random sample?**

- a.** A name is randomly selected from a list of a store's customers and every 10th person is selected before and after it.
- b.** A Member of Parliament randomly selects phone numbers from a city directory to survey citizen's opinions on government taxation.
- c.** The principal selects the same fraction of students from each class for a survey.
- d.** The Human Resources department of Acme Manufacturing Company sends out surveys to 50 employees randomly selected from the entire list of employees.

## Bias

**Bias** - error resulting from choosing a sample that does not represent the whole population.

**A sample could be biased if it is:**

- a. too small
- b. only based on one gender and age group
- c. not randomly drawn
- ☒ d. all of the above