

## 2.2 – Sampling Principles Worksheet

MPM1D

1. Identify the population in each situation

- a) Generally, girls learn to walk before boys do.
- b) The mean mark on yesterday's test was 72%
- c) As cars age their repair costs increase
- d) Most food stores charge more for cream than for milk.

2. Describe the data required to answer each question. Explain whether you would use a census or a sample to collect each set of data.

- a) Do girls learn to walk before boys do?
- b) Is the mean mark on a test greater than 75%?
- c) Is the mean annual salary of employees in Canada less than \$50 000?
- d) How are a person's height and age related?

f) What is the most common colour among the cars that drive by your school?

3. Describe how you could choose a random sample to determine each of the following:

a) The type of coffee preferred by customers of a local café.

b) Ontario teenagers' favourite magazines.

c) Political parties supported by bilingual Canadians

d) Countries of origin for immigrants to Canada.

4. Identify the type of sample in each situation. Comment on any possible bias in these samples.

a) A career studies class interviews University of Waterloo graduates to learn about career choices for university graduates.

b) A town council randomly selects phone numbers from a town directory to survey citizens' opinions on a new park.

c) Moviegoers leaving a cinema are interviewed to find out how people spend their free time.

d) Every fifth person entering the cafeteria is asked to fill out a questionnaire about the menu.

5. List three ways you could divide the students in your school into groups for selecting a stratified random sample.

i.

ii.

iii.

6. A government agency wants to survey Ontario farmers.

a) Identify the population.

b) Suggest a stratified random sampling technique that the agency could use.

7. A company wants to select 50 of its 325 employees for a survey.

a) Identify the population.

b) Describe a systematic random sampling technique that the company could use.

8. The physical education department wants to survey the members of school teams.

a) Identify the population.

b) Describe a method of randomly selecting 15% of the members of the teams.

9. (Extension Question) This table lists the enrolment at a high school. The school administration wants to interview a random sample of 150 students, stratified by grade. How many students should the administration select from each grade?

Grade	Number of Students
9	330
10	308
11	295
12	283

10. Identify the population for each of the following. Then, describe how you could select an appropriate sample of each population.

a) The popularity of various kinds of music in your school.

b) The popularity of various kinds of music in your community.

c) The effectiveness of a national campaign to convince people between the ages of 18 and 30 not to smoke.

d) The spending habits of senior citizens in Ontario.

e) The quality of printing from various computer printers on sale in Canada.

f) The mean cost of gasoline in your community.

11. Even in the 1920s, polling companies conducted surveys by calling people randomly selected from telephone directories. Explain why using this sampling method in the 1920s would not produce a representative sample of the opinions of everyone in the country.

## Answers:

1. a) all children      b) everyone who wrote the test  
c) all cars      d) all food stores
2. a) age when girls and boys learn to walk; sample  
b) test marks; census  
c) salaries of Canadian employees; sample  
d) people's heights and ages; sample  
e) make of car in school parking lot; census  
f) colour of cars driving by the school; sample
3. Answers will vary. Examples:  
a) Survey every fourth customer who comes into the cafe.  
b) Randomly select 1% of the teenagers in every high school across Ontario.  
c) Use a random number generator to select telephone numbers within Canada, and then survey the people who identify themselves as bilingual.  
d) Select households to survey by any random method, and then ask the people surveyed where they were born.
4. a) non-random sample; could be biased since University of Waterloo students may not be representative of all university graduates  
b) simple random sample; could be biased since the sample excludes anyone who does not have a telephone listing  
c) non-random sample; biased because it includes only people who have chosen to spend some of their free time going to a movie
5. by age, by grade, by gender
6. a) all Ontario farmers  
b) Answers will vary. Example: Randomly select 10% of the farmers in each county.
7. a) the company's employees  
b) Randomly select a starting point on an alphabetical list of the employees, and then select every sixth person until you have a total of 50.
8. a) members of the school teams  
b) Answers will vary. Example: Write each team member's name on a slip of paper, and then randomly draw 15% of the slips out of a box.
9. grade 9, 41; grade 10, 38; grade 11, 36; grade 12, 35
10. Answers for sampling methods will vary.  
a) students in the school  
b) all people in the community  
c) all people aged 18 to 30  
d) all senior citizens in Ontario  
e) all computer printers for sale in Canada  
f) gasoline prices at all vendors in the community
11. In the 1920s, many people did not have telephones. Since these people were not included in the surveys, the samples were not representative of the whole population.