2.1 Hypotheses and Sources of Data
MPM1D

1. State the opposite of each hypothesis.

a) Most people's favourite number is 7.

b) Adults spend more time listening to classical music than to rap.

c) In Ontario, more teenagers join soccer teams than hockey teams.

d) Chocolate is not the most popular flavor of ice cream.

2. State a hypothesis about a relationship between each pair of variables. Then, state the opposite of each hypothesis.

a) A student's age and time spent doing homework

hypothesis:

opposite hypothesis:

b) A mother's height and the height of her children

hypothesis:

opposite hypothesis:

c) Temperature and crime rates

hypothesis:

opposite hypothesis:

d) The cost of gasoline and the number of people using public transit

hypothesis:

opposite hypothesis:

3. Which of the following data are primary and which are secondary?

a) An office manager hands out a questionnaire to see if employees want to work earlier hours during the summer.

b) A student finds data on internet use in a report published by Statistics Canada.

c) A researcher collects information about how far people travel on public transit by talking to passengers on the buses.

d) A researcher downloads data about the length of rides taken on public transit from a transit authority's Web site.

4. Identify each data source as primary or secondary. State one advantage of each source of data.

a) A researcher interviewed 100 students about their study habits.

b) A sporting goods company searched on the Internet for data on how Canadians spend their leisure time.

c) A manufacturer surveyed 1000 recent customers about possible changes to a product.

d) A student found advertisements in out-of-town newspapers at a library to check admission prices at theatres across the country.

5. a) Make a hypothesis about whether the students in your class prefer cats or dogs as pets.

b) Describe how you could test your hypothesis. Explain whether you would use primary or secondary data.

6. Steve prepared the following table using data volunteered by eight male students in his science class.

a) Is Steve using primary or secondary data? Explain.

b) Make two hypotheses based on these data.

Name	Eye Colour	Height (cm)
Josanth	brown	167
Fred	green	181
Graham	green	185
Cho	brown	171
Seth	blue	154
Jamal	green	183
Juan	brown	160
Cameron	blue	173

c) How could you test your hypotheses?

7. a) Make a hypothesis about the number of phone calls Canadians make.

b) Describe how you could use primary data to test your hypothesis.

c) Describe how you could use secondary data to test your hypothesis.

d) Which set of data is more likely to give accurate results?

8. A coach is selecting students to compete in the high jump for the school's track and field team.

a) Make a hypothesis about a physical characteristic that could help an athlete do well in the high jump.

b) What data would you need to test your hypothesis? Would you use primary or secondary data? Explain why.

Bonus: The mean of a list of n numbers is 6. When the number 17 is added to the list, the mean becomes 7. What is the value of n?

Answers:

1. **a)** Most people's favourite number is not 7.
   b) Adults do not spend more time listening to classical music than rap. (Alternative: Adults spend either less time or as much time listening to classical music as they spend listening to rap.)
   c) In Ontario, the number of teenagers who join hockey teams is greater than or equal to the number who join soccer teams.
   d) Chocolate is the most popular flavour of ice cream.
2. Answers will vary. Examples:
   a) Hypothesis: Time spent doing homework increases as a student's age increases. Opposite: Time spent doing homework does not increase as a student's age increases.
   b) Hypothesis: Children tend to grow to the same height as their mothers. Opposite: Children do not tend to grow to the same height as their mothers.
   c) Hypothesis: As temperature increases, the crime rate also increases. Opposite: As temperature increases, the crime rate decreases or remains constant.
   d) Hypothesis: As the cost of gasoline increases, the number of people using public transit increases. Opposite: As the cost of gasoline increases, the number of people using public transit decreases or stays the same.
3. **a)** Primary; the office manager gathers the data.
   b) Secondary; the student uses data gathered by Statistics Canada.
   c) Primary; the researcher gathers the data.
   d) Secondary; the researcher uses data gathered by the transit authority.
4. Answers about advantages will vary.
   a) Primary; data are up-to-date
   b) Secondary; Internet search is fast and easy
   c) Primary; getting opinions from customers
   d) Primary; data are up-to-date
5. Answers will vary. Examples:
   a) Most students in the class prefer dogs as pets.
   b) Survey the class. Primary data are best since the population is small and secondary data may not be available.
6. **a)** Primary; Steve gathered the data himself.
   b) Answers will vary. Examples: Brown-eyed students are shorter. Blue is the least common eye colour.
   c) Survey a larger sample.
7. Answers will vary. Examples:
   a) Females make more phone calls than males.
   b) Survey 50 females and 50 males.
   c) Look for data on the Internet or in publications.
   d) Secondary sources using larger samples are more likely to be accurate.
8. Answers will vary. Examples:
   a) Taller people perform better at the high jump.
   b) Heights of the athletes and how high the athletes can jump; primary data for the school team would be easy to collect, but secondary sources could give a larger sample and more accurate results.