Answers

Get Ready, pages 614–615
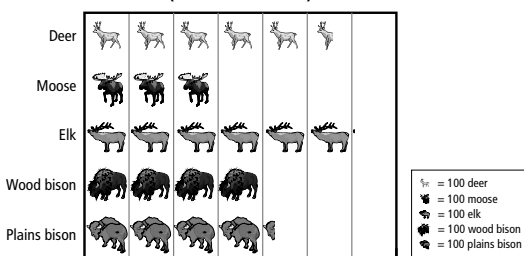
1. a) mean = 7; median = 6; modes = 8 and 15 **b)** mean = 4.5; median = 4.4; no mode

2. a) 6 **b)** 24

3. a) A **b)** 17 L

Math Link

1.

Approximate Total Park Count (2007 Fall Count)

Approximate Total Park Count (2007 Fall Count)

2. Elk
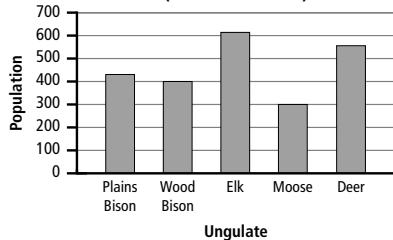
3. a) 3 Elk **b)** 36%

11.1 Warm Up, page 617

1. a) approximately 98 books **b)** Adventure books

2. a) 66.7% **b)** NO. The circle graph shows 100% of the books they signed out.

3. 50

4. 10% of the school was surveyed.

11.1 Factors Affecting Data Collection, pages 618–624

Working Example 1: Show You Know

a) NO. Answers may vary. Examples: Asking only grade 12 students is not fair. Asking only 10 students is not a large enough sample. **b)** The survey could be improved by asking more students in a variety of grades.

Working Example 2: Show You Know

a) bias; Do you think the hunting of polar bears should be stopped? **b)** use of language; Do you shop online? YES or NO. If yes, what kinds of products or services do you buy?

Communicate the Ideas

1. Answers may vary. Example: Most students prefer rock and roll to jazz. Would you prefer the school radio station to play more rock and roll or more jazz?

2. a) bias **b)** time/timing **c)** cost

Practise

3. a) Ask <u>hockey players</u> if they are willing to pay higher registration fees for hockey. **b)** Ask <u>new</u> motorcyclists if helmets should be mandatory. **c)** Ask <u>forestry workers</u> if more money should be spent on fighting forest fires.

4. a) A survey asks <u>how much parents earn</u> in 1 year. **b)** <u>Only teachers</u> are asked their opinion about a new school name. **c)** The <u>Arts Council</u> was surveyed about the importance of art classes in schools.

5. Answers may vary. Examples: **a)** Do you like to watch hockey? **b)** What is your favourite flavour of ice cream? **c)** Do you watch TV online? YES or NO. If yes, what TV programs do you watch most online?

Apply

6. Answers may vary. Examples: **a)** Which sport do you like best? Participants: people between the ages of 13 and 19 **b)** What is most important to your choice of cell phone: price or brand? Participants: people about to purchase a cell phone **c)** Which Internet site do you trust to give you accurate information? Participants: people who use the Internet to find information.

7. Answers may vary. Examples: **a)** Do you drink juice? YES or NO. If yes, would you switch to Crystal Juice? **b)** Do you use cough medicines? YES or NO. If yes, which brands do you use? **c)** Do you have Internet access? YES or NO. If yes, how satisfied are you with the level of service you get?

Math Link

Answers may vary. Examples:

Question #1: Do you think the Federal Government should create National Parks? YES or NO.
Question #2: Does the cost of the land matter to you? YES or NO.
Question #3: Do you believe that people living on future National Parks should be consulted? YES or NO.

11.2 Warm Up, page 625

1. Answers may vary. Examples: Since there are so many people who live in a country, it might be difficult or expensive to survey all of them.

2. more; more *or* less; less

3. a) 35 **b)** 197

4. a) 5% **b)** 20%

5. 1, 8, 15, 22, 29, 36, 43, 50, 57, 64, 71, 78, 85, 92, 99

11.2 Collecting Data, pages 626–634

Working Example 1: Show You Know

Answers may vary. Examples: **a)** the store's customers; sample; it would be difficult to get every customer to participate **b)** the restaurant's customers; sample; all customers might not want to participate **c)** teachers in Canada who wear glasses or contacts; sample; it would be too expensive and difficult to survey every teacher in the country.

Working Example 2: Show You Know

1. Answers may vary. Examples: **a)** voluntary response; use a suggestion box in the library **b)** systematic; sample every 1000th person in phone book.

2. a) random **b)** systematic **c)** voluntary response **d)** stratified

Communicate the Ideas

1. a) POPULATION **b)** NO; it is too expensive and difficult to survey everyone.

2. a) SCOTT; the more people surveyed, the more accurate the response will be. **b)** systematic sample; it would survey people who arrived late, perhaps because they took their own vehicles rather than public transit.

3. Surveying the population means surveying every person in BC. A sample is only a part of the whole population.

Practise

4. a) stratified **b)** convenience **c)** systematic **d)** random **e)** voluntary

5. a) teachers and students of the school; sample; it is less time-consuming and expensive. **b)** customers who use the repair department; sample; all customers might not want to be surveyed. **c)** people with disabilities; sample; it would be difficult to find everyone with a disability to survey.

Apply

Answers may vary. Examples:

6. a) population; there are not that many hospitals, so it is possible to survey the population. **b)** sample; it would be hard to survey grade 9 students. **c)** population; all parachutes must be safe. **d)** sample; it would be too expensive to test all tires.

7. Kristi could draw the names of 5 adults, 2 children, and 3 teens out of a hat. This way, she would talk to 25% of each group.

8. a) NO **b)** Erin's friends are a specific group not a random selection.

9. a) Students who use the cafeteria. **b)** convenience **c)** YES. He is asking the people who use the cafeteria.

Math Link

Answers will vary. Examples: **a)** Vancouver Island marmot **b)** over 300; less than 75 in 2001 **c)** Clearcut logging affected their habitat. **d)** What can be done to save the species? **e)** Random sampling was used because they had to catch the marmots using traps. They could not control which ones they captured.

11.3 Warm Up, page 635

1. Answers may vary. Example: A weather forecast gives the probability of precipitation. A high probability means it probably will rain or snow, but doesn't always mean it will for sure.

2. a) $\frac{13}{52}$; 0.25; 25% **b)** $\frac{2}{5}$; 0.4; 40%

3. a) mean = 10.6; median = 10; mode = 13 **b)** mean = 112.8; median = 111; mode = 111 and 100

11.3 Probability in Society, pages 636–648

Working Example 1: Show You Know

Step 1: 21%
Step 2: 1512
Step 3: Approximately 1512 college students will have blue eyes.

Working Example 2: Show You Know

a) mean = 21.4; median = 22; no mode. Prediction: The average mark is $\frac{21.4}{30}$ or 71.$\overline{3}$%. **b)** YES; The last numbers contain more 20s, which is common in the class, but not common in the first 5 numbers.

Working Example 3: Show You Know

a) Watching Movies: 50%; Bowling: 17.75% **b)** Answers may vary. Example: I would add up the totals for each activity to find the most commonly picked activity.

Communicate the Ideas

1. Answers may vary. Example: Taking too small a sample can result in a false prediction because it doesn't give fair or true results.

2. Experimental probability: Take a fair survey of soccer players to see their favourites. Theoretical probability: If 4 flavours are offered, the theoretical probability for each flavour is 25%.

Practise

3. a) 50 **b)** He assumed the sample was representative of the whole population.

4. 20 000

5. a) $\frac{1}{5}$ **b)** That the chance of picking each type is equal. **c)** 5; 10%

d) Peoples' preferences are not equally divided.

Apply

6. a) YES; the sample is too small. **b)** No; since the sample is biased, it could be incorrect.

7. a) 6.5 **b)** 7 **c)** 6 **d)** Answers may vary. Example: YES; they are close to the actual mean.

Math Link

a) Answers may vary. Example: I will look for experiments about the effect of reintroducing marmots into the wild. I will look at the marmot research centre online. **b)** Answers will vary.

11.4 Warm Up, page 649

1. part

2. Answers may vary. Examples: **a)** Asking only teachers about changing the school hours. **b)** Asking only the people entering a mall about the cleanliness of the mall. **c)** Picking names from a hat. **d)** Sending a questionnaire in the mail.

3. a) sample; average; population **b)** The average number of sea lice on 90 salmon is 3.

11.4 Developing and Implementing a Project Plan, pages 650–654

Answers will vary. Examples:

Step 1:

1. The Vancouver Island marmot

2. It is one of the most endangered species in the world; there are only 25 living in the wild.

3. There were 300 in the mid-1980s, then 75 in 2001.

4. Their habitat is disappearing.

5. Internet sites and library books.

6. Scientists use systematic samples. Since they keep finding fewer and fewer marmots, they know the population is in decline.

Step 2:

Expectation	Level 1	Level 2	Level 3	Level 4
Planning • question and hypothesis • description of population	• not clear • limited or not complete	• fairly clear • some description	• mostly clear • good enough description	• very clear • detailed description
Performing • research and data collection	• no research or incomplete or inappropriate data collection	• some research and data collection but may be too little, or too old	• current research and data and sufficient to make conclusions	• excellent research and current data from a variety of good sources
Recording • display of data	• data is not displayed; can't be understood	• data is in table or graph form only and is fairly easy to understand	• data is in both table and graph form and is easy to understand	• data is displayed clearly in a variety of easy-to-understand formats
Analysing • analysis • conclusion(s)	• unclear or incorrect conclusions	• analysis can be understood and the conclusion makes some sense	• analysis is clear and supports correct conclusion	• analysis and conclusion are very clear and entirely correct
Presenting • project plan and evaluation of results	• presentation is unclear or incomplete	• presentation is fairly clear and matches the evaluation of results	• presentation is clear and matches the information found in the project	• presentation not only explains the project results but is highly educational as well

Step 3:

a) My data will include a table that shows the populations each year and a line graph that matches the data.

b) I assumed that no marmots had been bred in captivity. My prediction was that there would be fewer left.

c) I will use a PowerPoint presentation to show pictures of the marmots, their habitat, the effects of clear-cutting, and the graphs showing the population change.

Step 4:

a)

Vancouver Island Marmot Population
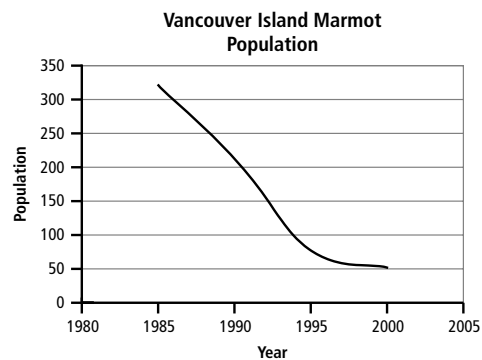
b) I predict the population will continue to decline in the wild unless clear-cutting is stopped.

c) Answers will vary.

Step 5: Answers will vary.

Math Link: Wrap It Up!, page 654

Answers will vary. Examples:

Step 6:

a) Marmots are being bred in zoos with the hope that they can be reintroduced into the wild.

b) There are so few left they are difficult to find.

c) The government could protect marmot habitat so they have a place to live.

d) No. There are too few left to repopulate without human help.

e) The Vancouver Island marmot is almost extinct and needs a lot of help to survive.

f) Scientists should find a way to reintroduce marmots into the wild.

g) The main type of sampling is systematic. Scientists could sample the whole population.

Graphic Organizer, page 655

Answers will vary. Examples:

Convenience sample

Definition: choosing people who are easy to survey

Example: the students in my class

Voluntary response sample

Definition: people who are invited to take the survey

Example: an Internet site that asks readers to take a survey

Stratified sample

Definition: when the population is divided into groups and each group is fairly surveyed

Example: 10 students are randomly surveyed from each grade in the school

Systematic sample

Definition: people on a list are fairly picked by their place on the list

Example: every 20th person in the telephone book is surveyed

Influencing factors

Definition: factors that affect the responses in a survey

Example: bias, language, ethics, cost, time and timing, privacy, cultural sensitivity

Population

Definition: all the individuals in the group being studied

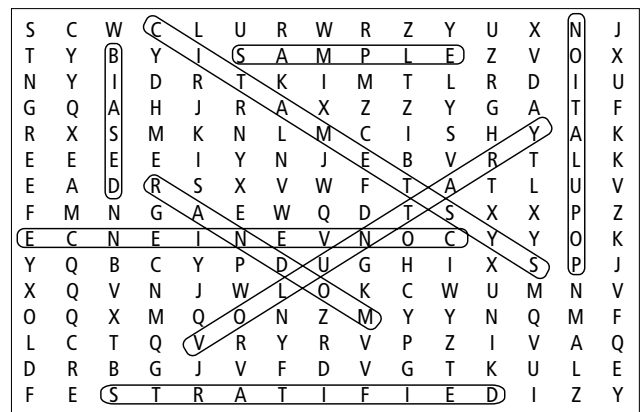Example: the grade 12 population is all the students in grade 12

Chapter 11 Review, pages 656–659

1. systematic sample **2.** influencing factors **3.** biased sample
4. convenience sample **5.** sample **6.** random sample **7.** population
8. stratified sample **9.** voluntary response sample
10. a) time and timing **b)** bias **c)** bias
11. Answers may vary. Example: **a)** use of language; Do you support more money for hospitals? Yes or No. **b)** bias; Do you listen to rock music? Yes or No. If yes, who is your favourite rock group? **c)** use of language; If you had to pick between the two, would you prefer to have snack after school or to play a sport?
12. a) teens in Canada; randomly sampling high school students from across Canada **b)** students at our school; randomly select 20 students from each grade **c)** members of our community; systematically survey every 20th person in community phone book
13. a) convenience; people entering from the north side might be from a particular neighbourhood that doesn't represent the mall population of shoppers **b)** stratified; smaller provinces are over represented **c)** convenience; the supervisor might only pick employees she likes
14. a) systematic sample; surveying every tenth customer would give a random sample **b)** stratified sample; surveying 10% of doctors, nurses, and administrators would be representative of the population
15. a) 8 people chose Candidate B. **b)** $\frac{1}{3}$; Each candidate has an equal chance of being voted for. **c)** The experimental probability is greater than the theoretical probability by about 17%. **d)** YES; The survey predicted candidate A will receive the most votes by far.

16. Answers may vary. Example: **a)** Her prediction is not reasonable because she only samples her class, which does not represent the whole school. **b)** 70% of the grade 9 students will vote for Nancy.

Key Word Builder, page 660

1. sample **2.** random **3.** stratified **4.** systematic **5.** population **6.** biased
7. voluntary **8.** convenience

```
S C W C L U R W R Z Y U X N J
T Y B Y I S A M P L E Z V O X
N Y I D R T K I M T L R D I U
G Q A H J R A X Z Z Y G A T F
R X S M K N L M C I S H Y A K
E E E E I Y N J E B V R T L K
E A D R S X V W F T A T L U V
F M N G A E W Q D T S X X P Z
E C N E I N E V N O C Y Y O K
Y Q B C Y P D U G H I X S P J
X Q V N J W L O K C W U M N V
O Q X M Q N Z M Y Y N Q M F
L C T Q V R Y R V P Z I V A Q
D R B G J V F D V G T K U L E
F E S T R A T I F I E D I Z Y
```

Chapter 11 Practice Test, pages 661–662

1. A **2.** C **3.** B **4.** D

5. sample

6. systematic sample

7. voluntary response sample

8. a) students in her high school **b)** Answers will vary. Example: Which type of music would you most like played at the school dance? Choose rap, alternative, rock, or country. **c)** Cheyenne could do a stratified sample by selecting 20 students from each grade.

9. a) 97 cellphones would be defective. **b)** The sample represents the population.

Challenge, page 663

Answers will vary. Example:

1. a) Data from Vancouver International Airport:

Year	Mean Annual Temperature (°C)
1998	11.3
1999	10.2
2000	10.1
2001	10.2
2002	10.3
2003	10.9
2004	11.5
2005	10.8
2006	10.6
2007	10.2

b)

Mean Annual Temperature (°C)
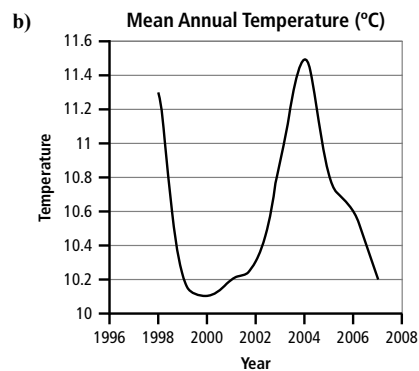
2. a) No, there is not a warming trend because the temperatures ended up lower than where they started. **b)** These findings do not support global warming because the temperatures did not show any sort of trend.

Chapters 8–11 Review, pages 664–670

1. a) $x = \dfrac{1}{20}$ **b)** $x = \dfrac{15}{2}$ or $7\dfrac{1}{2}$
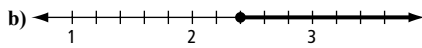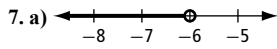
2. The height is 3.4 m.

3. He paid $3.49 for each box.

4. They charge the same amount for a 2.5 h service call.

5. The side length of the square is 21 units.

6. a) $x \le 17$ **b)** $x \ge -6\dfrac{3}{5}$ and $x < -5$

7. a)

b)

8. a) $\ge$ **b)** *Variable*: Let s = budget surplus. *Inequality*: $s > 1.3$ million

9. a) $x < 8.8$ **b)** $x > -5$ **c)** $x \ge -50$ **d)** $x \ge 12$

10. $x \ge 4.5$ or $\dfrac{9}{2}$ or $4\dfrac{1}{2}$

11. a) *Variable*: h = the number of hours; *Inequality*: $145h \le 800$
   b) $h \le 5.5$; Lori can rent the wall for 5.5 or fewer hours.

12. a) 47° **b)** 94°

13. 5.4

14. 48

15. a) bias; Do you play cards? **b)** bias; Would you prefer a band or a DJ at the dance?

16. a) students **b)** Answers will vary. Example: convenience sample, systematic sample

17. a) $P(\text{swimming}) = \dfrac{1}{5}$ **b)** Every activity has an equal chance of being chosen. Customers have an equal interest in each activity. **c)** 12, 24% **d)** Customers do not have an equal interest in each activity.