

# 11.1

## Factors Affecting Data Collection

**MathLinks 9, pages 414–421**

### Suggested Timing

60–80 minutes

### Materials

- magazines, newspapers, or computer with Internet access

### Blackline Masters

Master 2 Communication Peer Evaluation  
 BLM 11–3 Chapter 11 Warm-Up  
 BLM 11–5 Research Project Checklist  
 BLM 11–6 Section 11.1 Extra Practice  
 BLM 11–7 Section 11.1 Math Link

### Mathematical Processes

- Communication (C)
- Connections (CN)
- Mental Math and Estimation (ME)
- Problem Solving (PS)
- Reasoning (R)
- Technology (T)
- Visualization (V)

### Specific Outcomes

**SP1** Describe the effect of:

- bias
- use of language
- ethics
- cost
- time and timing
- privacy
- cultural sensitivity on the collection of data.

**SP3** Develop and implement a project plan for the collection, display and analysis of data by:

- formulating a question for investigation
- choosing a data collection method that includes social considerations
- selecting a population or a sample
- collecting the data
- displaying the collected data in an appropriate manner
- drawing conclusions to answer the question.

Category	Question Numbers
Essential (minimum questions to cover the outcomes)	#1–3, 4, 6, 9, Math Link
Typical	#1–3, 4, 6, 9, 10, 12, Math Link
Extension/Enrichment	#1–3, 12–15, Math Link

### Planning Notes

Have students complete the warm-up questions on **BLM 11–3 Chapter 11 Warm-Up** to reinforce material learned in previous sections.

## 11.1

### Factors Affecting Data Collection

#### Focus on...

After this lesson, you will be able to...

- identify how bias, use of language, ethics, cost, time and timing, privacy, and cultural sensitivity may influence the collection of data
- write and analyse appropriate survey questions



A Super Food employee provides samples of Bob Brat Sausages to customers between 5:00 p.m. and 5:30 p.m. for one day.

Store employees asked customers who buy Bob Brat Sausages the following question.

Did you buy Bob Brat Sausages because they are delicious, quick to prepare, or both delicious and quick to prepare?

#### Literacy Link

A survey is used to collect opinions and/or information.

The table shows the results from the survey.

Bob Brat Sausages	
Delicious	###
Quick to prepare	###
Both delicious and quick to prepare	###

A few weeks later, a store flyer made this advertising claim.

**Over 90% of shoppers love Bob Brat Sausages because they taste great and save time!**

#### Literacy Link

An advertising claim gives information about the performance of a product or service. The claim is designed to encourage you to buy. The claim may be true, false, or a little of both.

What factors might have influenced the survey responses? How accurate do you think the advertising claim is? Explain.

In this section, students identify influencing factors that affect data collection, and write and analyse survey questions.

As a class, begin by inviting students to recall occasions when they have observed samples being offered to customers in a store. Ask:

- Why do you think companies offer samples?
- What is the purpose of giving products away?
- Do you think giving away samples affects sales? on that day? on subsequent days?

As a class, read the introduction about Bob Brat Sausages, which sets the scenario for the Explore. Consider using questions such as the following to generate a brief discussion:

- Who is promoting the product?
- What claim is being made?
- What information is missing from the advertising claim?
- How accurate is the advertising claim? Explain.

### Explore Factors That Affect Survey Responses

1. From the store's point of view, did Super Foods promote Bob Brat sausages well? Explain.
2. a) Did the survey ask a fair question? Explain your reasoning.  
b) Did the survey sample represent the whole population of shoppers? Explain.
3. Some people who read the flyer said the advertisement was misleading. Do you agree with them? Explain why or why not. Discuss your ideas with your group.

### Reflect and Check

4. Imagine you are hired as the store's public relations consultant.  
a) What factors do you need to address to make the data collected about the sausages more accurate?  
b) Develop a survey question you would ask about Bob Brat Sausages. Who would you ask?

### Link the Ideas

Several *influencing factors* affect how data are collected or how responses are obtained.

These include:

- *bias*: Does the question show a preference for a specific product?
- *use of language*: Is the question presented in such a way that people understand what is being asked?
- *ethics*: Does the question refer to inappropriate behaviour?
- *cost*: Does the cost of the study outweigh the benefits?
- *time and timing*: Does the time the data were collected influence the results? Is the timing of the survey appropriate?
- *privacy*: Do people have the right to refuse to answer? Are the responses kept confidential?
- *cultural sensitivity*: Might the question offend people from different cultural groups?

**Literacy Link**  
Ethics involves judgments of right and wrong. For example, cheating on a test is wrong.

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**Literacy Link** Use the first Literacy Link on page 414 to clarify what a *survey* is. You might ask students to share information about surveys they have been involved with. Consider having students record a definition for survey on their concept map.

Use the second Literacy Link on the page to clarify an *advertising claim*. Consider having students share examples of advertising claims they are familiar with. For each one, ask if they think the claim is true, false, or a little of both.

## Explore Factors That Affect Survey Responses

In the Explore, students assess factors that influence a survey response and develop an appropriate survey question.

**Method 1** Have students work in groups of three to discuss #1 to 4. Consider having students plan and present a role play of the scenario that incorporates their responses to #4. If so, have students choose one of three roles (store employee, customer, public

relations consultant) and allow enough time for students to plan their role play. Circulate as they work and prompt students to identify what makes a survey question fair. Have students explain why the group's survey question is fair.

After the role plays have been performed, have students generate a list of factors that need to be addressed by the public relations consultant. Have students discuss how the original question forced the choices, and therefore manipulated the results. Students might refer to the list when completing their individual response to #4.

**Method 2** Have students work individually to complete #1 to 3. Then, have them discuss their responses with a partner.

### Meeting Student Needs

- Some students may benefit from collecting several ads from print media. Then, have them identify the advertising claim, list what information is missing from the claim, and assess the accuracy of the claim.
- Consider working through the Explore as a whole class.

### ELL

- Teach the following terms in context: *accurate*, *point of view*, *fair question*, and *misleading*.

## Answers

### Explore Factors That Affect Survey Responses

1. Example: The store made the product sound desirable when they claimed that 90% of the shoppers liked the product.
2. a) Example: No, the store asked a question that forced customers to choose from three answers.  
b) No. Examples:
  - Only shoppers who bought the product were represented, not all shoppers.
  - Only shoppers who shopped between 5:00 p.m. and 5:30 p.m. were surveyed.
3. Example: I agree. The flyer does not identify the shoppers nor how many shoppers were surveyed.
4. a) Example: Some factors include:
  - Who should be asked the question?
  - How should the question be worded?
  - When should the question be asked?b) Example: "Did you buy Bob Brat Sausages? YES NO If yes, why did you buy them?" All customers should be asked.

Assessment	Supporting Learning
Assessment as Learning	
<b>Reflect and Check</b> Listen as students discuss what they discovered during the Explore.	<ul style="list-style-type: none"> <li>• Try to have students come to consensus about the factors that affected the data collection.</li> <li>• Some students may benefit from using the role plays and follow-up discussion as a springboard to develop their own response. You might discuss as a class who might be asked to respond to the survey. The variety of responses may help students develop strategies for approaching similar questions.</li> </ul>

**Explore Factors That Affect Survey Responses**

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2. a) Did the survey ask a fair question? Explain your reasoning.  
b) Did the survey sample represent the whole population of shoppers? Explain.
3. Some people who read the flyer said the advertisement was misleading. Do you agree with them? Explain why or why not. Discuss your ideas with your group.

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  - a) What factors do you need to address to make the data collected about the sausages more accurate?
  - b) Develop a survey question you would ask about Bob Brat Sausages. Who would you ask?

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**Example 1: Identify Factors Affecting Data Collection**

Helen and Andre are reviewing the data collection methods used by a marketing company. For each situation, help them identify any influencing factors. Explain your reasoning.



What is your favourite brand of toothpaste? For what reason(s)?

- a) A sales representative stands in front of a display of different kinds of toothpaste. He asks every person buying toothpaste the following question.
- b) Free samples of sunscreen are sent to every home in fall and winter. A mail reply card asks people if they would use the product again.
- c) A grocery store employee conducts a telephone survey of people living within 10 km of the store. To help determine what meat products to sell, she asks what type of red meat people prefer.
- d) A sales representative conducts a telephone survey. As she poses the question, a person receiving the call says, "I am not interested, thank you." The sales representative responds, "Why not? Your input provides useful information." She begins to repeat the survey question.
- e) Your school is under construction and is quite dusty and dirty. A survey is conducted about the environmental health of your school. The survey is done every four years.
- f) A sales representative sets up an online survey. The survey offers a free MP3 file of a song that was downloaded from the Internet to everyone who completes the survey. The company has not bought the rights to the song.

**Solution**

- a) There is no bias. Standing in front of a toothpaste display allows the sales representative to survey people who are buying toothpaste.
- b) Fall and winter sun is less intense than spring and summer sun. People may be less likely to wear sunscreen during fall and winter. Therefore, these seasons are not likely the best choice for testing sunscreen. Sending sunscreen products during fall and winter is very costly for the company. In addition, asking people if they would use the product again assumes that they did use it. This may confuse people who have not tested the product. The language is unclear.
- c) The question is biased. It assumes that all people eat red meat, which is not true. Red meat is not acceptable to some people. For these people, this may be a culturally sensitive question.
- d) The sales representative does not respect the individual's right to refuse to participate in the survey. In addition, any responses obtained under pressure may not truly represent the person's opinion.
- e) This survey is poorly timed. When a school is under construction, some routines may be disturbed. People may express frustration with the temporary changes. This would reflect in a negative way on the survey.

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## Link the Ideas

As a class, introduce the terminology about influencing factors that affect data collection. Take time and ensure that students understand the meaning of each factor.

**Literacy Link** Direct students to the Literacy Link on page 415 that explains the term *ethics*. Consider having students record definitions for *bias* and *ethics* on their concept map.

### Example 1

This example illustrates several factors that affect the collection of data.

Read about each situation as a class. Consider having students respond to each situation, before discussing the given solution.

You might have students work in their groups of three from the Explore to discuss which factors affected the Bob Brat Sausage survey responses. You may also have them decide whether or not the public relations consultant addressed the factors adequately. Ask what changes, if any, they would recommend. Invite groups to discuss their responses with the class.

Have students work individually on the Show You Know, and then discuss their response with a classmate. As a class, prompt discussion by asking questions such as the following:

- Why do you think the firm came to their conclusion?
- Is their conclusion misleading? Explain.
- If you were the student council president, what would be your response to the firm? What would you say to students in your school?

- f) Offering a reward to participants in the survey is ethically wrong. In addition, it is not ethical to download music from the Internet without buying it. When people do this, musicians are not being paid for their work.

**Show You Know**

A marketing firm displayed two sports shirts at a grades 7 to 12 school with 800 students. The first ten grade 12 students who entered the school were asked the following question.

Which one of these two sports shirts would you buy?

A week later, the firm gave this flyer to the student council.

What factors might have affected the data collected and the company's conclusions? Explain.

Over 78% of students at Central High will buy Shirt B.



**Example 2: Write Survey Questions Free of Influencing Factors**

A steel milling company conducts a survey.

- a) Does the survey question influence the results? Explain.  
 b) Rewrite the question so that it is free of influencing factors.

The proposed mill will produce 250 jobs and economic benefits for your community. Are you in favour of having a forward-thinking steel mill in your community? YES NO

**Solution**

a) Yes, the wording in the question may lead people to answer in a specific way. It implies that due to the economic benefits the company can offer, people should vote in favour of the mill.

b) A better way to ask the question is, "Are you in favour of having a steel mill in your community?"

**Show You Know**

For each situation, explain whether the question has influencing factors. If it does, rewrite the question.

- a) Daniel is studying the population of polar bears in eastern Hudson Bay. He drafts the following question.

Do you think the senseless slaughter of polar bears should be stopped? YES NO

- b) A recent study shows that 45% of Canadians are using the Internet to shop. Amy develops the following question for a class survey.

What kinds of products and services do you buy online?

**Example 2**

This example models writing survey questions free of influencing factors.

As a class, read the information about the situation. Before walking through the given solution, ask students to identify the specific words or phrases in the survey question that influence the results. Ask them what these words or phrases imply.

You might discuss from the company's point of view that the question is not poorly worded if the intent is to influence the survey results. However, emphasize the importance of wording questions free from bias in order to obtain accurate results.

Have students work individually on the Show You Know. Have students exchange their response to part a) with a classmate, get feedback about the survey question, and make any revisions. Tell students to read their partner's question carefully and check that it is free of influencing factors. Then, have students do the same for part b) by exchanging their response with another classmate.

**Key Ideas**

- Survey questions should be worded so they are free from factors influencing the responses.

The survey questions ask about purchases made at a school cafeteria.

1. Do you buy food at the school cafeteria? YES NO  
 2. If you responded NO, what reason best explains why you do not buy food at the cafeteria? Circle one.  
 A The quality of the food is poor.  
 B I do not like the food choices.  
 C The cafeteria is in an inconvenient location.  
 D The prices are too high.  
 E Other (Please explain.)

- Influencing factors include bias, use of language, ethics, cost, time and timing, privacy, and cultural sensitivity.

1. In the past year, how many times did you buy food items at the cafeteria? \_\_\_\_\_

1. In the past week, did you buy any food items at the cafeteria? YES NO

2. If you responded YES, how many times did you buy each of the following food items?  
 soup or salad \_\_\_\_\_ main course \_\_\_\_\_ drink \_\_\_\_\_ snack \_\_\_\_\_

**Check Your Understanding**

**Communicate the Ideas**

- Your friend is unclear what the term *bias* means. Develop an example to help explain the term.
- Explain how influencing factors affect the collection of data. Give an example.
- Shunta and Susan are discussing how to choose the top five lunch specials for the cafeteria menu. Each develops a different survey question. They decide to survey all the students.

Shunta:

What are your top five favourite lunch specials?

Susan:

Which are your top five favourite lunch specials from this menu? Circle your choices.



Which survey question do you prefer? Explain why.

**Key Ideas**

The Key Ideas highlight the importance of writing survey questions free from factors that influence responses, and summarize a list of influencing factors. As a class, have students review the examples about purchases made at a cafeteria. For each survey question, ask:

- Is the question free from factors that influence the responses? Explain your reasoning. Students should recognize the following:
  - The first set of questions is free from bias. The questions do not force choices. There is an E option.
  - The question in the second box is not free from influence. The influencing factor is time and timing.
  - The change in wording from "in the past year" to "in the past week" improves the third set of questions. You might discuss how people can easily forget what items they purchased over a period of one year, unless they bought very few food items or bought the same items repeatedly.

Some students may benefit from developing a biased survey question, and then highlighting the words or phrases that make the question biased. Have them rewrite the question so it is free from bias and highlight the change in wording. Have students store their examples of influencing factors in the pocket of their Foldable.



### Meeting Student Needs

- Consider having students scan newspapers, magazines, or the Internet to find examples of titles or headlines that are misleading or misrepresent data. Have students discuss their findings with the class.
- Consider working through the examples as a whole class and having students work in pairs or small groups to complete the Show You Knows. Have students work individually to complete an additional Show You Know related to each example.

### ELL

- Ensure that students understand the term *factor*, which is used frequently in this chapter. You might explain that a factor (in the context of this chapter) is a condition that helps to bring about a result.
- Teach the following terms in context: *influencing, bias, preference, conduct, privacy, and cultural sensitivity*.
- Bias is a difficult concept to explain to English language learners. Often the terms used to describe bias are difficult to define concretely (e.g., *influence, point of view, claim, fair question*). Continually rephrase the term and use many examples of bias to help students clarify their understanding. You might

use an example such as asking only the members of a hockey team if they prefer team sports or individual sports. The hockey players likely prefer team sports. Using these results to make a statement that all teens prefer team sports is inaccurate. Asking only the hockey players is an example of bias. Additionally, students may struggle with identifying bias in the way that language is used in a question.

- For both examples, you may need to prompt students to come to an understanding of what factors may have affected the data collection.
- Students might work in pairs or small groups to complete the Show You Knows.
- Some students may benefit from additional questions similar to the Show You Knows.

### Common Errors

- Some students may not identify influencing factors.
- R<sub>x</sub>** Check that students understand the meaning of each factor described on page 415. Then, coach them through identifying the influencing factors for several situations in Example 1.

## Answers

### Example 1: Show You Know

Examples:

- Timing. Only the first ten grade 12 students were asked the question.
- Bias. Only grade 12 students were asked. The firm should have surveyed students from grades 7 to 12.

### Example 2: Show You Know

- Example: The word *senseless* may influence people to answer “YES” to the question. Rewrite: “Do you think polar bears in eastern Hudson Bay should be protected?”
- The wording assumes that the respondent shops online. The question would be confusing to people who do not shop online. Rewrite: “Do you shop online? YES NO If yes, what kind of products and services do you buy?”

Assessment	Supporting Learning
<b>Assessment for Learning</b>	
<p><b>Example 1</b> Have students do the Show You Know related to Example 1.</p>	<ul style="list-style-type: none"> <li>• Encourage students to verbalize their thinking.</li> <li>• You may wish to have students work with a partner.</li> <li>• Some students may not recognize the influencing factor. You might prompt students by asking: Does the sample represent the whole population of students? Explain. Does the question allow for people who might not buy any shirt? How might you improve the question? After discussing the solution, consider providing a similar situation for students to respond to. Note if students are able to identify the influencing factors in a new context.</li> </ul>
<p><b>Example 2</b> Have students do the Show You Know related to Example 2.</p>	<ul style="list-style-type: none"> <li>• Encourage students to verbalize their thinking.</li> <li>• You may wish to have students work with a partner.</li> <li>• Some students may not recognize the influencing factors. You might prompt students by asking: In part a), what words indicate a preference for a certain point of view? Explain. Does the question allow for alternatives beyond Yes and No responses? How might you improve the question? In part b), what assumption is Amy making? How might you improve the question? Provide students an opportunity to discuss their thinking for part a) before proceeding to part b).</li> <li>• Have students exchange their revised questions with a classmate and provide feedback.</li> </ul>

**Key Ideas**

- Survey questions should be worded so they are free from factors influencing the responses.  
The survey questions ask about purchases made at a school cafeteria.
- Influencing factors include bias, use of language, ethics, cost, time and timing, privacy, and cultural sensitivity.  
Which box shows better survey questions? Why?

1. Do you buy food at the school cafeteria? YES NO  
2. If you responded NO, what reason best explains why you do not buy food at the cafeteria? Circle one.  
A The quality of the food is poor.  
B I do not like the food choices.  
C The cafeteria is in an inconvenient location.  
D The prices are too high.  
E Other (Please explain.) \_\_\_\_\_

1. In the past year, how many times did you buy food items at the cafeteria? \_\_\_\_  
2. In the past week, did you buy any food items at the cafeteria? YES NO  
3. If you responded YES, how many times did you buy each of the following food items?  
soup or salad \_\_\_\_ main course \_\_\_\_ drink \_\_\_\_ snack \_\_\_\_

**Check Your Understanding**

**Communicate the Ideas**

- Your friend is unclear what the term *bias* means. Develop an example to help explain the term.
- Explain how influencing factors affect the collection of data. Give an example.
- Shunta and Susan are discussing how to choose the top five lunch specials for the cafeteria menu. Each develops a different survey question. They decide to survey all the students.

Shunta: What are your top five favourite lunch specials?

Susan: Which are your top five favourite lunch specials from this menu? Circle your choices.

**LUNCH SPECIALS**

tomato soup and salad	grilled cheese
hamburger	chicken salad sandwich
vegetarian lasagna	meatier hot dog
vegetarian chili	pepperoni pizza

Which survey question do you prefer? Explain why.

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**Practise**

For help with #4 and #5, refer to Example 1 on pages 416-417.

- In each case, identify and describe any factors that may affect the collection of data.
  - Survey members of the soccer team about new uniforms for the volleyball team.
  - At a truck rally, ask drivers what type of vehicle they prefer to drive.
  - Provide samples of a new granola bar at all conferences and conventions in your community. Ask people who attend the following question.
 

What is your favourite among the new granola bars you tried in the past month?
  - Ask customers in a sports store the following question.
 

Invincible Bikes are the most sturdy and expertly designed bikes on the market. What brand will you buy?
- For each situation, identify whether there is bias. If so, identify the bias. Then, rewrite the statement to correct it.
  - Ask all horse owners if they are willing to pay higher horse-boarding fees.
  - Ask owners of horses boarded in a stable in the city centre if this location is annoying.
  - Ask horseback riders if they would support building a public park on the site of their stable.
 



For help with #6 to #8, refer to Example 2 on page 417.

- In each case, describe the effect of any influencing factors on the collection of data. Then, write an improved survey question.
  - A sales representative asks the following question.
 

Which do you prefer?  
A Cola  
B Diet Cola
  - An opposition party member asks the following question.
 

Is the current prime minister not the best prime minister in Canadian history?  
YES NO
  - A small business develops the following question.
 

Do you know about the Hands-On Repair Company and the maintenance your appliances and tools need?  
YES NO
  - Jennifer asks students the following question.
 

What is your parents' total income?

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## Check Your Understanding

### Communicate the Ideas

These questions allow students to explain their understanding of influencing factors and well-designed survey questions. Have students work in pairs to discuss their ideas for #1 to 3, and then provide individual responses. Both #1 and 2 require students to develop an original example.

For #1, students explain the term *bias*. Consider having students verbalize their example and explanation with a classmate, before recording their response.

For #2, they use an example to help explain how influencing factors affect data collection.

For #3, students support their choice of survey question. Check their understanding of useful questions.

### Practise

Note that #4 and 5 and #6 to 8 are sets of similar questions. Consider giving students a choice to do one question from each set initially to demonstrate their understanding.

### Apply

For #10, students develop survey questions. Emphasize that survey questions need to be free from influencing factors and clearly written. You might have them

discuss the limitations for each situation. For example, in part a), they may decide to survey local youth in their community. Discuss how the choices for favourite sports listed in a survey question might vary depending on who is surveyed. This process may assist them in answering #12.

### Extend

Note that #13 is appropriate for many students. For #14, have students discuss why they should not survey the same 20 students for both questions. Help them realize that although they rewrote the survey question so it is free from bias, surveying the same students again will create bias.

**Literacy Link** Direct students to their concept map, and have them complete a definition for *influencing factors*. They should connect the oval with the definition to the oval labelled influencing factors. Encourage them to attach additional ovals and provide a definition of each type of influencing factor (i.e., bias, use of language, ethics, cost, time and timing, privacy, cultural sensitivity). Consider having students attach an oval to each type of influencing factor and using the ovals to summarize their own examples.

7. Rewrite each survey question without any influencing factors.

a) Sam asks riders of all-terrain vehicles the following question.

Do you support closing some riding trails to save some endangered animals?  
YES NO

b) A marketer surveys all the people entering a movie theatre.

Who is your favourite male movie star?  
A Brad Pitt  
B Keanu Reeves  
C Matt Damon  
D Other

c) A student asks people at an airport the following question.

Do you think flying is still the cheapest way to travel a long distance?  
YES NO

8. Rewrite each survey question so there are no influencing factors.

a) Do you like to watch hockey, the only great sport?  
YES NO

b) Most people choose chocolate, but what is your favourite flavour of ice cream?

c) A recent survey shows that 42% of teens use the Internet to watch TV. What TV shows do you watch most often online?

### Apply

9. For each situation, write two different survey questions that may have resulted in each conclusion.


- a) Most juice lovers prefer apple and orange.
- b) Yellow is the most popular shirt colour.
- c) Four out of five doctors surveyed strongly support a healthy, natural-food diet.

10. Write a survey question for each situation. Identify who you would ask to participate in the survey.

- a) You want to find out which sport teens like best.
- b) You want to find out if price or brand is more important when buying a cell phone.
- c) You want to find out which media source people trust most to give them accurate information.

11. Rewrite each survey question so that it collects more helpful data.

a) If you are a juice drinker, would you consider switching to Crystal Juice?  
YES NO

b) Which of the following cough medicines have you tried?  


c) Would you run if you came across a moose?  
YES NO

d) Are you satisfied with your Internet access? Circle one response.  
A Excellent  
B Good  
C Poor

12. For each case, identify the influencing factors that may affect the collection of data. Then, write a survey question that is free of influencing factors and is clearly written.

- a) Teens are asked about which clothing items they have bought at an expensive store in the past year.
- b) The members of a golf club are asked if they are in favour of a proposed highway. It will reduce traffic jams by going through the golf course.

14. a) You have been hired to develop Arctic adventure tours. Develop three survey questions to help determine the activities that appeal to tourists.

b) Exchange your questions with a classmate. Critique each other's questions for clarity and the presence of any influencing factors.

c) Based on the feedback, revise your survey questions so they are clearly written and free of influencing factors.



15. When interpreting the results of a political poll, why is it important to know the source of the poll?

### Extend

- 13. a) Write two survey questions that relate to a topic of your choice, such as sports, fashion, movies, or games.
  - Develop a question that contains bias.
  - Develop a different question that is free of influencing factors.
- b) Use the first question to survey 20 friends or classmates. Use the second question to survey 20 different friends or classmates.
- c) Compare the results. Identify the bias in the first question. Explain how its wording may have affected the results.

### Math Link

For your research project, select a wildlife protection or management topic.

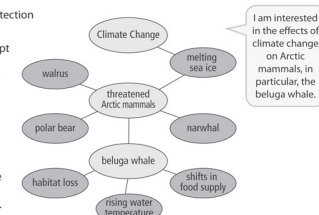
a) Use a graphic organizer such as the concept map shown here to help you organize ideas for your topic. Record subtopics and connecting details and facts.

b) Choose a subtopic to study.

c) Consider what data you need to obtain related to your topic. Then, write three possible research questions.

d) Exchange your questions with a classmate to check that they are free of influencing factors. Revise your questions if necessary.

WWW Web Link  
For information about national and provincial parks in Canada, go to [www.mathlinks9.ca](http://www.mathlinks9.ca) and follow the links.



I am interested in the effects of climate change on Arctic mammals, in particular, the beluga whale.

Research Questions: How does melting sea ice threaten Arctic mammals? Which Arctic mammals are most threatened by melting sea ice? What are the population trends for beluga whales in Canada?

## Math Link

The Math Link allows students to apply their understanding of influencing factors. In this Math Link, students select a wildlife protection or management topic for their research project, use a graphic organizer to help organize ideas for the topic, and then develop three research questions related to their topic. They exchange their questions with a classmate, check that they are free from influencing factors, and then revise their questions.

Provide students with access to magazines or the Internet to help them refine their topic.

As students work, circulate and coach students as needed to assist them with the research project process. Remind students to extend their concept map as needed.

## Meeting Student Needs

- Consider assigning fewer questions to students who need help with text-dense questions. Alternatively, provide students with more time.
- Provide **BLM 11–6 Section 11.1 Extra Practice** to students who would benefit from more practice.

## ELL

- For #1 and 2, allow English language learners to discuss their ideas in their first language, and then develop their response in English. This offers them the opportunity to activate their knowledge using familiar language. Afterwards, it may be easier for them to ask for the missing vocabulary to express their thinking in English.
- Ensure students understand the following terms: *truck rally*, *horse-boarding fees*, *boarding horses*, *opposition party member*, *all-terrain-vehicle*, and *media source*. Have students add any new terms to their dictionary.
- Check that students understand the vocabulary used in the questions in order for them to be able to identify influencing factors.
- Consider assigning fewer questions to English language learners who may struggle with text-dense questions.

### Gifted and Enrichment

- Challenge students to develop guidelines for designing effective questions to survey human behaviour. Have them present the guidelines in a format of their choice. They may find the related Web Link on this TR page useful.
- Challenge students to research data collection methods (e.g., personal interviews, telephone surveys, mail surveys, e-mail surveys, Web surveys) and their advantages and disadvantages. Have them develop a summary of survey methods and present their findings in a format of their choice. They may find the related Web Link on this TR page useful.

### Web Link

For guidelines about developing questions to survey behaviour, go to [www.mathlinks9.ca](http://www.mathlinks9.ca) and follow the links.

For information about data collection methods and their advantages and disadvantages go to [www.mathlinks9.ca](http://www.mathlinks9.ca) and follow the links.

## Answers

### Communicate the Ideas

1. Example: Ask members of the school football team which type of sport they prefer to play, a contact sport or a non-contact sport. Since football is a contact sport and the respondents play on the football team, the members would most likely answer that they prefer contact sports. Asking only the members of the football team is an example of bias.
2. Example: Influencing factors affect how data is collected. For example, suppose you ask only thirteen-year-old girls to state their favourite type of music. They might say rock music. If you then use the results to make a statement that most teenagers prefer rock music, you are making a false statement because you did not use a representative sample.
3. Either question is acceptable. Look for an explanation. Examples:
  - Shunta's question allows respondents to state their favourite lunch specials, and not be forced to choose from a list of items. A respondent's choice may not be among the eight items.
  - Susan's question is useful in situations where the listed items are the only lunch specials that are offered.



Assessment	Supporting Learning
<b>Assessment as Learning</b>	
<p><b>Communicate the Ideas</b> Have students complete #1 to 3.</p>	<ul style="list-style-type: none"> <li>• Encourage students to verbalize their thinking.</li> <li>• You may wish to have students work with a partner.</li> <li>• For #3, prompt students to identify why they chose the survey question they did. It may be beneficial for them to record the reasons for their choice for future reference.</li> <li>• Ask students who need assistance with #3 to verbalize the differences between the two survey questions. Ask what they would look for if they were checking for bias.</li> <li>• You may wish to have students use <b>Master 2 Communication Peer Evaluation</b> to assess each other's responses to #1 to 3.</li> </ul>
<b>Assessment for Learning</b>	
<p><b>Practise and Apply</b> Have students do #4, 6, and 9. Students who have no problems with these questions can go on to the remaining Apply questions.</p>	<ul style="list-style-type: none"> <li>• Students who need assistance with #4 may benefit from additional coaching with Example 1. Have students respond to the following questions: <ul style="list-style-type: none"> <li>– What information is the survey looking for?</li> <li>– Who will be asked?</li> <li>– What factors might influence the survey?</li> </ul> Coach students through #4, and then have them try #5 on their own.</li> <li>• Students who need assistance with #6 may benefit from additional coaching with Example 2. Coach students through #6. Refer students to the list of influencing factors on page 415, and have them use it as a checklist to identify factors. Have students identify problematic wording, before rewriting the survey question. Then, have them try #7 or 8 on their own.</li> <li>• Have students who struggle with #9 refer to Example 2. Explain to students who need coaching with #9 that, for each situation, opinions were collected and a conclusion was drawn. Point out that they are to write the survey question that led to the given conclusion.</li> </ul>
<p><b>Math Link</b> The Math Link on page 421 is intended to help students work toward the chapter problem wrap-up titled Wrap It Up! on page 443.</p>	<ul style="list-style-type: none"> <li>• It is recommended that all students complete the Math Link.</li> <li>• Consider providing students with access to magazines and/or the Internet to help them select a topic and develop their research questions. Encourage students to consider ocean populations in addition to land-based populations.</li> <li>• Some students who need assistance to narrow their research project topic may benefit from working with a partner to develop a concept map and identify an appropriate subtopic.</li> <li>• Consider having students who need assistance select a topic from a limited number of choices that you suggest, based on their interests.</li> <li>• Students who need help getting started could use <b>BLM 11–7 Section 11.1 Math Link</b>, which provides scaffolding.</li> <li>• If you have not done so earlier, you may wish to provide students who would benefit from an organizational tool to track their progress on the research project with <b>BLM 11–5 Research Project Checklist</b>. They can use the checklist to check off each step of the project as it is completed.</li> </ul>
<b>Assessment as Learning</b>	
<p><b>Literacy Link</b> By the end of section 11.1, have students complete a definition for <i>influencing factors</i>.</p>	<ul style="list-style-type: none"> <li>• Some students may benefit from using their Foldable to record definitions for terms as they are introduced. Then, at the end of the chapter, have them summarize the definitions for each term in their own words and organize them on the concept map.</li> <li>• Some students may find it helpful to attach an oval to each type of influencing factor and use the ovals to summarize their own examples.</li> </ul>
<p><b>Math Learning Log</b> Have students answer the following question:</p> <ul style="list-style-type: none"> <li>• Search magazines, newspapers, or the Internet for an advertisement claim that you think may be misleading. <ul style="list-style-type: none"> <li>– Identify any influencing factors.</li> <li>– Explain how influencing factors may have influenced the collection of data.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Encourage students to refer to their notes about influencing factors in their Foldable or concept map.</li> <li>• Have students discuss the effect of misleading advertising claims on consumers. Ask what advice they have for consumers as a result of their work in this section.</li> <li>• Depending on students' learning styles, have them provide oral or written answers.</li> <li>• Encourage students to use the What I Need to Work On section of their Foldable to note what they continue to have difficulties with.</li> </ul>