1.1 Advantages and Disadvantages of Different Graphs

***MathLinks 8*, pages 6–17**

Suggested Timing
80–100 minutes

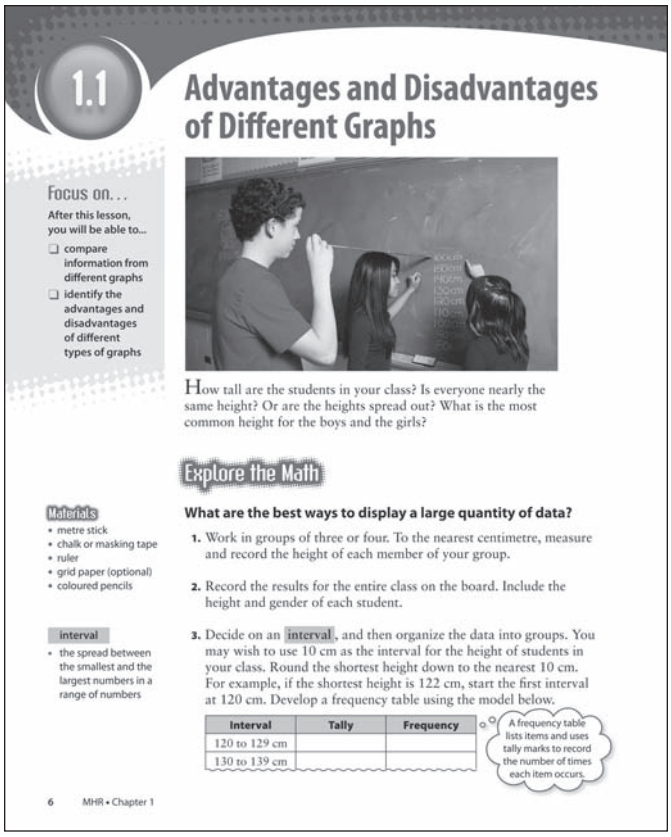
Materials
- metre stick
- chalk or masking tape
- ruler
- grid paper
- coloured pencils
- compass
- protractor
- variety of magazines and newspapers with graphs related to music or sports
- computer with Internet access (optional)
- scissors (optional)
- glue or tape (optional)

Blackline Masters
Master 8 Centimetre Grid Paper
Master 9 0.5 Centimetre Grid Paper
Master 12 Percent Circles (optional)
BLM 1–4 Chapter 1 Warm-Up
BLM 1–6 Section 1.1 Explore the Math
BLM 1–7 Compare a Bar Graph and a Pictograph
BLM 1–8 Section 1.1 Extra Practice
BLM 1–9 Section 1.1 Math Link

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

Specific Outcomes
SP1 Critique ways in which data is presented.

Category	Question Numbers
Essential (minimum questions to cover the outcomes)	1–4, 6–8, Math Link
Typical	1–4, 7, 10, 12–15, Math Link
Extension/Enrichment	1–3, 12, 15–17, Math Link



1.1 Advantages and Disadvantages of Different Graphs

Focus on...
After this lesson, you will be able to...
- compare information from different graphs
- identify the advantages and disadvantages of different types of graphs

How tall are the students in your class? Is everyone nearly the same height? Or are the heights spread out? What is the most common height for the boys and the girls?

Explore the Math

Materials
- metre stick
- chalk or masking tape
- ruler
- grid paper (optional)
- coloured pencils

What are the best ways to display a large quantity of data?

1. Work in groups of three or four. To the nearest centimetre, measure and record the height of each member of your group.
2. Record the results for the entire class on the board. Include the height and gender of each student.
3. Decide on an interval, and then organize the data into groups. You may wish to use 10 cm as the interval for the height of students in your class. Round the shortest height down to the nearest 10 cm. For example, if the shortest height is 122 cm, start the first interval at 120 cm. Develop a frequency table using the model below.

interval
- the spread between the smallest and the largest numbers in a range of numbers

Interval	Tally	Frequency
120 to 129 cm		
130 to 139 cm		

A frequency table lists items and uses tally marks to record the number of times each item occurs.

6 MHR • Chapter 1

Planning Notes

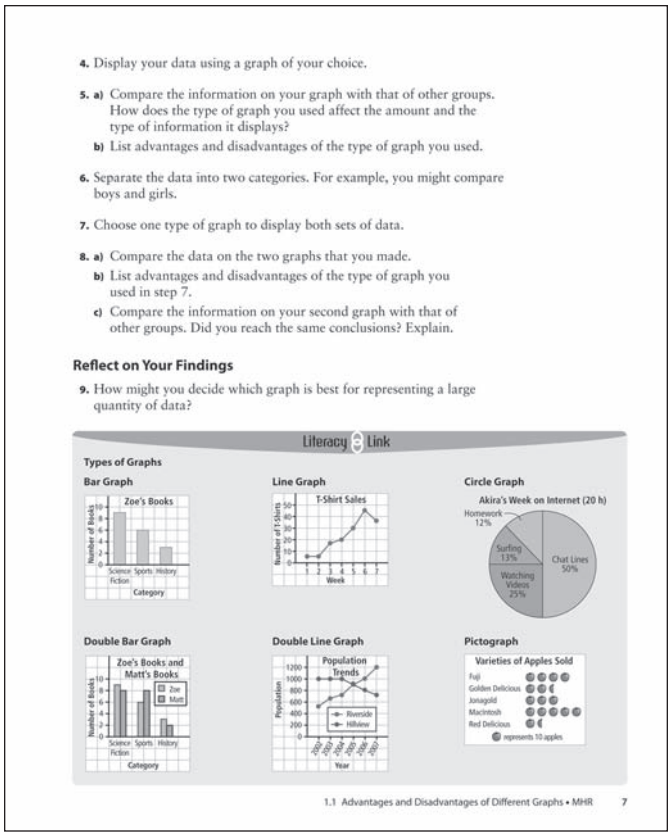
Have students complete the warm-up questions on **BLM 1–4 Chapter 1 Warm-Up**.

As a class, help students recall the different types of graphs. Read and discuss the questions in the introduction before beginning the Explore the Math.

Literacy Link Direct students to the Literacy Link on page 7 and have students note the features of each type of graph.

Explore the Math

In this exploration, students collect data about students' height, create a frequency table, and display the data on a graph of their choice.



4. Display your data using a graph of your choice.

5. a) Compare the information on your graph with that of other groups. How does the type of graph you used affect the amount and the type of information it displays?
   b) List advantages and disadvantages of the type of graph you used.

6. Separate the data into two categories. For example, you might compare boys and girls.

7. Choose one type of graph to display both sets of data.

8. a) Compare the data on the two graphs that you made.
   b) List advantages and disadvantages of the type of graph you used in step 7.
   c) Compare the information on your second graph with that of other groups. Did you reach the same conclusions? Explain.

Reflect on Your Findings

9. How might you decide which graph is best for representing a large quantity of data?

Literacy Link

Types of Graphs

Bar Graph

Line Graph

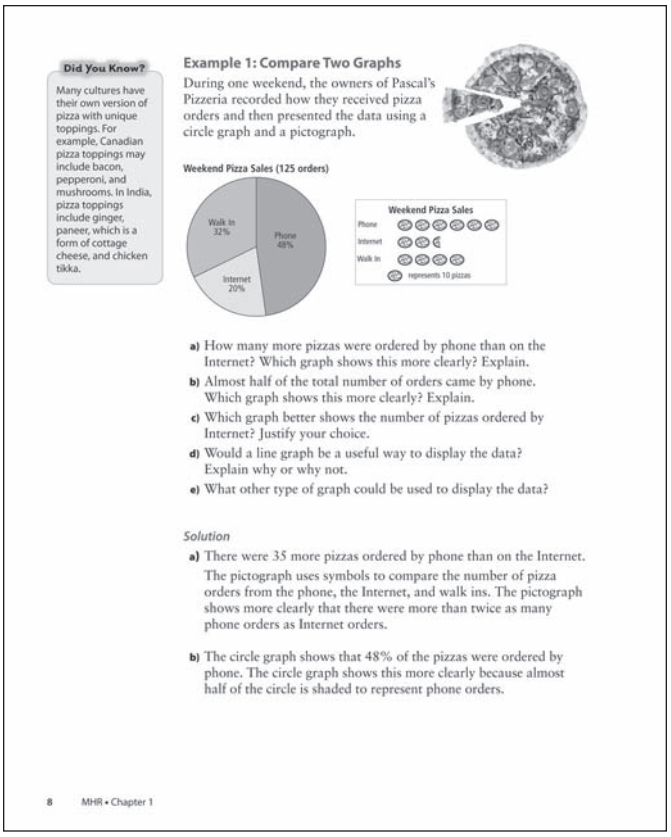
Circle Graph

Double Bar Graph

Double Line Graph

Pictograph

1.1 Advantages and Disadvantages of Different Graphs • MHR 7



Did You Know?

Many cultures have their own version of pizza with unique toppings. For example, Canadian pizza toppings may include bacon, pepperoni, and mushrooms. In India, pizza toppings include ginger, paneer, which is a form of cottage cheese, and chicken tikka.

Example 1: Compare Two Graphs

During one weekend, the owners of Pascal's Pizzeria recorded how they received pizza orders and then presented the data using a circle graph and a pictograph.

Weekend Pizza Sales (125 orders)

Weekend Pizza Sales

a) How many more pizzas were ordered by phone than on the Internet? Which graph shows this more clearly? Explain.
b) Almost half of the total number of orders came by phone. Which graph shows this more clearly? Explain.
c) Which graph better shows the number of pizzas ordered by Internet? Justify your choice.
d) Would a line graph be a useful way to display the data? Explain why or why not.
e) What other type of graph could be used to display the data?

Solution

a) There were 35 more pizzas ordered by phone than on the Internet.
The pictograph uses symbols to compare the number of pizza orders from the phone, the Internet, and walk ins. The pictograph shows more clearly that there were more than twice as many phone orders as Internet orders.

b) The circle graph shows that 48% of the pizzas were ordered by phone. The circle graph shows this more clearly because almost half of the circle is shaded to represent phone orders.

8 MHR • Chapter 1

Method 1 Have students work in groups. Provide each group with a metre stick and chalk or masking tape. Have students mark their heights using chalk or masking tape on the board or a wall and record each student's height. Next, have them record the results for the entire class on the board. As a class, have students decide on an interval and organize the data into groups. Circulate as students work on #4 and #7 to ensure that each type of graph will be represented for class discussion purposes. You might challenge some groups to try a different type of graph.

Method 2 Have students measure their height and bring it to class. Collect and record student heights for the entire class. As a class, decide on an interval and organize the data into groups. Brainstorm the different types of graphs. Have students choose the type of graph they will do and record that decision. Make sure that someone from the class uses each type of graph in the brainstormed list. Have students work individually or in pairs to create the graph.

Make copies of **Master 8 Centimetre Grid Paper**, **Master 9 0.5 Centimetre Grid**, and **Master 12 Percent Circles** available for making graphs. Have students discuss their findings as a class.

Example 1

Example 1 illustrates comparing information from a circle graph and a pictograph and identifying advantages and disadvantages of different graphs. Consider having students identify how the graphs are similar and how they are different.

Example 2

Example 2 illustrates representing data on a double bar graph and identifying advantages and disadvantages of different graphs. Have students interpret the data in the two tables and ask if the double bar graph and the circle graphs accurately represent the data.

Meeting Student Needs

- Provide **BLM 1–6 Section 1.1 Explore the Math**, which provides a copy of the table on page 6.
- You may need to assist students to understand the term *interval*. Explain that intervals can have any quantity of numbers, but are often in groups of ten, and using intervals makes graphs easier to construct and understand. For example, if each student's height was graphed, the graph would be very large and difficult to read.

c) The pictograph shows the number of pizzas ordered by Internet better than the circle graph. The pictograph uses 2.5 pizza symbols to represent the orders from the Internet.

Since each symbol represents 10 pizzas, then $2.5 \times 10 = 25$ pizzas.

You would have to perform extra calculations to determine the number of pizzas ordered by Internet using the information on the circle graph.

For example, the circle graph shows that 20% of the 125 pizzas were ordered on the Internet. You can find the number of pizzas by calculating 20% of the total number of pizzas.

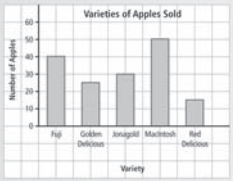
Since $20\% = 0.2$, then $0.2 \times 125 = 25$ pizzas.

d) A line graph would not be useful since the data do not show changes over time. You need to use a graph that compares data in different categories.

e) A bar graph could also have been used to compare data about pizza orders.

Show You Know

The graphs show the number of each variety of apple sold in a fruit stand.



a) In your opinion which graph is easier to read? Justify your choice.

b) Would a line graph be a useful way to display the data? Explain why or why not.

c) What other type of graph could be used to display the data?

History Link

The Stanley Cup was originally called the Dominion Hockey Challenge Cup. It was donated by Lord Stanley of Preston, a Governor General of Canada, and was first awarded in 1893 to Montréal.

Example 2: Representing Data

During the 2005–2006 hockey season, the Edmonton Oilers advanced to the Stanley Cup finals. In regular season play, two of their top three players were Shawn Horcoff (born in Trail, BC) and Jarret Stoll (born in Melville, SK). Here are the statistics for their previous three regular seasons with the Oilers.

Horcoff (Centre)

Season	Games Played	Goals	Assists	Total Points
1	78	12	21	33
2	80	15	25	40
3	79	22	51	73

Stoll (Centre)

Season	Games Played	Goals	Assists	Total Points
1	4	0	1	1
2	68	10	11	21
3	82	22	46	68

a) Use a double bar graph to display the data.

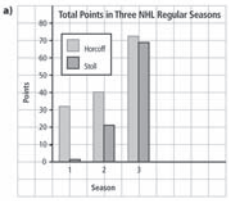
b) Which player shows the most improvement in total points?

c) Total points are used to assess a player's worth. Take a look at the number of games Horcoff and Stoll played. Is this a fair way to assess a player's worth?

d) Would two circle graphs be effective to display the data? Explain.

Solution

a)



- You might give students a strategy to choose an interval such as taking the highest number you need to plot and dividing it by the number of lines on the axis, then picking the most reasonable scale to work with.
- Consider allowing students to use spreadsheet software or graphing calculators, if available, to create graphs.
- Students with motor difficulties may need to use technology to create graphs.
- Students with motor difficulties may find it helpful to use **Master 12 Percent Circles** to create circle graphs.
- Consider walking through a second comparison of graphs for each example before having students attempt the Show You Know.

ELL

- English language learners may have difficulty with terms such as *height*, *measure*, *record*, *gender*, *tally*, and *more than twice*.
- Consider having students complete a T-Chart with the headings *Advantages* and *Disadvantages* and a visual of the type of graph used for each for #5b) and #8b) in the Explore the Math. A graphic organizer is a good way for English language learners to access information. The activity will also give English language learners the vocabulary to identify the advantages and disadvantages of graphs. For example, use words and phrases including *better*, *more clearly shows*, *easier to read*, and *hard to understand*.
- Since this lesson is textually dense, walk through each example as a class and check for understanding frequently.
- Since Example 2 is about hockey, ensure that all students are aware of the sport and how it is played. The Stanley Cup is a cultural reference to hockey. Point out the History Link on page 10 that provides information about its origins.

Common Errors

- Some students may not complete graphs correctly.

R_x Remind students to check the graphs for titles and appropriate labels.

b) Stoll shows the most improvement in total points over three seasons.

c) Total points are not a fair way to assess a player's worth. The graph does not take into account the number of games that each centre played during the regular season. The number of games that Stoll played increased over the three seasons, whereas the number of games that Horcoff played stayed approximately the same each season.

d) No, two circle graphs are less effective. Each circle graph shows the percent of points scored in each season compared with the total number of points scored over three seasons. It is difficult to compare the total points of the two players.

Horcoff's Total Points in Three NHL Regular Seasons (146 points)

Stoll's Total Points in Three NHL Regular Seasons (90 points)

Show You Know

Jenna surveyed students in grade 8 in her school to determine their favourite team sports.

a) Choose one type of graph to display the data.

b) Graph the data.

c) Give one advantage of using your choice of graph.

Sports	Frequency
Basketball	24
Volleyball	20
Soccer	45
Baseball	25
Hockey	32
Other	4
Total	150

Answers

Explore the Math

1. Answers will vary. Example: 160 cm, 172 cm, 138 cm, and 166 cm

2. Answers will vary. Example:

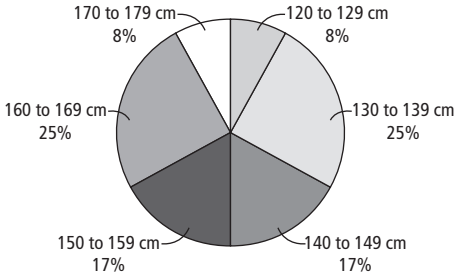
Student	Gender	Height (cm)
Mary	F	172
Cora	F	168
Anaya	F	166
Devindra	M	160
Ingrid	F	157
Jacob	M	155
Raven	F	140
Juan	M	140
Brian	M	138
Cody	M	136
Mavis	F	133
Yuri	M	128

3. Answers will vary. Example:

Class Interval	Tally	Frequency
120 to 129 cm	|	1
130 to 139 cm	|||	3
140 to 149 cm	||	2
150 to 159 cm	||	2
160 to 169 cm	|||	3
170 to 179 cm	|	1

4. Answers will vary. Example:

Height Intervals of Grade 8 Students (12 students)



5. a) Answers will vary. Example: The circle graph shows what percent of the class falls within each height range, whereas a bar graph shows how many students fall within each height range.

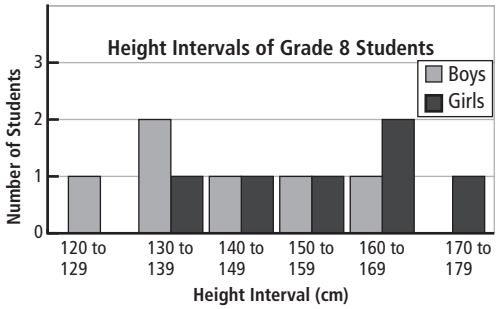
b) Answers will vary. Look for at least one advantage and one disadvantage. Example:

- An advantage of the circle graph is that you can easily see which height ranges contain the most or least percent of students.
- A disadvantage is that you must perform calculations to find out how many students fall within each height range.

6. Answers will vary. Example:

Class Interval	Boys	Girls
120 to 129 cm	|	
130 to 139 cm	||	|
140 to 149 cm	|	|
150 to 159 cm	|	|
160 to 169 cm	|	||
170 to 179 cm		|

7. Answers will vary. Example:



8. a) Answers will vary. Example: The double bar graph shows how many boys and girls fall within each height range, whereas the circle graph shows the percent of the total students that fall within each height range.

b) Answers will vary. Look for at least one advantage and one disadvantage. Example:

- An advantage of the double bar graph is that the number of boys and girls in each height range is easily seen.
- A disadvantage is that you must add the number of boys and girls together to see the number of students in each height range.

c) Answers will vary. Some students may choose to use a stacked bar graph. A double line graph would not be appropriate because the data is discrete, not continuous. Look for a statement about reaching the same conclusions and an explanation. Example: We reached the same conclusion whether we used a stacked bar graph or a double bar graph. The two graphs show the same data using a different visual format.

9. Answers will vary. Example:
- A circle graph might be best for a large quantity of data that represent different parts of a whole.
- A line graph might be best for a large quantity of data that represent changes over time.

Show You Know: Example 1

a) The bar graph is easier to read because no calculations are required.

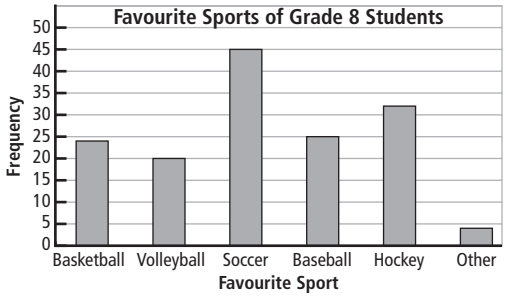
b) A line graph would not be useful because the apple varieties are completely independent. Line graphs are better suited to showing changes in data over time.

c) A circle graph could be used.

Show You Know: Example 2

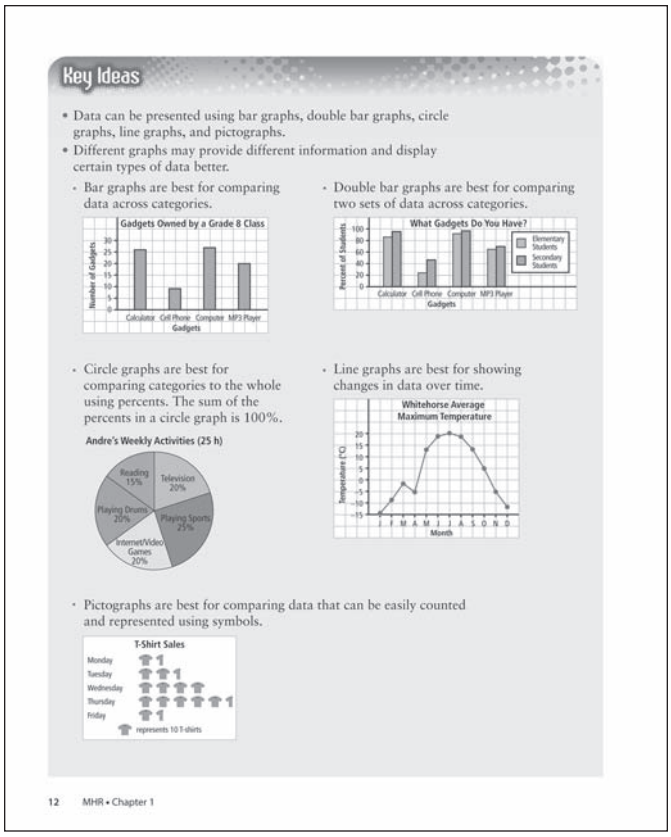
a) Answers will vary. Example: A bar graph can be used.

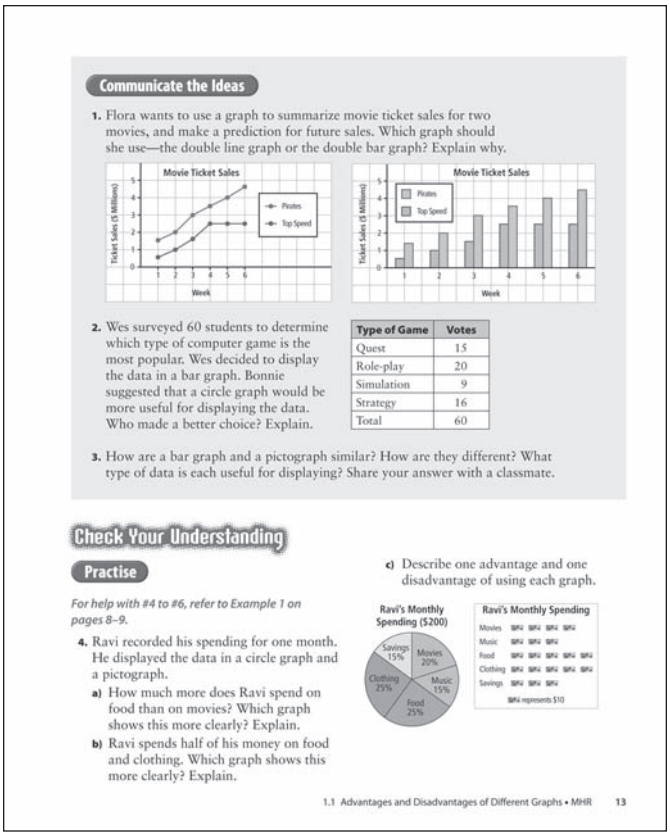
b) Answers will vary. Example:



c) Answers will vary. Example: The bar graph makes it easy to compare the frequency across the categories of favourite team sports.

Assessment	Supporting Learning
Assessment *as* Learning	
Reflect on Your Findings Listen as students discuss what they discovered during the Explore the Math. Try to have students generalize the conclusion about their findings. Encourage them to provide specific examples of how they know which graph is best for representing a large quantity of data.	• You may wish to team students who made different graphs to encourage discussion. • Allow students to present their findings either orally or in written form. • As a class, have students list advantages and disadvantages of the different graphs, and contribute to a master list. • This reflection is important for future understanding; therefore, provide additional class discussion about the advantages and disadvantages of each graph before moving on. • Provide some examples of large quantities of data for students who may benefit. Examples include population trends, attendance at sporting events, CD sales, Olympic medal standings, and box office records for movies.
Assessment *for* Learning	
Example 1 Have students do the Show You Know related to Example 1.	• Encourage students to verbalize their thinking. • You may wish to have students discuss their answers with a partner. • Check students' answers and make sure they understand the usefulness of different types of graphs. • It may be helpful for students to choose and compare types of graphs with the Literacy Link on page 7. • Give students a similar problem to solve. Allow them to work with a partner and talk through their thinking.
Example 2 Have students do the Show You Know related to Example 2.	• Encourage students to verbalize their thinking. • You may wish to have students work with a partner. • Check each graph for accuracy and completeness. Provide specific suggestions for improvement, as needed. • It may be helpful for students to choose and compare types of graphs with the Literacy Link on page 7. • Give students a similar problem to solve. Allow them to work with a partner and talk through their thinking.





Key Ideas

The Key Ideas summarize the advantages of using different types of graphs. As a class, discuss the features of each type of graph. Have students prepare their own summary of the Key Ideas using words and visuals, and store it in their chapter Foldable.

Communicate the Ideas

These questions allow students to reinforce their understanding of which types of graphs display certain types of data better. Have students work individually to answer the questions and then share their answers with a partner.

Literacy Link Identifying similarities and differences have proven to be one of the most effective strategies for learning. Developing a comparison using a graphic organizer, such as a double bubble organizer, provides students with visual and memory aids. You may wish to use an overhead of **BLM 1–7 Compare a Bar Graph and a Pictograph** and complete the organizer as a class.

Meeting Student Needs

- Double bubble organizers are very useful for visual learners. You may wish to have these learners complete **BLM 1–7 Compare a Bar Graph and a Pictograph** to organize their response to #3.

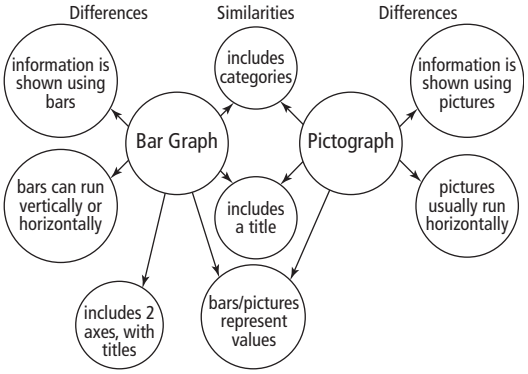
Answers

Communicate the Ideas

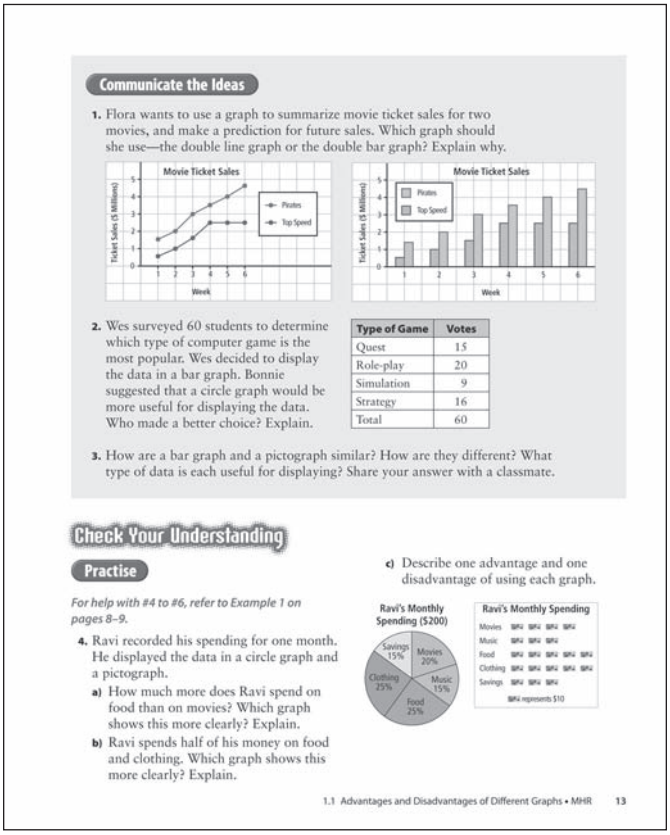
1. The double line graph is the best choice because it shows the change in ticket sales over a time period of six weeks.

2. Both choices are appropriate. Examples:
- The bar graph shows the number of votes for each type of game.
- The circle graph shows the percent of votes for each type of game out of a total of 60 votes.

3. Organizers may vary. Students may note that pictographs are limited to data that can be easily counted.



Assessment	Supporting Learning
Assessment *as* Learning	
Communicate the Ideas Have all students complete #1 to #3.	• Check each student's answers to #1 and #2. These are key questions; make sure students understand which graphs display certain types of data better. • Students may benefit from checking the Key Ideas on page 12 to compare graphs.



Communicate the Ideas

1. Flora wants to use a graph to summarize movie ticket sales for two movies, and make a prediction for future sales. Which graph should she use—the double line graph or the double bar graph? Explain why.

2. Wes surveyed 60 students to determine which type of computer game is the most popular. Wes decided to display the data in a bar graph. Bonnie suggested that a circle graph would be more useful for displaying the data. Who made a better choice? Explain.

Type of Game	Votes
Quest	15
Role-play	20
Simulation	9
Strategy	16
Total	60

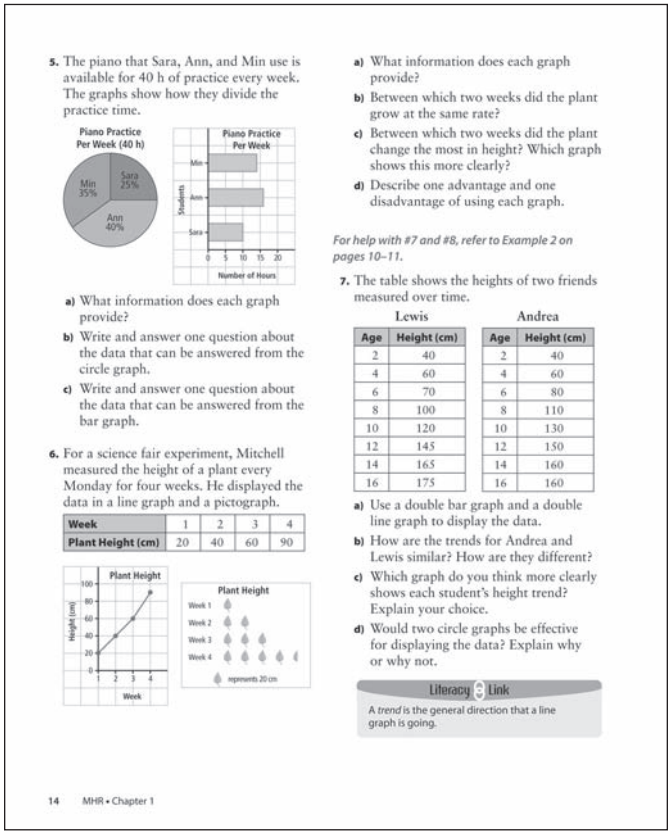
3. How are a bar graph and a pictograph similar? How are they different? What type of data is each useful for displaying? Share your answer with a classmate.

Check Your Understanding

Practise

For help with #4 to #6, refer to Example 1 on pages 8–9.

4. Ravi recorded his spending for one month. He displayed the data in a circle graph and a pictograph.
   a) How much more does Ravi spend on food than on movies? Which graph shows this more clearly? Explain.
   b) Ravi spends half of his money on food and clothing. Which graph shows this more clearly? Explain.
   c) Describe one advantage and one disadvantage of using each graph.



5. The piano that Sara, Ann, and Min use is available for 40 h of practice every week. The graphs show how they divide the practice time.

   a) What information does each graph provide?
   b) Write and answer one question about the data that can be answered from the circle graph.
   c) Write and answer one question about the data that can be answered from the bar graph.

6. For a science fair experiment, Mitchell measured the height of a plant every Monday for four weeks. He displayed the data in a line graph and a pictograph.

Week	1	2	3	4
Plant Height (cm)	20	40	60	90

   a) What information does each graph provide?
   b) Between which two weeks did the plant grow at the same rate?
   c) Between which two weeks did the plant change the most in height? Which graph shows this more clearly?
   d) Describe one advantage and one disadvantage of using each graph.

For help with #7 and #8, refer to Example 2 on pages 10–11.

7. The table shows the heights of two friends measured over time.

Lewis		Andrea	
Age	Height (cm)	Age	Height (cm)
2	40	2	40
4	60	4	60
6	70	6	80
8	100	8	110
10	120	10	130
12	145	12	150
14	165	14	160
16	175	16	160

   a) Use a double bar graph and a double line graph to display the data.
   b) How are the trends for Andrea and Lewis similar? How are they different?
   c) Which graph do you think more clearly shows each student's height trend? Explain your choice.
   d) Would two circle graphs be effective for displaying the data? Explain why or why not.

Literacy Link

A *trend* is the general direction that a line graph is going.

Check Your Understanding

Make copies of **Master 8 Centimetre Grid Paper**, **Master 9 0.5 Centimetre Grid Paper**, and **Master 12 Percent Circles** available for students to create their graphs in this section.

Practise

Note that #4 and #5, and #7 and #8 are pairs of similar questions. Consider giving students a choice to do one question of each pair initially. Question #4 and #5 allow students to compare two graphs and describe the advantages and disadvantages of each type.

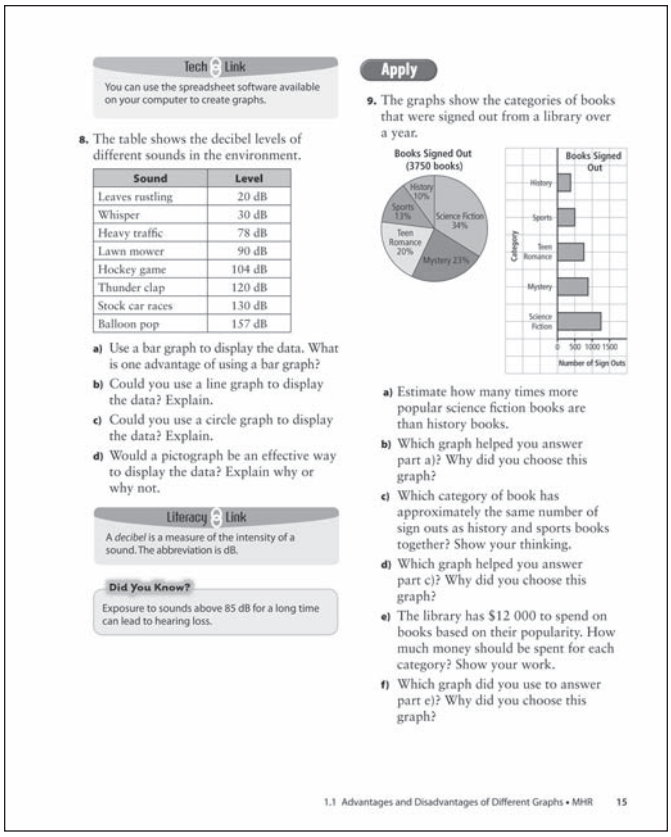
Literacy Link For #7, refer to the Literacy Link on page 14 and explain the term *trend*. For #8, refer to the Literacy Link on page 15 and explain the term *decibel*.

Apply

For #12, remind students to make a frequency table and organize the data into groups. For #15, consider providing a variety of magazines and newspapers for students to look through, and/or computer access. Have them cut out and glue or tape a graph into their notebook. Encourage students to share their questions and answers for #15 with a partner and listen to each other's explanations.

Extend

For #17, have students discuss an appropriate range for the number of sectors in a circle graph. Have them consider the number of options that would be suitable for other types of graphs.



Tech Link

You can use the spreadsheet software available on your computer to create graphs.

8. The table shows the decibel levels of different sounds in the environment.

Sound	Level
Leaves rustling	20 dB
Whisper	30 dB
Heavy traffic	78 dB
Lawn mower	90 dB
Hockey game	104 dB
Thunder clap	120 dB
Stock car races	130 dB
Balloon pop	157 dB

a) Use a bar graph to display the data. What is one advantage of using a bar graph?
b) Could you use a line graph to display the data? Explain.
c) Could you use a circle graph to display the data? Explain.
d) Would a pictograph be an effective way to display the data? Explain why or why not.

Literacy Link

A *decibel* is a measure of the intensity of a sound. The abbreviation is dB.

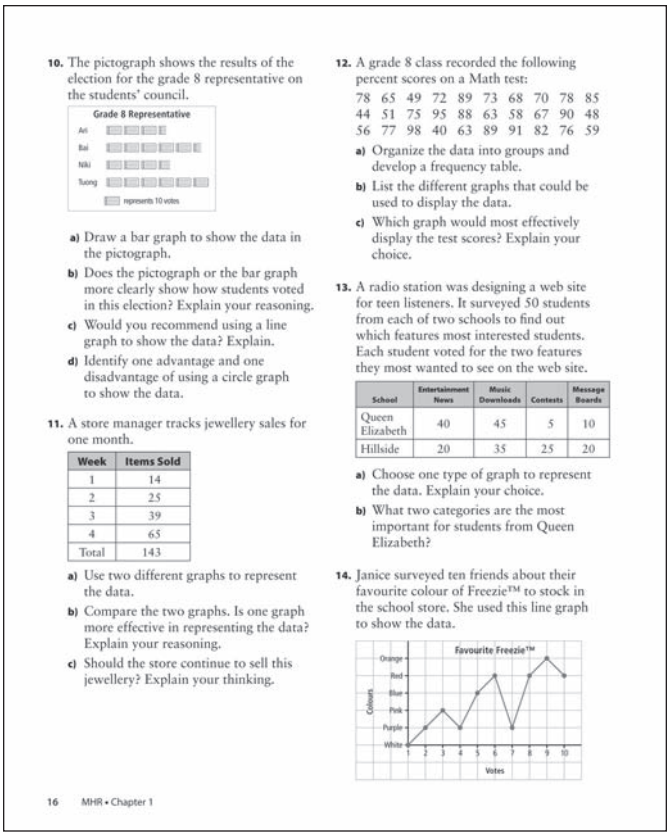
Did You Know?

Exposure to sounds above 85 dB for a long time can lead to hearing loss.

Apply

9. The graphs show the categories of books that were signed out from a library over a year.

a) Estimate how many times more popular science fiction books are than history books.
b) Which graph helped you answer part a)? Why did you choose this graph?
c) Which category of book has approximately the same number of sign outs as history and sports books together? Show your thinking.
d) Which graph helped you answer part c)? Why did you choose this graph?
e) The library has $12 000 to spend on books based on their popularity. How much money should be spent for each category? Show your work.
f) Which graph did you use to answer part e)? Why did you choose this graph?



10. The pictograph shows the results of the election for the grade 8 representative on the students' council.

a) Draw a bar graph to show the data in the pictograph.
b) Does the pictograph or the bar graph more clearly show how students voted in this election? Explain your reasoning.
c) Would you recommend using a line graph to show the data? Explain.
d) Identify one advantage and one disadvantage of using a circle graph to show the data.

11. A store manager tracks jewellery sales for one month.

Week	Items Sold
1	14
2	25
3	39
4	65
Total	143

a) Use two different graphs to represent the data.
b) Compare the two graphs. Is one graph more effective in representing the data? Explain your reasoning.
c) Should the store continue to sell this jewellery? Explain your thinking.

12. A grade 8 class recorded the following percent scores on a Math test:

78 65 49 72 89 73 68 70 78 85
44 51 75 95 88 63 58 67 90 48
56 77 98 40 63 89 91 82 76 59

a) Organize the data into groups and develop a frequency table.
b) List the different graphs that could be used to display the data.
c) Which graph would most effectively display the test scores? Explain your choice.

13. A radio station was designing a web site for teen listeners. It surveyed 50 students from each of two schools to find out which features most interested students. Each student voted for the two features they most wanted to see on the web site.

School	Entertainment News	Music Downloads	Contests	Message Boards
Queen Elizabeth	40	45	5	10
Hillside	20	35	25	20

a) Choose one type of graph to represent the data. Explain your choice.
b) What two categories are the most important for students from Queen Elizabeth?

14. Janice surveyed ten friends about their favourite colour of Freezie™ to stock in the school store. She used this line graph to show the data.

Math Link

The Math Link allows students to reinforce their learning by creating a frequency table, creating a graph, and analysing the graph. It is important for students to be able to explain advantages and disadvantages of different graphs in order to justify the choice of graph to represent particular data. Have students get your approval for their survey question before they conduct the survey. As a class, have students share and discuss the advantages and disadvantages of using their graph format.

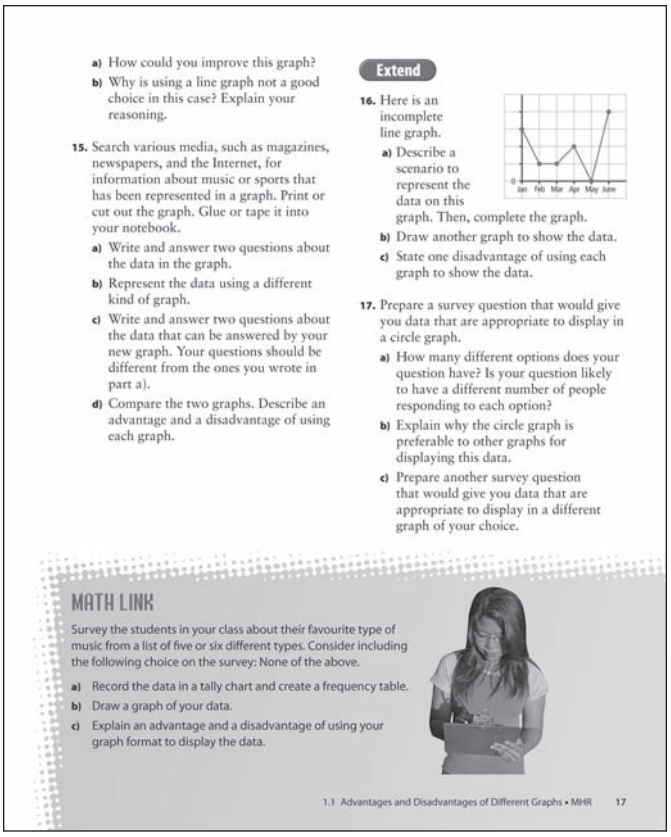
Meeting Student Needs

- Allow students to explain their answers in any combination of oral and written form.
- Consider allowing students to use spreadsheet software to create graphs.
- For #15, allow students to search for graphs that display information for another topic. For example, they could look for graphs about local immigration populations or the cultural groups in their community. Alternatively, they could look for graphs about populations of different First Nations or Inuit communities in Western and Northern Canada.
- Provide **BLM 1–8 Section 1.1 Extra Practice** to students who would benefit from more practice.

Common Errors

- Some students may make errors in representing data on graphs.

R_x Emphasize the importance of accuracy in representing data in order to interpret the information correctly. As you circulate, check students' graphs for accuracy and completeness, and provide coaching as needed.



a) How could you improve this graph?
b) Why is using a line graph not a good choice in this case? Explain your reasoning.

15. Search various media, such as magazines, newspapers, and the Internet, for information about music or sports that has been represented in a graph. Print or cut out the graph. Glue or tape it into your notebook.
a) Write and answer two questions about the data in the graph.
b) Represent the data using a different kind of graph.
c) Write and answer two questions about the data that can be answered by your new graph. Your questions should be different from the ones you wrote in part a).
d) Compare the two graphs. Describe an advantage and a disadvantage of using each graph.

Extend

16. Here is an incomplete line graph.
a) Describe a scenario to represent the data on this graph. Then, complete the graph.
b) Draw another graph to show the data.
c) State one disadvantage of using each graph to show the data.

17. Prepare a survey question that would give you data that are appropriate to display in a circle graph.
a) How many different options does your question have? Is your question likely to have a different number of people responding to each option?
b) Explain why the circle graph is preferable to other graphs for displaying this data.
c) Prepare another survey question that would give you data that are appropriate to display in a different graph of your choice.

MATH LINK

Survey the students in your class about their favourite type of music from a list of five or six different types. Consider including the following choice on the survey: None of the above.
a) Record the data in a tally chart and create a frequency table.
b) Draw a graph of your data.
c) Explain an advantage and a disadvantage of using your graph format to display the data.

1.1 Advantages and Disadvantages of Different Graphs • MHR 17

Answers

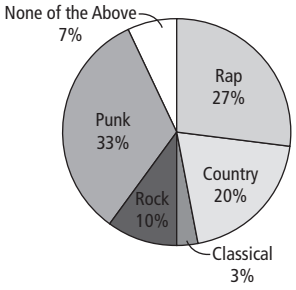
Math Link

a) Answers will vary. Example:

Type of Music	Tally	Frequency
Rap	𝍸 |||	8
Country	𝍸 |	6
Classical	|	1
Rock	|||	3
Punk	𝍸 𝍸	10
None of the above	||	2

b) Graphs will vary. Example:

Favourite Types of Music (30 students)



c) Answers will vary. Look for at least one advantage and disadvantage. Example:
- An advantage of a circle graph is that you can easily see what percent of the class prefer each type of music.
- A disadvantage of a circle graph is that you must perform calculations to see how many students prefer each type of music.

Assessment	Supporting Learning
Assessment *for* Learning	
Practise Have students do #4, #6, and #7. Students who have no problems with these questions can go on to the Apply questions.	• Encourage students to refer to the examples to help them. • Provide additional coaching using Example 1 for students who need help with #4 and #6. Have students explain their understanding of circle graphs, pictographs, and line graphs; correct any misunderstandings. Coach students through corrections to their answers and then have them complete #5 on their own. • Provide additional coaching with Example 2 to students who need help with #7. Have students explain their understanding of double bar graphs and double line graphs; correct any misunderstandings. Coach students through corrections to their answers, and then have them complete #8 on their own. • Check back with students several times to ensure that they understand the concepts.
Math Link The Math Link on page 17 is intended to help students work toward the chapter problem wrap-up titled Wrap It Up! on page 39.	• It is recommended that all students complete the Math Link. • Have students brainstorm a list of popular types of music. • Check that each student's question is worded in such a way that it is easily answered with one of the options. Discuss using None of the above as an option. • Check students' tally charts, frequency tables, and graphs for accuracy and completeness. • Students who need help getting started could use **BLM 1–9 Section 1.1 Math Link**, which provides scaffolding.
Assessment *as* Learning	
Math Learning Log Have students answer the following question: • In your opinion, which type of graph is best for representing most types of data? Explain your reasoning.	• Have students summarize what kinds of data each type of graph best displays. They could generate a context for using each type of graph. Encourage students to refer to the student resource for ideas. • Encourage students to use the What I Need to Work On section of their chapter Foldable to note what they continue to have difficulties with.