Chapter 1 Lesson Plans

MathLinks 8 Pre-Planning for Chapter 1

STRAND/ORGANIZER: Statistics and Probability (Data Analysis)

General Outcome: Collect, display and analyze data to solve problems.

1. Before getting started with lesson planning for Chapter 1 Representing Data, you need to understand what skills students have already been exposed to.

- If students in your jurisdiction have *not* completed the new Grade 7 WNCP (2006) curriculum, they should have some understanding of the following outcomes from the previous curriculum:
  Grade 7(1995):
  - ☑ Formulate questions for investigation, from a real world context.
  - ☑ Select, defend and use appropriate methods of collecting data:
    - designing and using questionnaires
    - interviews
    - experiments
    - research.
  - ☑ Describe issues to be considered when collecting data.
  - ☑ Display data by hand or by computer in a variety of ways, including circle graphs.
  - ☑ Read and interpret graphs.

- If students in your jurisdiction *have* completed the new Grade 7 WNCP (2006) curriculum, they should have some understanding of the following:
  Grade 7 (2006):
  - ☑ Construct, label and interpret circle graphs to solve problems.

2. To familiarize yourself with the features of *MathLinks 8*, you may wish to do the following:
- Review **A Tour of Your Textbook** (pp. viii–xii) and **Problem Solving** (pp. xiii–xvii) to familiarize yourself with the features of the student resource.
- Review **Answers** (pp. 476–516), **Glossary** (pp. 517–521), and **Index** (pp. 522–525) to familiarize yourself with their contents.

3. Note that not every section within each chapter is meant to be a stand-alone lesson. In order to allow students time to experience the depth and breadth of a concept, some sections may take two or three classes to complete. The Teacher's Resource suggests time lines.

4. Before starting Chapter 1, read through the **chapter opener** (p. 2), **Key Words** (p. 3), **Math Links** (pp. 5, 17, 27, 35), and **Wrap It Up!** (p. 39). These sections will provide a sense of how the chapter concepts are tied together and how students will be asked to apply their learning.

5. The chapter begins with a **Literacy Link** showing a graphic organizer (p. 3) and a **Foldable** feature (p. 4).

a) The KWL chart will help students organize their learning and activate previously learned concepts. **Master 16 KWL Chart** provides a reproducible copy.

b) Foldables provide unique ways for students to:
- organize their learning
- keep track of key words and examples
- organize their thinking
- keep track of what they need to work on in a particular chapter and use for review

Foldables are exciting ways for students to engage themselves in learning. Most take approximately 10 min to make.

A materials centre at the back of the classroom can make it easier for students to produce Foldables. This centre could range from a table at the back of the classroom to a box on a shelf. Stock the centre with paper, scissors, glue, tape, and markers.

You may wish to help students stay organized and keep their Foldables for year-end reference by either:
- providing a file folder and storage box in the classroom, or
- using a page-protector pouch that students can keep in their binders. These can be purchased at a dollar store.

6. As part of your pre-planning for each chapter, review the related materials in:
- the Teacher's Resource for support in meeting the needs of all learners, a list of common errors, language learning skills, and rubric notes for the Wrap It Up! questions,
- the Blackline Masters (BLMs) for additional questions, scaffolding of all Math Links, a chapter test, and assessment assistance,
- the *MathLinks 8 Practice and Homework Book* for additional exercises and scaffolding for concepts, and
- the Teacher Centre of the McGraw-Hill Ryerson Online Learning Centre for examples of student work for the Challenges and Tasks, scoring rubrics, additional challenges for students, and final exams.

MathLinks 8 Chapter 1, Lesson 1

Time: 40–50 min

STRAND/ORGANIZER: Statistics and Probability (Data Analysis)

General Outcome: Collect, display and analyze data to solve problems.

Specific Outcome:
SP1 Critique ways in which data is presented.

Resources/Materials:
- BLM 1–1 *MathLinks 8* Scavenger Hunt
- blank paper or Master 16 KWL Chart

Lesson Objective:
Getting to Know the Student Resource
It is important for students to learn the different parts of the student resource. Choose from among the following approaches:

1. If you have the Teacher's Resource, you might use **BLM 1–1 *MathLinks 8* Scavenger Hunt**. Allow 20–30 min for this activity. Review the answers with students.
2. If you do not have the Teacher's Resource, use the introductory pages of the student resource: **A Tour of Your Textbook** (pp. viii–xii) and **Problem Solving** (pp. xiii–xvii). Review these sections with students for about 20 min.
3. You might reference the introductory pages after the Scavenger Hunt to help students become familiar with them. Invite them to refer back to these pages at a later date. These are also excellent pages for parents to read, allowing them to gain an understanding of the instructional material.
4. Make sure students are aware of the location of the **Answers** (pp. 476–516), **Glossary** (pp. 517–521), and **Index** (pp. 522–525) and understand how to use them. Explain that the purpose of answers is to verify their calculations. Encourage students with an incorrect answer to revisit the related Example(s), identify where they may have gone wrong, and redo their calculations or revisit their thinking.

Starting Chapter 1:
Scan the teaching notes in the Teacher's Resource before starting any chapter. Then, review the notes for each lesson as you plan it. Note that timeframes can change depending on your particular mix of students.

If you do not have access to the Teacher's Resource, begin Chapter 1 by telling students that this chapter is about representing data using different types of graphs including bar graphs, circle graphs, line graphs, and pictographs.

Students begin by comparing how different graphs represent the same data and then identify the advantages and disadvantages of different graphs. Next, they explore how data can be misrepresented, which results in misinterpretations and false conclusions. At the end, they learn to justify the use of different types of graphs to represent a set of data.

MathLinks 8 Chapter 1, Lesson 2

Time: 40–50 min

STRAND/ORGANIZER: Statistics and Probability (Data Analysis)

General Outcome: Collect, display and analyze data to solve problems.

Specific Outcome:
SP1 Critique ways in which data is presented.

Resource/Materials:
- *MathLinks 8*, pp. 2–5
- Master 16 KWL Chart
- BLM 1–2 Chapter 1 Math Link Introduction
- BLM 1–3 Chapter 1 Get Ready or *MathLinks 8 Practice and Homework Book*, pp. 2–3
- BLM 1–5 Chapter 1 Problems of the Week
- sample chapter Foldable
- 11 × 17 sheet of paper
- ruler
- stapler
- scissors (optional)
- quarter sheets of notebook paper or index cards

Teacher's Resource:
pp. 5–9

***MathLinks 8* Adapted Resource:**
Get Ready, pp. 2–3
Math Link, p. 4

Introduction:
Before working on Chapter 1, review the Get Ready and the Math Link (p. 5). Decide whether students will complete both of the activities or only one of them. The Get Ready assesses how well students know the prerequisite skills for this chapter. The Math Link also activates students' prior knowledge and skills related to Chapter 1 and, in addition, introduces the chapter problem.

Read the chapter opener together (p. 2). Read through the What You Will Learn (p. 2) and the Key Words (p. 3). How many students can already define or describe the key words?

Point out the data for Hayley Wickenheiser and ask students to identify the various types of data and ways they are presented (e.g., dates and scores in tables and in running text). Ask how else the data could be presented.

Procedure/Activities/Instruction:

1. Have students complete the Get Ready. Use **BLM 1–3 Chapter 1 Get Ready** or *MathLinks 8 Practice and Homework Book,* pp. 2–3.
2. Have students complete a KWL chart (see Teacher's Resource p. 6 for question prompts). You may wish to hand out **Master 16 KWL Chart** as a template. Collect these from students before they leave the class. Reviewing this material will give you a better idea of your students' recall and comprehension of concepts related to representing data.
3. Explain the purpose of a Foldable and show students the one you have made. Identify the materials they need to make their own. Make the Foldables together as a class or have students make their own following the instructions (p. 4). They could label it as shown or according to your directions.
   Hint: Reuse paper for the note cards. Old library catalogue cards, pieces of manila tag, or trimmings from construction paper fit well in Foldable pouches.
4. Have students complete the Math Link. Read the Math Link as a class and survey students' preferences for both music style and format. Determine whether students share any preferences. Explain that the chapter problem involves representing data related to the music industry. If doing the Math Link, some students may benefit from using **BLM 1–2 Chapter 1 Math Link Introduction**, which provides scaffolding.
   Discuss and remediate any areas that students have difficulty with before beginning the next lesson.

Problems of the Week:

BLM 1–5 Chapter 1 Problems of the Week provides additional problems to encourage ongoing problem solving and opportunities for students to use personal strategies in mathematics. These problems require students to think from different perspectives and experiment with a variety of approaches. Students can take the problems home and consult with parents, or work with a partner in class. Encourage students to complete at least one problem in each chapter.

Assessment:

1. Get Ready (Assessment *for* Learning)
2. KWL Chart (Assessment *as* Learning)
3. Math Link (p. 5) (Assessment *for* Learning) You might use **BLM 1–2 Chapter 1 Math Link Introduction**.
4. Foldable (Assessment *for* Learning)

Math Link:

Have students start a section in their notebooks or use the back side of their Foldables to record ideas about the chapter problem related to music. As a class,

consider reading through each Math Link (pp. 5, 17, 27, and 35) and the Wrap It Up! (p. 39) so students have a good understanding of the chapter problem. Notes about the Math Links throughout the chapter will appear under Assessment.

Foldable Entry:
Encourage students to add the following terms from the Get Ready and Math Link to their Foldables. Have them use diagrams, illustrations, or explanations to define each term. Remind them to use their own words and examples.

bar graph	circle graph	double bar graph	line graph

Either now, or along with section 1.1, you may wish to have students complete a checklist for constructing each type of graph. Each checklist could be recorded on a note card and inserted in section 1.1 of their Foldables. Points might include:

For a bar graph:
- ❑ Decide on a scale.
- ❑ Title and label the categories along the *x*-axis.
- ❑ Title and label the values along the *y*-axis.
- ❑ Draw a bar from each data point to the *x*-axis.
- ❑ Title the graph.

For a circle graph using a protractor:
- ❑ Draw a circle using a compass.
- ❑ Convert each percent to an angle measurement out of 360°.
- ❑ Use a protractor to measure and draw each angle.
- ❑ Label each sector with its category and percent.
- ❑ Shade each sector.
- ❑ Title the graph.

For a circle graph using a percent circle (the circle is divided into 100 equal pieces or sectors each worth 1%):
- ❑ Determine the percent and therefore the size of the sector for each category.
- ❑ Mark the beginning and end of each sector.
- ❑ Label each sector with its category and its percent.
- ❑ Shade each sector.
- ❑ Add a title.

For a line graph:
- ❑ Decide on a scale.
- ❑ Title and label the categories along the *x*-axis.
- ❑ Title and label the values along the *y*-axis.
- ❑ Plot the data points, then, join them with a line.
- ❑ Title the graph.

MathLinks 8 Chapter 1, Lesson 3

Time: 40–50 min

STRAND/ORGANIZER: Statistics and Probability (Data Analysis)

General Outcome: Collect, display and analyze data to solve problems.

Specific Outcome:
SP1 Critique ways in which data is presented.

Achievement Indicators:

- ☑ Compare the information that is provided for the same data set by a given set of graphs, including circle graphs, line graphs, bar graphs, double bar graphs and pictographs, to determine the strengths and limitations of each graph.
- ☑ Identify the advantages and disadvantages of different graphs, including circle graphs, line graphs, bar graphs, double bar graphs and pictographs, in representing a specific given set of data.

Resource/Materials:

- *MathLinks 8*, pp. 6–7
- BLM 1–4 Chapter 1 Warm-Up
- BLM 1–6 Section 1.1 Explore the Math
- metre sticks
- chalk or masking tape
- grid paper, Master 8 Centimetre Grid Paper, or Master 9 0.5 Centimetre Grid Paper
- compass or Master 12 Percent Circles
- protractor
- ruler
- coloured pencils
- scissors
- glue or tape (optional)
- Foldable

Teacher's Resource:
pp. 10–14

***MathLinks 8* Adapted Resource:**
1.1 Warm-Up, p. 5

Introduction:
Have students recall the different types of graphs encountered in the Math Link. Ask how they would decide which one to use. Explain to students that they will be doing a group activity in which they display data collected from the class.

Procedure/Activities/Instruction:
1. Have students complete the warm-up questions for section 1.1 on **BLM 1–4 Chapter 1 Warm-Up** to reinforce material learned previously.
2. Divide students into small groups. Provide the necessary supplies for them to carry out the Explore the Math (pp. 6–7). You may wish to provide them with **BLM 1–6 Section 1.1 Explore the Math** to record their findings. Once complete, have them discuss their findings as a class.

Assessment:
1. Section 1.1 on **BLM 1–4 Chapter 1 Warm-Up** (Assessment *for* Learning)
2. Reflect on Your Findings #9 (p. 7) (Assessment *as* Learning)

Foldable Entry:
Direct students to the Literacy Link (p. 7). Have them use a diagram, illustrations, or explanations using their own words to define each graph type and, if they have not already done so, explain how to make each one. They can add this information to section 1.1 of their Foldables.

Have students define the following terms in their Foldables and add instructions on how to make a pictograph.

interval	pictograph

Example:
For a pictograph:
- ❑ Decide on a symbol.
- ❑ Provide a key.
- ❑ Add a title.

Math Learning Log:
Have students explain how circle graphs are different from bar graphs.

MathLinks 8 Chapter 1, Lesson 4/5

Time: 80 min

STRAND/ORGANIZER: Statistics and Probability (Data Analysis)

General Outcome: Collect, display and analyze data to solve problems.

Specific Outcome:
SP1 Critique ways in which data is presented.

Achievement Indicators:
- ☑ Compare the information that is provided for the same data set by a given set of graphs, including circle graphs, line graphs, bar graphs, double bar graphs and pictographs, to determine the strengths and limitations of each graph.
- ☑ Identify the advantages and disadvantages of different graphs, including circle graphs, line graphs, bar graphs, double bar graphs and pictographs, in representing a specific given set of data.

Resource/Materials:
- *MathLinks 8,* pp. 8–17
- *MathLinks 8 Practice and Homework Book*, pp. 4–5
- Master 12 Percent Circles
- 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
- grid paper, Master 8 Centimetre Grid Paper, or Master 9 0.5 Centimetre Grid Paper

Teacher's Resource:
pp. 11–12, 14–18

***MathLinks 8* Adapted Resource:**
1.1, pp. 6–19

Introduction:
Recall the class activity from the previous day. Explain to students that they will walk through some worked examples and then apply their knowledge to solve problems.

Procedure/Activities/Instruction:
1. Work through Examples 1 and 2 (pp. 8–11). Have students complete the Show You Know questions before going on.

2. As a class, discuss the Key Ideas (p. 12). Challenge students to compare the terminology and examples in their Foldables to the material in the Key Ideas. Is there anything they would like to add?
3. Assign Communicate the Ideas #1–3 (p. 13). Provide students with **BLM 1–7 Compare a Bar Graph and a Pictograph** for #3.
4. Assign questions as outlined in the Assessment section below. Have all students record their response to the Communicate the Ideas questions in their Math Learning Log. Collect this part of the assignment and review student responses to gain insight into students' understanding.
   Ensure that students are successful with the Practise questions before proceeding to the Apply questions. Support for re-teaching or alternative approaches for students who are not successful with the Practise questions can be found in the Teacher's Resource under Assessment – Supporting Learning (p. 18).

Assessment:

1. Show You Know questions (pp. 9, 11) (Assessment *for* Learning)
2. Communicate the Ideas #1–3 (p. 13) (Assessment *as* Learning)
3. Student assignments (Assessment *for* Learning)
   Essential: #1–4, 6–8, Math Link
   Typical: #1–4, 7, 10, 12–15, Math Link
   Extension/Enrichment: #1–3, 12, 15–17, Math Link
   Note: Some students may benefit from completing **BLM 1–8 Section 1.1 Extra Practice**, if they have not already done so.
   Encourage students who work faster to start the Math Link (p. 17). Students may need additional class time to complete the Math Link. **BLM 1–9 Section 1.1 Math Link** is available for students who may benefit from scaffolding to get started on the Math Link.
4. The *MathLinks 8 Practice and Homework Book* provides additional problems (Assessment *for* Learning).

Foldable Entry:

Have students write the page reference and question numbers they had difficulty with in the What I Need to Work On section of their Foldables.

Math Learning Log:

Have students complete **BLM 1–7 Compare a Bar Graph and a Pictograph** or discuss the comparison of two other graphs.

MathLinks 8 Chapter 1, Lesson 6

Time: 40–50 min

STRAND/ORGANIZER: Statistics and Probability (Data Analysis)

General Outcome: Collect, display and analyze data to solve problems.

Specific Outcome:
SP1 Critique ways in which data is presented.

Achievement Indicators:
- ☑ Explain how the format of a given graph, such as the size of the intervals, the width of bars and the visual representation, may lead to misinterpretation of the data.
- ☑ Explain how a given formatting choice could misrepresent the data.
- ☑ Identify conclusions that are inconsistent with a given data set or graph and explain the misinterpretation.

Resource/Materials:
- *MathLinks 8*, pp. 18–23
- BLM 1–4 Chapter 1 Warm-Up
- grid paper, Master 8 Centimetre Grid Paper, or Master 9 0.5 Centimetre Grid Paper
- ruler
- coloured pencils
- Foldable

Teacher's Resource:
pp. 19–23

***MathLinks 8* Adapted Resource:**
1.2 Warm-Up, p. 20
1.2, pp. 21–25

Introduction:
Students will identify if graphs are distorted or misrepresented. Read the opening paragraph as a class (p. 18). Draw students' attention to the Literacy Link that defines *distort*. Ask students to share their ideas about how they would know that a graph was distorted. Ask them to identify other places where they have encountered a distortion.

In the Explore the Math, students discover that the size of the intervals on a graph can be misleading.

Procedure/Activities/Instruction:

1. Have students complete the warm-up questions for section 1.2 on **BLM 1–4 Chapter 1 Warm-Up** to reinforce material learned previously. You may wish to review their work.
2. Collect, orally mark, or take up the previous day's homework. Remind students to note any questions they had difficulty with in the What I Need to Work On section of their Foldables.
3. Hand out grid paper, **Master 8 Centimetre Grid Paper**, or **Master 9 0.5 Centimetre Grid Paper** and have students complete the Explore the Math independently or in groups.
4. Have students complete Reflect on Your Findings #5 (p. 19) and compare their answers with a partner. Discuss the results as a class to gauge if students have understood the big question in the Explore the Math or if further reinforcement is needed.
5. Work through Example 1 that explains a scale distortion (pp. 19–20). Clarify the meaning of the break in the Literacy Link (p. 19). Have students do the Show You Know question (p. 20) and then discuss it as a class. Discussions are a form of differentiated instruction as they support learners who may be hesitant to ask questions.
   Work through Example 2 as a class (pp. 20–21). This example looks at how distorting visuals on a pictograph can be misleading. Have students complete the Show You Know question (p. 21) and discuss their conclusions orally.
   Work through Example 3 (pp. 21–22), which examines how distorting the size of category bars on a graph can be misleading. Have students compare the size of the bars in Graph A and B (p. 21). For each graph, ask how many bars representing laptop sales fit into the bar representing desktop sales. As a class, orally complete the Show You Know question (p. 22).
6. Assign and then collect all students' individual work for Communicate the Ideas #1 and 2 (p. 23).
7. Have students record the term *distort* in section 1.2 of their Foldables along with an example of their own. Refer them to the Literacy Link (p. 18).

Assessment:

1. Section 1.2 on **BLM 1–4 Chapter 1 Warm-Up** (Assessment *for* Learning)
2. Show You Know questions (pp. 20–22) (Assessment *for* Learning)
3. Communicate the Ideas #1 and 2 (p. 23) (Assessment *as* Learning)

Foldable Entry:

Have students use their Foldables to define each of the following terms. Have them include an example for each.

distort	break in a graph

Math Learning Log:

Have students complete the following statement: I have seen distorted graphs used to/in …

MathLinks 8 Chapter 1, Lesson 7/8

Time: 80 min

STRAND/ORGANIZER: Statistics and Probability (Data Analysis)

General Outcome: Collect, display and analyze data to solve problems.

Specific Outcome:
SP1 Critique ways in which data is presented.

Achievement Indicators:
- ☑ Explain how the format of a given graph, such as the size of the intervals, the width of bars and the visual representation, may lead to misinterpretation of the data.
- ☑ Explain how a given formatting choice could misrepresent the data.
- ☑ Identify conclusions that are inconsistent with a given data set or graph and explain the misinterpretation.

Resource/Materials:
- *MathLinks 8,* pp. 23–27
- *MathLinks 8 Practice and Homework Book*, pp 6–7
- Master 12 Percent Circles
- BLM 1–10 Section 1.2 Extra Practice
- BLM 1–11 Section 1.2 Math Link
- grid paper, Master 8 Centimetre Grid Paper, or Master 9 0.5 Centimetre Grid Paper
- ruler
- coloured pencils

Teacher's Resource:
pp. 24–26

***MathLinks 8* Adapted Resource:**
1.2, pp. 26–30

Introduction:
Help students recall the types of distortions and misrepresentations from the previous day's lesson. Students will now apply their learning and understanding to problems.

Procedure/Activities/Instruction:
1. Collect, orally mark, or take up the Communicate the Ideas answers.

2. Distribute grid paper for the Check Your Understanding questions.
3. Assign questions as outlined in the Assessment section below. Ensure that students are successful with the Practise questions before proceeding to the Apply questions. Support for re-teaching or alternative approaches for students who are not successful with the Practise questions can be found in the Teacher's Resource under Assessment – Supporting Learning (p. 26).

Assessment:

1. Student assignments (Assessment *for* Learning)
   Essential: #4, 6, 8, 13, Math Link
   Typical: #3, 4, 6, 9–18, Math Link
   Extension/Enrichment: #3, 9, 17, 19–22, Math Link
   This assignment is likely to take more than one class as students will draw several graphs.
   Note: Some students may benefit from completing **BLM 1–10 Section 1.2 Extra Practice**, if they have not already done so.
   Encourage students who work faster to start the Math Link (p. 27). **BLM 1–11 Section 1.2 Math Link** is available for students who may benefit from scaffolding to get started on the Math Link.
2. The *MathLinks 8 Practice and Homework Book* provides additional problems (Assessment *for* Learning).
3. Math Learning Log (Assessment *as* Learning)

Foldable Entry:

Have students write the page reference and question numbers they had difficulty with in the What I Need to Work On section of their Foldables.

Math Learning Log:

Have students comment on two or three items they feel they have improved on and explain how they have improved.

MathLinks 8 Chapter 1, Lesson 9

Time: 40–50 min

STRAND/ORGANIZER: Statistics and Probability (Data Analysis)

General Outcome: Collect, display and analyze data to solve problems.

Specific Outcome:
SP1 Critique ways in which data is presented.

Achievement Indicator:
- ☑ Justify the choice of a graphical representation for a given situation and its corresponding data set.

Resource/Materials:
- *MathLinks 8*, pp. 28–31
- BLM 1–4 Chapter 1 Warm-Up
- Master 12 Percent Circles
- grid paper, Master 8 Centimetre Grid Paper, or Master 9 0.5 Centimetre Grid Paper
- ruler
- coloured pencils
- compass
- protractor
- Foldable

Teacher's Resource:
pp. 27–30

***MathLinks 8* Adapted Resource:**
1.3 Warm-Up, p. 31
1.3, pp. 32–35

Introduction:
Read the section title, opening paragraph, and article as well as the big question in the Explore the Math (p. 28). Read the Did You Know? to clarify the meaning of *run*. Ask students what is different about the bars in the graph (stacked bars). Point out the Literacy Link that explains the meaning of *stacked bar graph*.

In the Explore the Math, students analyse a graph.

Procedure/Activities/Instruction:

1. Have students complete the warm-up questions for section 1.3 on **BLM 1–4 Chapter 1 Warm-Up** to reinforce material learned previously.
2. Collect, orally mark, or take up the previous day's homework. Remind students to note any question they had difficulty with in the What I Need to Work On section of their Foldables.
3. Have students complete the Explore the Math independently and then compare answers with a partner before discussing the results as a class. Have them list questions or concepts they are having difficulty with in the What I Need to Work On section of their Foldables.
4. The Example (pp. 29–30) illustrates how to critique a graph. Before working through the Example, it may be beneficial to have students recall the types of graphs, and identify which ones better display certain types of data. Have students discuss the Example with a partner.
   Have students complete the Show You Know questions (p. 30) with their partner and then share their answers with the class.
5. You may wish to put a sample graph on the board and use it to help discuss the Key Ideas.
6. Assign and then collect all students' individual work for Communicate the Ideas questions as outlined in the Assessment section below.

Assessment:

1. Section 1.3 on **BLM 1–4 Chapter 1 Warm-Up** (Assessment *for* Learning)
2. Reflect on Your Findings #4 (p. 29) (Assessment *as* Learning)
3. Show You Know questions (p. 30) (Assessment *for* Learning)
4. Have students discuss sample graphs and use the Key Ideas outline to critique them. Listen as they do their critique (Assessment *as* Learning).
5. Communicate the Ideas (Assessment *as* Learning)
   Essential: #1, 2
   Typical: #1, 3
   Extension/Enrichment: #1, 3
6. Math Learning Log (Assessment *as* Learning)

Foldable Entry:

Have students define the following term in their Foldables.

stacked bar graph

Math Learning Log:

Have students complete the following statement: Critiquing data means to …

Have students comment on two or three items they feel they have improved on and how they have improved.

MathLinks 8 Chapter 1, Lesson 10

Time: 40–50 min

STRAND/ORGANIZER: Statistics and Probability (Data Analysis)

General Outcome: Collect, display and analyze data to solve problems.

Specific Outcome:
SP1 Critique ways in which data is presented.

Achievement Indicator:
- ☑ Justify the choice of a graphical representation for a given situation and its corresponding data set.

Resource/Materials:
- *MathLinks 8,* pp. 32–35
- *MathLinks 8 Practice and Homework Book*, pp. 8–9
- Master 12 Percent Circles
- BLM 1–12 Section 1.3 Extra Practice
- BLM 1–13 Section 1.3 Math Link
- grid paper, Master 8 Centimetre Grid Paper, or Master 9 0.5 Centimetre Grid Paper
- ruler
- coloured pencils

Teacher's Resource:
pp. 31–33

***MathLinks 8* Adapted Resource:**
1.3, pp. 36–39

Introduction:
Begin the class with an oral recall of how to critique a graph. Alternatively, use a sample graph you find in the media and have students critique it to reinforce their learning (real-world context connection).

The lesson provides students with an opportunity to apply their understanding of the concepts learned in the lesson, as well as those from the two previous lessons in a problem solving context.

Procedure/Activities/Instruction:

1. Collect, orally mark, or take up the previously assigned Communicate the Ideas questions. Remind students to note any question they had difficulty with in the What I Need to Work On section of their Foldables.
2. Assign questions as outlined in the Assessment section below. Ensure that students are successful with the Practise questions before proceeding to the Apply questions. Support for re-teaching or alternative approaches for students who are not successful with the Practise questions can be found in the Teacher's Resource under Assessment – Supporting Learning (p. 33). A number of the assignments require students to redraw graphs in order to present the data more accurately. Remind them of the materials they need to facilitate their work.

Assessment:

1. Student assignments (Assessment *for* Learning)
   Essential: #4, 6, 8, 10, Math Link
   Typical: #4, 6–10, Math Link
   Extension/Enrichment: #11–13, Math Link
   Note: Some students may benefit from completing **BLM 1–12 Section 1.3 Extra Practice**, if they have not already done so.
   Encourage students who work faster to start the Math Link (p. 35). They may need additional class time to complete the Math Link. **BLM 1–9 Section 1.1 Math Link** is available for students who may benefit from scaffolding to get started on the Math Link.
2. The *MathLinks 8 Practice and Homework Book* provides additional questions or replacement questions (Assessment *for* Learning).
3. Math Learning Log (Assessment *as* Learning)

Foldable Entry:

Have students write the page reference and question numbers they had difficulty with in the What I Need to Work On section of their Foldables.

Math Learning Log:

Have students comment on two or three items they feel they have improved on and explain how they have improved.

MathLinks 8 Chapter 1, Lesson 11

Time: 40–50 min

STRAND/ORGANIZER: Statistics and Probability (Data Analysis)

General Outcome: Collect, display and analyze data to solve problems.

Specific Outcome:
SP1 Critique ways in which data is presented.

Achievement Indicators:

- ☑ Compare the information that is provided for the same data set by a given set of graphs, including circle graphs, line graphs, bar graphs, double bar graphs and pictographs, to determine the strengths and limitations of each graph.
- ☑ Identify the advantages and disadvantages of different graphs, including circle graphs, line graphs, bar graphs, double bar graphs and pictographs, in representing a specific given set of data.
- ☑ Justify the choice of a graphical representation for a given situation and its corresponding data set.
- ☑ Explain how the format of a given graph, such as the size of the intervals, the width of bars and the visual representation, may lead to misinterpretation of the data.
- ☑ Explain how a given formatting choice could misrepresent the data.
- ☑ Identify conclusions that are inconsistent with a given data set or graph and explain the misinterpretation.

Resource/Materials:

- *MathLinks 8*, pp. 36–37
- *MathLinks 8 Practice and Homework Book*, pp. 10–11
- Master 12 Percent Circles
- BLM 1–5 Chapter 1 Problems of the Week
- BLM 1–8 Section 1.1 Extra Practice
- BLM 1–10 Section 1.2 Extra Practice
- BLM 1–12 Section 1.3 Extra Practice
- grid paper, Master 8 Centimetre Grid Paper, or Master 9 0.5 Centimetre Grid Paper
- ruler
- Foldable

Teacher's Resource:
pp. 34–35

***MathLinks 8* Adapted Resource:**
Chapter 1 Review, pp.40–43
Key Word Builder, p. 47

Introduction:
Students are now at the chapter review, which serves as a self-assessment tool.

Procedure/Activities/Instruction:
1. Decide how you wish students to approach the Chapter 1 Review. The review is an opportunity for students to verify that they have mastered the concepts and identify any areas of weakness prior to any Assessment *of* Learning. There are a number of approaches that could be used, including:
   - Have students use the notes they made in the What I Need to Work On section of their Foldables to identify any areas of weakness and to help them select review questions.
   - Have students complete at least one related item from each section.
   - Have students revisit their assignments, identify areas of weakness, and select review questions accordingly.
   - As the teacher, you might select the questions to be completed by the class or individual students.
   - Have students do the Math Game (p. 40). The game provides additional reinforcement that students enjoy doing.
   - If students have the *MathLinks 8 Practice and Homework Book*, have them complete questions from the relevant sections.
   - You may wish to use questions from **BLM 1–8 Section 1.1 Extra Practice**, **BLM 1–10 Section 1.2 Extra Practice**, and **BLM 1–12 Section 1.3 Extra Practice**.

Assessment:
1. Chapter 1 Review (Assessment *for* Learning). Consider assigning #6, 7, 8, 9, 11, and 13, which are the minimum questions that will meet the curriculum outcomes. Assignments should be completed within class time in order for students to get assistance.

Foldable Entry:
Encourage students to use the terminology in their Foldables. As they do the review, they could note what areas in the What I Need to Work On section they now understand. This is a good opportunity for students to note personal growth.

Problems of the Week:
This may be a good time to discuss students' responses to **BLM 1–5 Chapter 1 Problems of the Week**.

MathLinks 8 Chapter 1, Lesson 12

Time: 40–50 min

STRAND/ORGANIZER: Statistics and Probability (Data Analysis)

General Outcome: Collect, display and analyze data to solve problems.

Specific Outcome:
SP1 Critique ways in which data is presented.

Achievement Indicators:

- ☑ Compare the information that is provided for the same data set by a given set of graphs, including circle graphs, line graphs, bar graphs, double bar graphs and pictographs, to determine the strengths and limitations of each graph.
- ☑ Identify the advantages and disadvantages of different graphs, including circle graphs, line graphs, bar graphs, double bar graphs and pictographs, in representing a specific given set of data.
- ☑ Justify the choice of a graphical representation for a given situation and its corresponding data set.
- ☑ Explain how the format of a given graph, such as the size of the intervals, the width of bars and the visual representation, may lead to misinterpretation of the data.
- ☑ Explain how a given formatting choice could misrepresent the data.
- ☑ Identify conclusions that are inconsistent with a given data set or graph and explain the misinterpretation.

Resource/Materials:

- *MathLinks 8*, pp. 38–39
- Master 12 Percent Circles
- BLM 1–14 Chapter 1 Test
- grid paper, Master 8 Centimetre Grid Paper, or Master 9 0.5 Centimetre Grid Paper
- ruler
- coloured pencils
- compass
- protractor
- calculator (optional)
- computer with spreadsheet software (optional)
- Foldable

Teacher's Resource:
pp. 36–38

***MathLinks 8* Adapted Resource:**
Chapter 1 Practice Test, pp. 44–45

Introduction:
Students are now at the practice test. This could serve as a self-assessment tool or as a summative tool.

Procedure/Activities/Instruction:
1. Before completing the Chapter 1 Practice Test, ask students to complete the What I **Learned** column from the KWL chart that they started at the beginning of the chapter. Discuss how students might now answer their questions in the What I **Want** to Know column and which ones still need to be answered.
2. Decide how you wish students to approach the practice test. Practice tests are opportunities for students to verify that they have mastered the concepts and identify any areas of weakness prior to Assessment *of* Learning. Provide students with a number of questions that they can comfortably do in one class. Choose at least one question for each concept, skill, or process.
3. You may wish to use **BLM 1–14 Chapter 1 Test**, items from the computerized assessment bank (CAB), or the Challenge in Real Life as a summative assessment.

Assessment:
1. **Master 16 KWL Chart** (Assessment *for* Learning)
2. Chapter 1 Practice Test (pp. 38–39) (Assessment *for* Learning). The essential questions to meet the curriculum requirements are #1–3, 5, 6, and 9. Assignments should be completed within class time in order to allow students to get assistance.
3. **BLM 1–14 Chapter 1 Test** (Assessment *of* Learning)
4. Challenge in Real Life (p. 41) (Assessment *of* Learning)

Foldable Entry:
Encourage students to use their Foldables for terminology, and to note areas of personal growth.

MathLinks 8 Chapter 1, Lesson 13/14

Time: 80 min

STRAND/ORGANIZER: Statistics and Probability (Data Analysis)

General Outcome: Collect, display and analyze data to solve problems.

Specific Outcome:
SP1 Critique ways in which data is presented.

Achievement Indicators:

- ☑ Compare the information that is provided for the same data set by a given set of graphs, including circle graphs, line graphs, bar graphs, double bar graphs and pictographs, to determine the strengths and limitations of each graph.
- ☑ Identify the advantages and disadvantages of different graphs, including circle graphs, line graphs, bar graphs, double bar graphs and pictographs, in representing a specific given set of data.
- ☑ Justify the choice of a graphical representation for a given situation and its corresponding data set.
- ☑ Explain how the format of a given graph, such as the size of the intervals, the width of bars and the visual representation, may lead to misinterpretation of the data.
- ☑ Explain how a given formatting choice could misrepresent the data.
- ☑ Identify conclusions that are inconsistent with a given data set or graph and explain the misinterpretation.

Resource/Materials:

- *MathLinks 8*, p. 39
- Master 1 Project Rubric
- Master 12 Percent Circles
- BLM 1–15 Chapter 1 Wrap It Up!
- grid paper, Master 8 Centimetre Grid Paper, or Master 9 0.5 Centimetre Grid Paper
- ruler
- coloured pencils
- compass
- protractor
- calculator (optional)
- computer with spreadsheet software (optional)
- Foldable

Teacher's Resource:
pp. 39–41

***MathLinks 8* Adapted Resource:**
Wrap It Up!, p. 46

Introduction:
Students will complete the chapter problem Wrap It Up! (p. 39). Their work on the Math Links throughout the chapter may help them with this process.

Procedure/Activities/Instruction:
1. Decide and communicate how much class time students will have to complete the Wrap It Up!
2. Read through the Wrap It Up! and clarify any misunderstandings. Discuss graphing options. Remind them to refer back to their previous work on the Math Links to help them. Encourage students to use any data they collected during the Check Your Understanding questions and the Math Link for section 1.2. Emphasize the importance of producing complete and accurate graphs. Students may wish to use the checklists they created and stored in their Foldables during the Math Link introduction.
   BLM 1–15 Chapter 1 Wrap It Up! provides scaffolding for students who need help to get started.
3. It is important for students to understand how they will be graded. Provide each student with **Master 1 Project Rubric**. Clarify the assessment criteria using the master rubric or the version of the rubric in the Teacher's Resource (p. 41). Work with students to develop the expected outcomes for each level. If using the rubric in the Teacher's Resource, delete the content in the column with the specific question notes and work with students to complete the expected outcomes for each level. Completing specific question notes in this way allows students to identify the key criteria for each level. At the same time, you might emphasize the criteria that differentiate different levels (e.g., Level 3 and Level 4), in an effort to encourage students to improve their performance.

Assessment:
1. **Master 1 Project Rubric** (Assessment *of* Learning)

Foldable Entry:
Encourage students to refer to their Foldables as they practise using appropriate mathematical terminology.

MathLinks 8 Chapter 1, Lesson 15

Time: 40–50 min

STRAND/ORGANIZER: Statistics and Probability (Data Analysis)

General Outcome: Collect, display and analyze data to solve problems.

Specific Outcome:
SP1 Critique ways in which data is presented.

Achievement Indicators:

- ☑ Compare the information that is provided for the same data set by a given set of graphs, including circle graphs, line graphs, bar graphs, double bar graphs and pictographs, to determine the strengths and limitations of each graph.
- ☑ Identify the advantages and disadvantages of different graphs, including circle graphs, line graphs, bar graphs, double bar graphs and pictographs, in representing a specific given set of data.
- ☑ Justify the choice of a graphical representation for a given situation and its corresponding data set.
- ☑ Explain how the format of a given graph, such as the size of the intervals, the width of bars and the visual representation, may lead to misinterpretation of the data.
- ☑ Explain how a given formatting choice could misrepresent the data.
- ☑ Identify conclusions that are inconsistent with a given data set or graph and explain the misinterpretation.

Resource/Materials:

Math Games	Challenge in Real Life
MathLinks 8, p. 40 • 2 dice per pair of students • grid paper, Master 8 Centimetre Grid Paper, or Master 9 0.5 Centimetre Grid Paper • Foldable	*MathLinks 8*, p. 41 • Master 1 Project Rubric • grid paper, Master 8 Centimetre Grid Paper, or Master 9 0.5 Centimetre Grid Paper • ruler • coloured pencils (optional) • calculator (optional) • compass (optional) • protractor (optional)

Teacher's Resource:
pp. 42–45

***MathLinks 8* Adapted Resource:**
Math Games, p. 48
Challenge in Real Life, p. 49

Introduction:
The game allows students to use their mental skills of addition to plot data.

The challenge allows students to apply their understanding of data collection and use their knowledge of data presentation to fairly and accurately compare results.

Procedure/Activities/Instruction:
Math Games

1. Read through the game with students. You might want to play a demonstration round.
2. Partner students according to ability.
   Note: The game could be used as reinforcement in place of the Chapter 1 Review.

Challenge in Real Life
You may need to book the computer lab in advance for students to research the data or invite a community guest speaker to share information with students. You may also wish to discuss this challenge with a science teacher or Social Action Committee in your school and see if it could be applied in these areas as well.

1. As an introduction, explore as a class how your community recycles.
2. Read through Keep Your Community Green as a class.
3. Clarify that the task is to research data related to recycling in the students' community and one other Canadian community. Students will then compare the two sets of data by representing them in two different ways (one graph that accurately represents the data and one graph that misrepresents the data). Students will write a news article using the graphs that showcase their own community. Alternatively, if you are short on time, you may wish to provide students with recycling data you have researched using the Web Link in the Teacher's Resource (p.44). The Web Link refers to links in the Teacher Centre of the McGraw-Hill Ryerson Online Learning Centre that will lead you to suitable information about various Western communities. Students could then be responsible for the graphs and a related article.
4. If you use the challenge for Assessment *of* Learning, it is important that students understand how they will be graded. Review **Master 1 Project Rubric** or use the version in the Teacher's Resource (p. 45) and work with students to develop the expected outcomes for each level. If using the version in the Teacher's Resource, delete the content in the column with the specific question notes and work with students to complete the expected outcomes for each level. Completing specific question notes in this way allows students to identify the key criteria for each level. At the same time, you might emphasize the criteria that differentiate different levels (e.g., Level 3 and Level 4), in an effort to encourage students to improve their performance.

Assessment:

1. You may decide to let students choose either the game or the challenge, depending on the type of assessment you are looking for.
   - Math Games (Assessment *for* Learning)
   - Challenge in Real Life (Assessment *of* Learning or Assessment *for* Learning)

Foldable Entry:

Encourage students to use their Foldables to help them use mathematical terminology appropriately.