11 Data Analysis

General Outcomes

- Collect, display and analyze data to solve problems.
- Use experimental or theoretical probabilities to represent and solve problems involving uncertainty.

Specific Outcomes

SP1 Describe the effect of:

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

SP2 Select and defend the choice of using either a population or a sample of a population to answer a question.

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.

SP4 Demonstrate an understanding of the role of probability in society.

By the end of this chapter, students will be able to:

Section	Understanding Concepts, Skills, and Processes
11.1	✓ 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
11.2	✓ identify the difference between a population and a sample
	✓ identify different types of samples
	✓ justify using a population or a sample of a population for given situations
	✓ determine whether results from a sample can be applied to a population
11.3	✓ identify and explain assumptions linked to probabilities
	✓ explain decisions based on probabilities
11.4	✓ develop a research project plan
	✓ complete a research project according to a project plan, collect data, display data, draw conclusions, and communicate findings
	✓ self-assess a research project by applying a rubric

Assessment	Supporting Learning
Assessment *for* Learning	
Method 1: Use the Math Link introduction on page 413 in *MathLinks 9* to activate student prior knowledge about the skills and processes that will be covered in this chapter. **Method 2:** Have students develop a journal entry to explain what they personally know about collecting and displaying research data. Consider making newspapers or magazines available and have students select a research report that includes a graph or a table. Have them use the report and respond to the following prompts: • How was the data collected? • How was the data displayed? • What conclusions were made based on the data?	• **BLM 11–1 Chapter 11 Math Link Introduction** provides scaffolding for the Math Link introduction. • Have students use the What I Need to Work On section of their Foldable to keep track of the skills and processes that need attention. They can check off each item as they develop the skill or process at an appropriate level. • Students who require activation of prerequisite skills may wish to complete the Get Ready materials available on **BLM 11–2 Chapter 11 Get Ready**, in the *MathLinks 9 Practice and Homework Book*, and at the www.mathlinks9.ca book site.
Assessment *as* Learning	
Literacy Link (page 411) At the beginning of the chapter, work with students to model the use of a concept map.	• As students move through sections 11.1 to 11.3, have them complete their concept map, so they will have a useful tool for reviewing the skills and concepts covered in the chapter. • Encourage students to develop definitions for terms in their own words. • Consider providing real-life examples that students may be familiar with to help them understand the terms. • Some students may benefit from using the glossary starting on page XX to help them.
Chapter 11 Foldable As students work on each section in Chapter 11, have them keep track of any problems they are having in the What I Need to Work On section as well as any terms that are not familiar.	• As students complete each section, have them review the list of items they need to work on and check off any that have been handled.
Assessment *for* Learning	
BLM 11–3 Chapter 11 Warm-Up This BLM includes four warm-ups, one to be used at the beginning of each section. Each warm-up provides cumulative review questions for the entire student resource to that point, as well as mental math practice.	• As students complete questions from previous chapters, note which skills they are retaining and which ones may need additional reinforcement. • Use the warm-up to provide additional opportunities for students to demonstrate their understanding of the chapter material. • Have students share their strategies for completing mental math calculations.

Problems of the Week

Have all students try at least one of the problems on **BLM 11–4 Chapter 11 Problems of the Week**. Many of these problems require students to think outside the box and experiment with a variety of approaches. Some have definitive answers; others can be answered in more than one way.

Students can take the problems home and consult with parents or guardians, work with other students when their work is completed, or try them on their own. The questions take a varying amount of time to solve, depending on the particular student and the problem itself. You may wish to give out these problems at the beginning of the chapter and discuss the solutions at appropriate times throughout your work on the chapter.

Chapter 11 Planning Chart

Section/ Suggested Timing	Prerequisite Skills	Materials/Technology	Teacher's Resource Blackline Masters	Exercise Guide	Extra Support	Assessment		
						Assessment *as* Learning	Assessment *for* Learning	Assessment *of* Learning
Chapter Opener • 40–50 minutes (TR page 557)	Students should be familiar with • different types of graphs and how to create graphs • completing a graph including title, labels on axes, and scale • terms related to measures of central tendency • calculating percents	• sheet of 11 × 17 paper • ruler • seven sheets of 8.5 × 11 paper • scissors • stapler • grid paper • compass (optional) • protractor (optional) • coloured pencils • newspapers and magazines (optional) • computer with Internet access (optional)	Master 8 Centimetre Grid Paper Master 9 0.5 Centimetre Grid Paper BLM 11–1 Chapter 11 Math Link Introduction BLM 11–2 Chapter 11 Get Ready BLM 11–4 Chapter 11 Problems of the Week BLM 11–5 Research Project Checklist		Online Learning Centre	TR page 556 Chapter 11 Foldable, TR page 556	TR page 556	
11.1 Factors Affecting Data Collection • 60–80 minutes (TR page 562)	Students should be familiar with • reading and interpreting a table • the meaning of a survey	• magazines, newspapers, or computer with Internet access	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	**Essential:** #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	*MathLinks 9 Practice and Homework Book* *MathLinks 9 Solutions Manual*	Master 2 Communication Peer Evaluation TR pages 564, 570 Math Learning Log, TR page 570 Chapter 11 Foldable, TR page 570	TR pages 566, 570	
11.2 Collecting Data • 80–100 minutes (TR page 571)	Students should be familiar with • taking a survey • reading a map • converting fractions to percents	• magazines, newspapers, or computer with Internet access	Master 2 Communication Peer Evaluation BLM 11–3 Chapter 11 Warm-Up BLM 11–8 Section 11.2 Extra Practice BLM 11–9 Section 11.2 Math Link	**Essential:** #1, 3, 4, 7–10, 13, Math Link **Typical:** #1, 3, 4 and 7 *or* 5 and 6, 8–10, 12, 13, Math Link **Extension/Enrichment:** #1–3, 12–16, Math Link	*MathLinks 9 Practice and Homework Book* *MathLinks 9 Solutions Manual*	Master 2 Communication Peer Evaluation TR pages 572, 579 Math Learning Log, TR page 579 Chapter 11 Foldable, TR page 579	TR pages 575, 579	
11.3 Probability in Society • 80–100 minutes (TR page 580)	Students should be familiar with • the meaning of probability and how to calculate it • calculating the percent of a number • the meaning of and how to calculate mean, median, and mode • converting fractions to percents	• magazines, newspapers, or computer with Internet access	Master 2 Communication Peer Evaluation BLM 11–3 Chapter 11 Warm-Up BLM 11–10 Section 11.3 Extra Practice BLM 11–11 Section 11.3 Math Link	**Essential:** #1–4, 6, 9–12, 14, Math Link **Typical:** #1–3, 4 *or* 5, 6 *or* 7, 8–12, 14, Math Link **Extension/Enrichment:** #1–3, 13, 15–18, Math Link	*MathLinks 9 Practice and Homework Book* *MathLinks 9 Solutions Manual*	Master 2 Communication Peer Evaluation TR pages 581, 589 Math Learning Log, TR page 589 Chapter 11 Foldable, TR page 589	TR pages 585, 589	
11.4 Developing and Implementing a Project Plan • 80–100 minutes (TR page 590)	Students should be familiar with • rubrics and how to use them • flow charts and how to interpret flow charts	• computer with Internet access	Master 1 Project Rubric BLM 11–1 Chapter 11 Math Link Introduction BLM 11–5 Research Project Checklist BLM 11–7 Section 11.1 Math Link BLM 11–9 Section 11.2 Math Link BLM 11–11 Section 11.3 Math Link BLM 11–12 Research Project Rubric BLM 11–13 Sample Research Project Rubric		*MathLinks 9 Practice and Homework Book* *MathLinks 9 Solutions Manual*	Math Learning Log, TR page 593 Chapter 11 Foldable, TR page 593		
Chapter 11 Math Link: Wrap It Up! • 40–50 minutes (TR page 594)			Master 1 Project Rubric BLM 11–12 Research Project Rubric BLM 11–13 Sample Research Project Rubric BLM 11–14 Chapter 11 Math Link: Wrap It Up!		Online Learning Centre			TR page 594 Master 1 Project Rubric
Chapter 11 Review • 40–50 minutes (TR page 596)			BLM 11–6 Section 11.1 Extra Practice BLM 11–8 Section 11.2 Extra Practice BLM 11–10 Section 11.3 Extra Practice	Have students do at least one question related to any concept, skill, or process that has been giving them trouble.	*MathLinks 9 Practice and Homework Book* *MathLinks 9 CAB*	Chapter 11 Foldable, TR page 596	TR page 597	
Chapter 11 Practice Test • 40-50 minutes (TR page 598)			BLM 11–15 Chapter 11 Test	Provide students with the number of questions they can comfortably do in one class. Choose at least one question for each concept, skill, or process. **Minimum:** #1–11	*MathLinks 9 CAB*	TR page 599		TR page 599 BLM 11–15 Chapter 11 Test
Chapter 11 Challenge: Global Warming • 80–100 minutes (TR page 600)		• computer with Internet access • spreadsheet software (optional) • grid paper	Master 1 Project Rubric Master 8 Centimetre Grid Paper Master 9 0.5 Centimetre Grid Paper BLM 11–16 Global Mean Temperature		Online Learning Centre		TR page 602	TR page 602 Master 1 Project Rubric
Chapter 11 Challenge: Probability in Society • 60–80 minutes (TR page 604)		• magazines or newspapers • computer with Internet access (optional)	Master 1 Project Rubric BLM 11–17 Newspaper Headlines		Online Learning Centre		TR page 605	TR page 605 Master 1 Project Rubric
Chapters 8–11 Review • 60–75 minutes (TR page 607)		• ruler	BLM 11–18 Chapter 11 BLM Answers	Provide students with the number of questions they can comfortably do in one class. Choose at least one question for each concept, skill, or process. **Minimum:** #1–12, 14, 15, 17–20, 22, 23	*MathLinks 9 CAB*	TR page 609 Chapters 9, 10, and 11 Foldable Math Learning Log, TR page 609	TR page 609	