2

Probability

Key Terms

data
event
experimental probability
outcome
statistics
theoretical probability
trial

Curriculum Expectations
Applying Probability

In this chapter, students will

DM2.01 identify examples of the use of probability in the media and various ways in which probability is represented (e.g., as a fraction, as a percent, as a decimal in the range 0 to 1)

DM2.02 determine the theoretical probability of an event (i.e., the ratio of the number of favourable outcomes to the total number of possible outcomes, where all outcomes are equally likely), and represent the probability in a variety of ways (e.g., as a fraction, as a percent, as a decimal in the range 0 to 1)

DM2.03 perform a probability experiment (e.g., tossing a coin several times) represent the results using a frequency distribution, and use the distribution to determine the experimental probability of an event

DM2.04 compare, through investigation, the theoretical probability of an event with the experimental probability, and explain why they might differ

DM2.05 determine, through investigation using class-generated data and technology-based simulation models (e.g., using a random number generator on a spreadsheet or a graphing calculator), the tendency of experimental probability to approach theoretical probability as the number of trials in an experiment increases (e.g., "If I simulate tossing a coin 1000 times using technology, the experimental probability that I calculate for tossing tails is likely to be closer to the theoretical probability than if I only simulate tossing the coin 10 times")

DM2.06 interpret information involving the use of probability and statistics in the media, and make connections between probability and statistics (e.g., statistics can be used to generate probabilities)

Teaching Suggestions
Chapter Opener

- As a class, discuss what is meant by a *census*. Discuss why a census is not practical when counting fish or other wildlife.
- The opener mentions four careers that might depend on probability. Brainstorm to suggest other careers that may depend on probability.
- Divide the class into groups and assign one of the above-mentioned careers to each group. Have each group discuss specifically how probability might be used in that particular career. When finished, share findings with the class.

Career Profile

Have students discuss what they believe a fish and wildlife technician does. As an extension, have students research this career and other similar careers, and present their findings to the class. You may wish to use **BLM A-4 Presentation Checklist** to assess students' presentations.

Using their research, have students discuss:
• What a fish and wildlife technician does.
• What type of education and training are needed for this career.
• Another career that is similar.
• The differences in the training and education required for the similar career.

You may wish to have students include their research in their portfolios.

For more career resources for your students, see the McGraw-Hill Ryerson Web-site at *www.mcgrawhill.ca/books/foundations11*.

Chapter 2 Planning Chart

Section Suggested Timing	Student Text Page(s)	Teacher's Resource Blackline Masters	Assessment	Tools
Chapter 1 Opener • 10 min	56–57		• BLM A-4 Presentation Checklist	
Prerequisite Skills • 70 min	58–59	• BLM 2-1 Prerequisite Skills	• BLM 2-1 Prerequisite Skills • BLM 2-2 Prerequisite Skills Self-Assessment Checklist	
2.1 Probability Experiments • 70 min	60–67	• BLM 2-3 Section 2.1 Probability Experiments		• 10 coloured tiles: 5 red, 5 blue • 15 coloured tiles: 7 yellow, 5 red, 3 blue • opaque bag or box
2.2 Theoretical Probability • 70 min	68–75	• BLM 2-4 Section 2.2 Theoretical Probability		
2.3 Compare Experimental and Theoretical Probabilities • 150 min	76–85	• BLM 2-5 Section 2.3 Compare Experimental and Theoretical Probabilities • BLM G-1 Grid Paper • BLM T-1 Microsoft® *Excel*	• BLM 2-6 Section 2.3 Achievement Check Rubric	• coins • grid paper • graphing calculator *Optional* • spreadsheet software • random number generator
2.4 Interpret Information Involving Probability • 70 min	86–93	• BLM 2-7 Section 2.4 Interpret Information Involving Probability • BLM G-1 Grid Paper • BLM 2-9 Chapters 2 and 3 Literacy Connect	• BLM 2-8 Section 2.4 Achievement Check Rubric • BLM A-18 Opinion Piece Checklist	• graphing calculator • grid paper *Optional* • spreadsheet software • random number generator • spinners
Chapter 2 Review • 30–45 min	94–95	• BLM 2-10 Chapter 2 Review		
Chapter 2 Practice Test • 30–45 min	96–97		• BLM 2-11 Chapter 2 Practice Test • BLM 2-12Chapter 2 Test	
Chapter 2 Problem Wrap-Up • 30–45 min	97		• BLM 2-13 Chapter 2 Problem Wrap-Up Rubric	

Chapter 2 Blackline Masters Checklist

		Title	Purpose
Chapter 2 Opener			
	BLM A-4	Presentation Checklist	Assessment
Prerequisite Skills			
	BLM 2-1	Prerequisite Skills	Practice
	BLM 2-2	Prerequisite Skills Self-Assessment Checklist	Self-Assessment
2.1 Probability Experiments			
	BLM 2-3	Section 2.1 Probability Experiments	Practice
2.2 Theoretical Probability			
	BLM 2-4	Section 2.2 Theoretical Probability	Practice
2.3 Compare Experimental and Theoretical Probabilities			
	BLM 2-5	Section 2.3 Compare Experimental and Theoretical Probabilities	Practice
	BLM 2-6	Section 2.3 Achievement Check Rubric	Assessment
	BLM G-1	Grid Paper	Student Support
	BLM T-1	Microsoft® *Excel*	Student Support
2.4 Interpret Information Involving Probability			
	BLM 2-7	Section 2.4 Interpret Information Involving Probability	Practice
	BLM 2-8	Section 2.4 Achievement Check Rubric	Assessment
	BLM G-1	Grid Paper	Student Support
	BLM 2-9	Chapters 2 and 3 Literacy Connect	Literacy
Chapter 2 Review			
	BLM 2-10	Chapter 2 Review	Review
Chapter 2 Practice Test			
	BLM 2-11	Chapter 2 Practice Test	Diagnostic Assessment
	BLM 2-112	Chapter 2 Test	Summative Assessment
Chapter 2 Problem Wrap-Up Rubric			
	BLM 2-13	Chapter 2 Problem Wrap-Up Rubric	Summative Assessment

Common Errors

- Some students may need to review operations with fractions.

R_x Have students find the sum and product of $\frac{1}{2}$ and $\frac{1}{4}$, and include diagrams in their solutions. Repeat for $\frac{1}{2}$ and $\frac{1}{3}$. Ask students to explain, or to write in a journal, why common denominators are needed when adding fractions, but not when multiplying fractions.

- Students may have difficulty using their calculators to work with fractions.

R_x Review the common types of calculators, including those with fraction buttons. Ensure that students know what type they have and how it works.

- Students may have difficulty with or forget how to express fractions in lowest terms.

R_x Use simple examples like $\frac{2}{4}$, $\frac{6}{8}$, or $\frac{4}{10}$ to remind students how to reduce fractions. Encourage the use of the phrase "dividing common factors" as opposed to "cancel".

Accommodations

Memory—provide examples for fraction conversions

Perceptual—have students measure heights of students in the class and construct a histogram of the class data

Gifted and Enrichment—students could research the actual breakdown of vehicle type ownership and construct a visual display of the data

Teaching Suggestions

- Students may have different skill levels in working with fractions, decimals, and percents. Suggest working in pairs or groups on **questions 1 to 6**. For **questions 1 and 2**, students may need to be reminded that the fraction $\frac{3}{4}$ can also be interpreted as "3 divided by 4". This may help them convert from fractions to decimals both with and without a calculator.
- It may be beneficial to list some common fractions and convert them to decimals and percents. Suggest using $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, and $\frac{1}{8}$. Students should also become familiar with certain repeating decimals; ask them to evaluate $\frac{1}{3}$, $\frac{1}{6}$, $\frac{1}{9}$ ($\frac{2}{9}$, $\frac{4}{9}$, etc.) using their calculators.
- **Questions 8 to 10** provide an opportunity to discuss various types of graphs.
- All BLMs referred to throughout this chapter can be found on the *Foundations for College Mathematics 11 Teacher's Resource* CD-ROM.

Assessment

- Assess student readiness to proceed by informal observation as students work on the questions. A formal test would be inappropriate since this material is not part of the grade 11 curriculum for this chapter.
- Student self-assessment is also an effective technique; students can place a checkmark beside topics in the Prerequisite Skills in which they feel confident with the necessary skills. Use **BLM 2-2 Prerequisite Skills Self-Assessment Checklist** as a self-assessment for students.
- Remedial action can be taken in small groups or with a whole-class skills review.

Extra Practice

- Use **BLM 2-1 Prerequisite Skills** for extra practice or remediation.

Chapter Problem

- The Chapter Problem is introduced on page 59. Have students discuss their understanding of the topic. You may wish to have students complete the Chapter Problem questions that are posed throughout the chapter. These questions are designed to help students move toward the Chapter Problem Wrap-Up on page 97.
- Alternatively, you may wish to assign the Chapter Problem questions and Chapter Problem Wrap-Up when students have completed the chapter, as part of a summative assessment.