3

One Variable Statistics

Student Text Pages
98–163

Suggested Timing
20–30 min

Related Resources
BLM A-4 Presentation Checklis

Key Terms

bias
bimodal distribution
box-and-whisker plot
categorical data
continuous data
discrete data
interquartile range
mean
median
mode
normal distribution
outlier
population
primary source
quartiles
range
sample
secondary source
skewed distribution
standard deviation
variance

Chapter Curriculum Specific Expectations
Working With One Variable Data

In this chapter, students will

DM1.01 identify situations involving one-variable data (i.e., data about the frequency of a given occurrence), and design questionnaires (e.g., for a store to determine which CDs to stock; for a radio station to choose which music to play) or experiments (e.g., counting, taking measurements) for gathering one-variable data, giving consideration to ethics, privacy, the need for honest responses, and possible sources of bias

DM1.02 collect one-variable data from secondary sources (e.g., Internet databases), and organize and store the data using a variety of tools (e.g., spreadsheets, dynamic statistical software)

DM1.03 explain the distinction between the terms *population* and *sample*, describe the characteristics of a good sample, and explain why sampling is necessary (e.g., time, cost, or physical constraints)

DM1.04 describe and compare sampling techniques (e.g., random, stratified, clustered, convenience, voluntary); collect one-variable data from primary sources, using appropriate sampling techniques in a variety of real-world situations; and organize and store the data

DM1.05 identify different types of one-variable data (i.e., categorical, discrete, continuous), and represent the data, with and without technology, in appropriate graphical forms (e.g., histograms, bar graphs, circle graphs, pictographs)

DM1.06 identify and describe properties associated with common distributions of data (e.g., normal, bimodal, skewed)

DM1.07 calculate, using formulas and/or technology (e.g., dynamic statistical software, spreadsheet, graphing calculator), and interpret measures of central tendency (i.e., mean, median, mode) and measures of spread (i.e., range, standard deviation)

DM1.08 explain the appropriate use of measures of central tendency (i.e., mean, median, mode) and measures of spread (i.e., range, standard deviation)

DM1.09 compare two or more sets of one-variable data, using measures of central tendency and measures of spread

DM1.10 solve problems by interpreting and analyzing one-variable data collected from secondary sources

Additional information and teaching materials for this chapter are available on the McGraw-Hill Ryerson Web-site at *www.mcgrawhill.ca/books/ foundations11*. You will need your password to access this material.

Teaching Suggestions

Chapter Opener

- Have students describe a situation where they have heard statistics used or quoted. Sports statistics, numbers from weekend box office receipts, as well as scientific studies or even numbers from option selections in their school will usually be mentioned.
- Offer suggestions of when statistics can be misused. For example, students may have seen several different shows on TV, each advertised as Canada's number one show. Ask how this was decided and how this claim can be misleading. Another example might be a band that is quoted as being the most popular band. Is this a partial quote where the record company really means most popular within a particular genre of music, or most CD's sold, or most sold out concerts?
- Have students discuss the inconvenience of surveying an entire population and how they would select a small sample that would represent the population. Leave these as ideas only. Perhaps record the ideas and revisit them after the different types of sampling techniques have been studied.
- Discuss what students think the term *average* means.

Career Profile

Have students discuss where industrial engineering technologists might work. 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 A4 Presentation Checklist** to assess students' presentations.

Using their research, have students discuss:
- What an industrial engineering technologist 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 3 Planning Chart

Section Suggested Timing	Student Text Page(s)	Teacher's Resource Blackline Masters	Assessment	Tools
Chapter 1 Opener • 20–30 min	98–99		• BLM A-4 Presentation Checklist	
Prerequisite Skills • 30–60 min	100–101		• BLM 3-1 Prerequisite Skills • BLM 3-2 Prerequisite Skills Self-Assessment Checklist	
3.1 Sampling Techniques • 80–160 min	102–109	• BLM 3-3 Section 3.1 Sampling Techniques	• BLM 3-4 Section 3.1 Achievement Check Rubric	• graphing calculators *Optional* • software application with random number generator
3.2 Collect and Analyse Data • 80–160 min	110–117	• BLM 3-5 Section 3.2 Collect and Analyse Data	• BLM 3-6 Section 3.2 Achievement Check Rubric	
3.3 Display Data • 80–160 min	118–129	• BLM 3-7 Section 3.3 Display Data • BLM G-1 Grid Paper • BLM T-1 *Microsoft® Excel* • BLM T-4 *Fathom*™	• BLM 3-8 Section 3.3 Achievement Check Rubric	• calculators • protractors • compasses • grid paper • coloured pencils or markers • rulers • computers • Microsoft® *Excel* • graphing calculators • *Fathom*™
3.4 Measures of Central Tendency • 80–160 min	130–139	• BLM 3-9 Section 3.4 Measures of Central Tendency	• BLM 3-10 Section 3.4 Achievement Check Rubric	• calculators • graphing calculators • computers • Microsoft® *Excel* • Fathom™
3.5 Measures of Spread • 80–160 min	140–147	• BLM 3-11 Section 3.5 Measures of Spread	• BLM 3-12 Section 3.5 Achievement Check Rubric	• graphing calculators
3.6 Common Distributions • 80–160 min	148–155	• BLM 3-13 Section 3.6 Common Distributions • BLM G-1 Grid Paper	• BLM 3-14 Section 3.6 Achievement Check Rubric	• calculators • rulers • grid paper • graphing calculators
Chapter 3 Review • 80 min	156–157	• BLM 3-15 Chapter 3 Review • BLM G-1 Grid Paper		• grid paper
Chapter 3 Practice Test • 80 min	158–159		• BLM 3-16 Chapter 3 Practice Test • BLM 3-17 Chapter 3 Test	
Chapter 3 Problem Wrap-Up • 30–40 min	159	• BLM G-1 Grid Paper	• BLM 3-18 Chapter 3 Problem Wrap-Up Rubric	• grid paper
Chapters 1 to 3 Review • 80–160 min	160–161	• BLM G-1 Grid Paper	• BLM A-13 Self-Assessment Recording Sheet • BLM A-14 Self-Assessment Checklist	• grid paper
Task: Road to the Stanley Cup • 80–160 min	162–163	• BLM G-1 Grid Paper	• BLM 3-19 Task: Road to the Stanley Cup Rubric	• grid paper

Chapter 3 Blackline Masters Checklist

		Title	Purpose
Chapter 3 Opener			
	BLM A-4	Presentation Checklist	Assessment
Prerequisite Skills			
	BLM 3-1	Prerequisite Skills	Practice
	BLM 3-2	Prerequisite Skills Self-Assessment Checklist	Self-Assessment
3.1 Sampling Techniques			
	BLM 3-3	Section 3.1 Sampling Techniques	Practice
	BLM 3-4	Section 3.1 Achievement Check Rubric	Assessment
3.2 Collect and Analyse Data			
	BLM 3-5	Section 3.2 Collect and Analyse Data	Practice
	BLM 3-6	Section 3.2 Achievement Check Rubric	Assessment
3.3 Display Data			
	BLM 3-7	Section 3.3 Display Data	Practice
	BLM 3-8	Section 3.3 Achievement Check Rubric	Assessment
	BLM G-1	Grid Paper	Student Support
	BLM T-1	*Microsoft® Excel*	Student Support
	BLM T-4	*Fathom™*	Student Support
3.4 Measures of Central Tendency			
	BLM 3-9	Section 3.4 Measures of Central Tendency	Practice
	BLM 3-10	Section 3.4 Achievement Check Rubric	Assessment
3.5 Measures of Spread			
	BLM 3-11	Section 3.5 Measures of Spread	Practice
	BLM 3-12	Section 3.5 Achievement Check Rubric	Assessment
3.6 Common Distributions			
	BLM 3-13	Section 3.6 Common Distributions	Practice
	BLM 3-14	Section 3.6 Achievement Check Rubric	Assessment
	BLM G-1	Grid Paper	Student Support
Chapter 3 Review			
	BLM 3-15	Chapter 3 Review	Review
	BLM G-1	Grid Paper	Student Support
Chapter 3 Practice Test			
	BLM 3-16	Chapter 3 Practice Test	Diagnostic Assessment
	BLM 3-17	Chapter 3 Test	Summative Assessment
Chapter 3 Problem Wrap-Up Rubric			
	BLM 3-18	Chapter 3 Problem Wrap-Up Rubric	Summative Assessment
	BLM G-1	Grid Paper	Student Support
Chapters 1 to 3 Review			
	BLM A-13	Self-Assessment Recording Sheet	Self-Assessment
	BLM A-14	Self-Assessment Checklist	Self-Assessment
	BLM G-1	Grid Paper	Student Support
Chapter 3 Task: Road to the Stanley Cup			
	BLM 3-19	Chapter 3 Task: Road to the Stanley Cup Rubric	Summative Assessment
	BLM G-1	Grid Paper	Student Support

Student Text Pages
100–101

Suggested Timing
30–60 min

Related Resources
BLM 3-1 Prerequisite Skills
BLM 3-2 Prerequisite Skills
    Self-Assessment Checklist

Common Errors

- Some students may incorrectly order fractions and negative integers in **question 1**.

R_x Have students find a common denominator before ordering the fractions, and put fractions and integers on a number line before ordering.

- Some students may use their calculators incorrectly to find the values in **question 2**.

R_x Remind students the addition in the numerator must be found before the division can be done. This means either using brackets on the calculator or pressing $\boxed{=}$ before the division.

- Some students may not look at the scale on the graphs in **questions 4, 6, and 7**.

R_x Go over the importance of using the scale to determine the values in graphs.

Accommodations

Gifted and Enrichment—have gifted students act as peer tutors

Teaching Suggestions
- The Prerequisite Skills section is a basic review of skills students will need to successfully work with one variable statistics. Have students work in pairs. Allow enough time for students to complete all questions. If time permits, all questions should be taken up in class. Stress the importance of being able to perform these algebraic operations and graphing skills for success in the chapter.
- All BLMs referred to throughout this chapter can be found on the *Foundations for College Mathematics 11 Teacher's Resource* CD-ROM.

Assessment
- Assess students' readiness to proceed by informal observation as students are working on the questions. A formal test is 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 Get Ready in which they feel confident. Use **BLM 3-2 Prerequisite Skills Self-Assessment Checklist** as a self-assessment for students.

Extra Practice
- Use **BLM 3-1 Prerequisite Skills** for extra practice or remediation.

Chapter Problem
- The Chapter Problem is introduced on page 101. Have students discuss their understanding of the topic. Ask students if they have ever been asked by a market research company to respond to a survey, either on the phone or at a mall. You may wish to have students complete the Chapter Problem revisits that occur throughout the chapter. These questions are designed to help students move toward the Chapter 3 Problem Wrap-Up on page 159.
- 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.