Measurement Systems

1

General Outcome

Develop spatial sense and proportional reasoning.

Specific Outcomes

M1 Solve problems that involve linear measurement, using:
- SI and imperial units of measure
- estimation strategies
- measurement strategies.

M2 Apply proportional reasoning to problems that involve conversions between SI and imperial units of measure.

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

Section	Understanding Concepts, Skills, and Processes
1.1	✓ justify the choice of units used for determining a measurement
	✓ solve problems that involve linear measurement
	✓ explain the process used to estimate a linear measurement
1.2	✓ provide referents for linear measurements
	✓ describe a personal strategy used to make a linear measurement
	✓ solve problems that involve linear measurement using instruments
	✓ estimate a linear measurement using a referent
1.3	✓ compare SI and imperial units using referents
	✓ solve problems that involve conversion of linear measurements between SI and imperial systems
	✓ use mental mathematics to confirm the reasonableness of a solution to a conversion problem

Assessment	Supporting Learning
Assessment *as* Learning	
Use the Before column of **BLM 1–1 Chapter 1 Self-Assessment** to provide students with the big picture for this chapter and help them identify what they already know, understand, and can do. You may wish to have students keep this master in their math portfolio and refer back to it during the chapter.	• During work on the chapter, have students keep track of what they need to work on in the What I Need to Work On section of their Foldable. They can check off each item as they develop the skill or process at an appropriate level.
Assessment *for* Learning	
Method 1: Use the introduction on page 6 in *Mathematics 10* to activate student prior knowledge about the skills and processes that will be covered in this chapter. **Method 2:** Have students develop a journal to explain what they personally know about measuring in SI units. You might provide the following prompts: • Where have you encountered SI units for measuring distance? • What item(s) have you measured the length of in SI units? • What did you use to make your measurement? • Do you know the approximate length of any SI units?	• 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 **BLM 1–2 Chapter 1 Prerequisite Skills**. This material is on the Teacher CD of this Teacher's Resource and mounted on the www.mhrmath10.ca book site.
Assessment *as* Learning	
Chapter 1 Foldable As students work on each section in Chapter 1, have them keep track of any problems they are having in the What I Need to Work On section of their Foldable.	• 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. • Encourage students to write definitions for the Key Terms in their own words, including reminder tips that may be helpful for review throughout the chapter. • Encourage students to write examples of their own for each section. They could imitate questions from the student resource if necessary.
Assessment *for* Learning	
BLM 1–3 Chapter 1 Warm-Up This master includes a warm-up to be used at the beginning of each section. Each warm-up provides a review of prerequisite skills needed for the section.	• As students complete questions, 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 mathematics calculations.

Chapter 1 Planning Chart

Section/ Suggested Timing	Prerequisite Skills	Materials/Technology	Teacher's Resource Blackline Masters	Exercise Guide	Assessment		
					Assessment *as* Learning	Assessment *for* Learning	Assessment *of* Learning
Chapter Opener • 50–60 min (TR page 7)			BLM 1–1 Chapter 1 Self-Assessment BLM 1–2 Chapter 1 Prerequisite Skills BLM 1–4 Chapter 1 Unit 1 Project BLM U1–2 Unit 1 Project Checklist		TR page 6 Chapter 1 Foldable,TR page 6	TR page 6	
1.1 SI Measurement • 100–120 min (TR page 9)	Students should be familiar with • SI units of length • scale • plotting ordered pairs • ratios • multiplying and dividing powers of ten • the relationships between diameter, radius, and circumference • the relationships between velocity, distance, and time	• three items that are non-standard measuring units (e.g., coin, paperclip) • grid paper • SI measuring instruments e.g., ruler, tape measure, caliper, metre stick • CD case • watch • outdoor measuring device	BLM 1–3 Chapter 1 Warm-Up BLM 1–4 Chapter 1 Unit 1 Project BLM 1–5 Section 1.1 Extra Practice	**Essential:** #1–3, 5, 7, 9, 10, 12, 14, 18–19 **Typical:** #1–7, 9–14, 18–19, 21 **Extension/Enrichment:** #7, 8, 12–14, 16, 17–21	TR pages 11, 15 Chapter 1 Foldable, TR page 6	TR pages 13, 15	
1.2 Imperial Measurement • 100–120 min (TR page 16)	Students should be familiar with • converting between units • scale • fraction operations • the relationships between diameter, radius, and circumference • the Pythagorean relationship • estimating using a referent • area of a rectangle, circle, and triangle • rounding values • surface area • properties of similar triangles	• imperial measuring instrument, e.g., imperial ruler, caliper, measuring tape • compact disc (CD) • cassette tape case • MP3 player • envelopes of different sizes • scissors	BLM 1–3 Chapter 1 Warm-Up BLM 1–4 Chapter 1 Unit 1 Project BLM 1–6 Section 1.2 Extra Practice	**Essential:** #1, 4–8, 12, 14, 17, 18 **Typical:** #1–8, 10, 12, 13, 15, 17, 18 **Extension/Enrichment:** 9, 12–19	TR pages 18, 22 Chapter 1 Foldable, TR page 6	TR pages 20, 22	
1.3 Converting Between SI and Imperial Systems • 180–240 min (TR page 23)	Students should be familiar with • estimating using a referent • area of a circle • proportion • the relationships between velocity, distance, and time • scale factors	• compact disc (CD) • SI measuring instrument • imperial measuring instrument	BLM 1–3 Chapter 1 Warm-Up BLM 1–4 Chapter 1 Unit 1 Project BLM 1–7 Section 1.3 Extra Practice	**Essential:** #1–4, 6, 7, 9, 10, 14, 17, 18 **Typical:** #1–8, 11, 12, 14 **Extension/Enrichment:** #5, 14–18	TR pages 25, 29 Chapter 1 Foldable, TR page 6	TR pages 27, 29	
Chapter 1 Review • 100–120 min (TR page 30)		• an object with a curved surface, such as a can • SI ruler or measuring tape • imperial ruler or measuring tape	BLM 1–5 Section 1.1 Extra Practice BLM 1–6 Section 1.2 Extra Practice BLM 1–7 Section 1.3 Extra Practice	Have students do at least one question related to any concept, skill, or process that has been giving them trouble.	Chapter 1 Foldable, TR page 6	TR page 31	
Chapter 1 Practice Test • 50–60 min (TR page 32)		• SI ruler or measuring tape • imperial ruler or measuring tape	BLM 1–8 Chapter 1 Test BLM 1–9 Chapter 1 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, 6, 8, 10	TR page 33		TR page 33 BLM 1–8 Chapter 1 Test