Surface Area and Volume

2

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.

M3 Solve problems, using SI and imperial units, that involve the surface area and volume of 3-D objects, including:

- right cones
- right cylinders
- right prisms
- right pyramids
- spheres.

General Outcome

Develop algebraic reasoning and number sense.

Specific Outcome

AN3 Demonstrate an understanding of powers with integral and rational exponents.

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

Section	Understanding Concepts, Skills, and Processes
2.1	✓ solve problems that involve area and volume units within SI and imperial systems
	✓ use mental math to judge the reasonableness of a solution to a problem
2.2	✓ solve problems involving the surface area of three-dimensional objects
	✓ find an unknown dimension of a three-dimensional object given its surface area
2.3	✓ solve problems involving the volume of three-dimensional objects
	✓ find an unknown dimension of a three-dimensional object given its volume

Assessment	Supporting Learning
Assessment *as* Learning	
Use the Before column of **BLM 2–1 Chapter 2 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 54 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 area and volume. You might provide the following prompts: • What units of area and volume do you use most often, in SI and/or imperial systems? • In what instances in your life did you need to know volume or surface area? • Where have you encountered composite objects? Why might the surface area and/or volume of a composite object be important, and to whom?	• 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 2–2 Chapter 2 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 2 Foldable As students work on each section in Chapter 2, 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.
Assessment *for* Learning	
BLM 2–3 Chapter 2 Warm-Up This reproducible 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 math calculations.

Chapter 2 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 • 30–40 min (TR page 39)	Students should be familiar with • surface area of right rectangular prisms and right cylinders • volume of right rectangular prisms and right cylinders • SI and imperial units of length, area, and volume • square roots		BLM 2–1 Chapter 2 Self-Assessment BLM 2–2 Chapter 2 Prerequisite Skills BLM 2–4 Chapter 2 Foldable BLM 2–5 Chapter 2 Unit 1 Project BLM U1–2 Unit 1 Project Checklist		TR page 38 Chapter 2 Foldable, TR page 40	TR page 38	
2.1 Units of Area and Volume • 100–120 min (TR page 41)	Students should be familiar with • SI units of length, area, and volume • imperial units of length, area, and volume • area of rectangles and circles • ratios • solving proportions • multiplying fractions	• rulers or tape measures in imperial units	BLM 2–3 Chapter 2 Warm-Up BLM 2–5 Chapter 2 Unit 1 Project BLM 2–6 Section 2.1 Extra Practice	**Essential:** #1a), b), 2a), b), 4a), 5, 6, 8, 14–16 **Typical:** #1a), b), 2a), b), 3, 4a), 5–8, 11, 12, 14–16 **Extension/Enrichment:** #6, 8, 11–16	TR pages 44, 50 Chapter 2 Foldable, TR page 38	TR pages 44, 47, 50	
2.2 Surface Area • 100–120 min (TR page 51)	Students should be familiar with • square roots • area of circles, triangles, and rectangles • relationship between radius, diameter, and circumference • Pythagorean relationship • surface area of right rectangular prisms and right cylinders • nets for 3-D objects	• right cones • spheres • right pyramids • right cylinders	BLM 2–3 Chapter 2 Warm-Up BLM 2–5 Chapter 2 Unit 1 Project BLM 2–7 Investigate Surface Area of Three-Dimensional Objects BLM 2–8 Section 2.2 Extra Practice TM 2–1 How to Do Page 79 #18 Using TI-Nspire™ TM 2–2 How to Do Page 79 #18 Using Microsoft® Excel	**Essential:** #1–4, 6, 8, 9, 19, 20 **Typical:** #1–3, 5, 6, 8–10, 12–14, 18–20 **Extension/Enrichment:** #3, 8, 10–12, 14–20	TR pages 53, 62 Chapter 2 Foldable, TR page 38	TR pages 58, 62	
2.3 Volume • 100–120 min (TR page 63)	Students should be familiar with • volume of right rectangular prisms and right cylinders	• conical cup • paper • scissors • tape or glue • sand, rice, or popcorn	BLM 2–3 Chapter 2 Warm-Up BLM 2–5 Chapter 2 Unit 1 Project BLM 2–9 Section 2.3 Extra Practice TM 2–3 How to Do Page 91 #19 Using TI-Nspire™ TM 2–4 How to Do Page 91 #19 Using Microsoft® Excel	**Essential:** #1, 2, 4–9, 15, 16, 21 **Typical:** #1–5, 7–11, 13–16, 20, 21 **Extension/Enrichment:** #8, 11–21	TR pages 64, 70 Chapter 2 Foldable, TR page 38	TR pages 68, 70	
Chapter 2 Review • 60–90 min (TR page 71)			BLM 2–6 Section 2.1 Extra Practice BLM 2–8 Section 2.2 Extra Practice BLM 2–9 Section 2.3 Extra Practice	Have students do at least one question related to each concept, skill, or process that has been giving them trouble.	Chapter 2 Foldable, TR page 38	TR page 71	
Chapter 2 Practice Test • 40–50 min (TR page 72)			BLM 2–10 Chapter 2 Test BLM 2–11 Chapter 2 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:** #1–7, 9–12	TR page 73		TR page 73 BLM 2–10 Chapter 2 Test