2 Rational Numbers

General Outcomes

- Develop number sense.

Specific Outcomes

N3 Demonstrate an understanding of rational numbers by:
- comparing and ordering rational numbers
- solving problems that involve arithmetic operations on rational numbers.

N5 Determine the square root of positive rational numbers that are perfect squares.

N6 Determine an approximate square root of positive rational numbers that are non-perfect squares.

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

Section	Understanding Concepts, Skills, and Processes
2.1	✓ compare and order rational numbers
	✓ identify a rational number between two given rational numbers
2.2	✓ perform operations on rational numbers in decimal form
	✓ solve problems involving rational numbers in decimal form
2.3	✓ perform operations on rational numbers in fraction form
	✓ solve problems involving rational numbers in fraction form
2.4	✓ determine the square root of a perfect square rational number
	✓ determine an approximate square root of a non-perfect square rational number

Assessment	Supporting Learning
Assessment *for* Learning	
Method 1: Use the Math Link introduction on page 45 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 rational numbers, including how to write them, how to compare and order them, how to perform operations on rational numbers in problem solving, and how to determine the square roots of positive rational numbers.	• **BLM 2–1 Chapter 2 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 on **BLM 2–2 Chapter 2 Get Ready** in the *MathLinks 9 Practice and Homework Book*, and at the www.mathlinks9.ca book site.
Assessment *as* Learning	
Literacy Link (page 43) At the beginning of the chapter, work with students to model the use of a Frayer model for the term *rational number*.	• Encourage students to use the glossary starting on page xx to help them with unfamiliar terminology. • Students who computerize their model may wish to access the *MathLinks 9* online glossary by going to www.mathlinks9.ca and following the links. • At the end of section 2.3, have students revisit their Frayer model for *rational number* in order to make additions and improvements.
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.
Assessment *for* Learning	
BLM 2–3 Chapter 2 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 2–4 Chapter 2 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 2 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 55)	Students should be familiar with • squares and square roots of whole numbers • Pythagorean relationship	• sheet of 11 × 17 paper • ruler • three sheets of 8.5 × 11 paper • scissors • sheet of grid paper • stapler	Master 16 Frayer Model BLM 2–1 Chapter 2 Math Link Introduction BLM 2–2 Chapter 2 Get Ready BLM 2–4 Chapter 2 Problems of the Week		Online Learning Centre	TR page 54 Chapter 2 Foldable, TR page 54	TR page 54	
2.1 Comparing and Ordering Rational Numbers • 80–100 minutes (TR page 59)	Students should be familiar with • opposite integers • division of integers • equivalent positive fractions • converting positive fractions to decimals • comparing and ordering positive fractions and decimals	• ruler	Master 2 Communication Peer Evaluation Master 4 Number Lines BLM 2–3 Chapter 2 Warm-Up BLM 2–5 Section 2.1 Extra Practice BLM 2–6 Section 2.1 Math Link	**Essential:** #1–4, 6, 8, 10, 12, 14a), b), 16a), b), 18, Math Link **Typical**: #1–4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 23, Math Link **Extension/Enrichment**: #1–3, 20, 22, 25–30	*MathLinks 9 Practice and Homework Book* *MathLinks 9 Solutions Manual*	Master 2 Communication Peer Evaluation TR pages 62, 70 Math Learning Log, TR page 70 Chapter 2 Foldable, TR page 70	TR pages 66, 70	
2.2 Problem Solving With Rational Numbers in Decimal Form • 80–100 minutes (TR page 71)	Students should be familiar with • operations with positive decimals • sign rules for multiplying and dividing integers • order of operations • problem solving with positive decimals	• ruler • integer chips (optional) • hundred grids (optional) • base ten blocks (optional)	Master 2 Communication Peer Evaluation Master 4 Number Lines BLM 2–3 Chapter 2 Warm-Up BLM 2–7 Section 2.2 Extra Practice BLM 2–8 Section 2.2 Math Link	**Essential**: #1–4, 6, 8, 10, 12, Math Link **Typical**: #1–4, 6, 8, 10, 12, 13, 16, 18, 22, Math Link **Extension/Enrichment**: #1–3, 16, 20, 22, 24–29	*MathLinks 9 Practice and Homework Book* *MathLinks 9 Solutions Manual*	Master 2 Communication Peer Evaluation TR pages 73, 82 Math Learning Log, TR page 82 Chapter 2 Foldable, TR page 82	TR pages 78, 82	
2.3 Problem Solving With Rational Numbers in Fraction Form • 80–100 minutes (TR page 83)	Students should be familiar with • operations with positive fractions • sign rules for multiplying and dividing integers • order of operations • problem solving with positive fractions	• ruler	Master 2 Communication Peer Evaluation Master 4 Number Lines BLM 2–3 Chapter 2 Warm-Up BLM 2–9 Section 2.3 Extra Practice BLM 2–10 Section 2.3 Math Link	**Essential**: #1–3, 5, 7, 9, 12, 13, Math Link **Typical**: #1–5, 7, 9, 12, 13 or 14, 15, one of 16–18, 20, Math Link, History Link **Extension/Enrichment**: #1–4, 17, 19 or 20, 21–27, History Link	*MathLinks 9 Practice and Homework Book* *MathLinks 9 Solutions Manual*	Master 2 Communication Peer Evaluation TR pages 85, 96 Math Learning Log, TR page 96 Chapter 2 Foldable, TR page 96	TR pages 91, 96	
2.4 Determining Square Roots of Rational Numbers • 80–100 minutes (TR page 97)	Students should be familiar with • squares and square roots of whole numbers • Pythagorean relationship	• ruler • grid paper • calculator	Master 2 Communication Peer Evaluation Master 4 Number Lines Master 8 Centimetre Grid Paper Master 9 0.5 Centimetre Grid Paper BLM 2–3 Chapter 2 Warm-Up BLM 2–11 Section 2.4 Extra Practice BLM 2–12 Section 2.4 Math Link	**Essential:** #1–7, 9, 11, 13, 15, 16, Math Link **Typical**: #1–7, 9, 11, 13, 15, 16, two of 17–21, 26, 29, Math Link **Extension/Enrichment**: #1–4, 17, 20, 23, 24, 29, 31–36	*MathLinks 9 Practice and Homework Book* *MathLinks 9 Solutions Manual*	Master 2 Communication Peer Evaluation TR pages 100, 109 Math Learning Log, TR page 109 Chapter 2 Foldable, TR page 109	TR pages 104, 109	
Chapter 2 Review • 40–50 minutes (TR page 110)		• ruler • calculator • grid paper	Master 4 Number Lines Master 8 Centimetre Grid Paper Master 9 0.5 Centimetre Grid Paper BLM 2–5 Section 2.1 Extra Practice BLM 2–7 Section 2.2 Extra Practice BLM 2–9 Section 2.3 Extra Practice BLM 2–11 Section 2.4 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 2 Foldable, TR page 111	TR pages 111	
Chapter 2 Practice Test • 40–50 minutes (TR page 112)		• ruler • grid paper • calculator	Master 4 Number Lines Master 8 Centimetre Grid Paper Master 9 0.5 Centimetre Grid Paper BLM 2–13 Chapter 2 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**: #3–9, 11, 13–17	*MathLinks 9 CAB*	TR page 113		TR page 113 BLM 2–13 Chapter 2 Test
Chapter 2 Math Link: Wrap It Up! • 40–50 minutes (TR page 114)		• dice, coins, playing cards, and other materials for creating a game	Master 1 Project Rubric BLM 2–1 Chapter 2 Math Link Introduction BLM 2–6 Section 2.1 Math Link BLM 2–8 Section 2.2 Math Link BLM 2–10 Section 2.3 Math Link BLM 2–12 Section 2.4 Math Link BLM 2–14 Chapter 2 Math Link: Wrap It Up!		Online Learning Centre			TR page 114 Master 1 Project Rubric
Chapter 2 Challenge: Reaction Time • 40–50 minutes (TR page 116)		• 30-cm ruler • calculator	Master 1 Project Rubric		Online Learning Centre		TR pages 118	TR page 118 Master 1 Project Rubric
Chapter 2 Challenge: Going Up? • 40–50 minutes (TR page 120)		• grid paper	Master 1 Project Rubric Master 9 0.5 Centimetre Grid Paper BLM 2–15 Chapter 2 BLM Answers		Online Learning Centre		TR pages 121	TR page 121 Master 1 Project Rubric