10

Circle Geometry

General Outcomes

- Use direct or indirect measurement to solve problems.

Specific Outcomes

SS1 Solve problems and justify the solution strategy using circle properties including:

- the perpendicular from the centre of a circle to a chord bisects the chord
- the measure of the central angle is equal to twice the measure of the inscribed angle subtended by the same arc
- the inscribed angles subtended by the same arc are congruent
- a tangent to a circle is perpendicular to the radius at the point of tangency.

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

Section	Understanding Concepts, Skills, and Processes
10.1	✓ describe the relationship between inscribed angles in a circle
	✓ relate the inscribed angle and central angle subtended by the same arc
10.2	✓ describe the relationship between chords and radii of circles
10.3	✓ relate tangent lines to the radius of the circle

Assessment	Supporting Learning
Assessment *for* Learning	
Method 1: Use the Math Link introduction on page 377 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 circles including parts of a circle and central angles.	• **BLM 10–1 Chapter 10 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 **BLM 10–2 Chapter 10 Get Ready**, in the *MathLinks 9 Practice and Homework Book*, and at the www.mathlinks9.ca book site.
Assessment *as* Learning	
Literacy Link (page 375) As students work on each section in Chapter 10, have them enter into their web Key Words or phrases that are connected with the centre term *circle geometry*. Webs are graphic organizers that help students to remember essential characteristics of a concept and to make connections that show how the information is related.	• As students complete a section, have them review the Key Words and any other phrases and terminology that link to circle geometry. Have them use a branch from the centre for each new word or phrase.
Chapter 10 Foldable As students work on each section in Chapter 10, 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 10–3 Chapter 10 Warm-Up This BLM includes three 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 10–4 Chapter 10 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 10 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 513)	Students should be familiar with • types of triangles • central angles • names of regular polygons up to six sides	• sheet of 11 × 17 paper • six sheets of 8.5 × 11 paper • compass • stapler • ruler • scissors • protractor • tracing paper	BLM 10–1 Chapter 10 Math Link Introduction BLM 10–2 Chapter 10 Get Ready BLM 10–4 Chapter 10 Problems of the Week		Online Learning Centre	TR page 512 Chapter 10 Foldable, TR page 512	TR page 512	
10.1 Exploring Angles in a Circle • 50–60 minutes (TR page 517)	Students should be familiar with • types of triangles • central angles • sum of angles in a triangle	• compass or circular geoboard with elastic bands • protractor • ruler • compass • coloured pencils or markers • other materials for designing a piece of art	Master 2 Communication Peer Evaluation Master 22 Circular Geoboard BLM 10–3 Chapter 10 Warm-Up BLM 10–5 Section 10.1 Extra Practice BLM 10–6 Section 10.1 Math Link	**Essential:** #1–3, 5, 6, 8, 10, 11, 13, 15, Math Link **Typical:** #1–3, 5–8, 11, 13, 15, 16, Math Link **Extension/Enrichment:** #2, 7, 9, 13, 15, 18–22, Math Link	*MathLinks 9 Practice and Homework Book* *MathLinks 9 Solutions Manual*	Master 2 Communication Peer Evaluation TR pages 518, 525 Math Learning Log, TR page 525 Chapter 10 Foldable, TR page 525	TR pages 522, 525	
10.2 Exploring Chord Properties • 50–60 minutes (TR page 526)	Students should be familiar with • types of triangles • the Pythagorean relationship • perpendicular bisectors	• compass • tracing paper • ruler • coloured pencils or markers • other materials for creating a mandala	Master 2 Communication Peer Evaluation BLM 10–3 Chapter 10 Warm-Up BLM 10–7 Section 10.2 Extra Practice BLM 10–8 Section 10.2 Math Link	**Essential:** #1–4, 6, 9, 11, 12, Math Link **Typical:** #1–3, 4 or 5, 6, 7 or 8, 11, 12, 14, 16, Math Link **Extension/Enrichment:** #3, 9, 16–21, Math Link	*MathLinks 9 Practice and Homework Book* *MathLinks 9 Solutions Manual*	Master 2 Communication Peer Evaluation TR pages 527, 533 Math Learning Log, TR page 533 Chapter 10 Foldable, TR page 533	TR pages 529, 533	
10.3 Tangents to a Circle • 50–60 minutes (TR page 534)	Students should be familiar with • types of triangles • the Pythagorean relationship • perpendicular bisectors	• Turning Circle diagram • protractor • ruler • grid paper • compass • coloured pencils or markers • other materials for designing a piece of art or logo	Master 2 Communication Peer Evaluation Master 8 Centimetre Grid Paper Master 9 0.5 Centimetre Grid Paper BLM 10–3 Chapter 10 Warm-Up BLM 10–9 Turning Circle Diagram BLM 10–10 Section 10.3 Extra Practice BLM 10–11 Section 10.3 Math Link	**Essential:** #1–3, 6–8, 11, Math Link **Typical:** #1–3, 6–8, 11, 13, 15, Math Link **Extension/Enrichment:** #2, 8, 12, 14, 16–22, Math Link	*MathLinks 9 Practice and Homework Book* *MathLinks 9 Solutions Manual*	Master 2 Communication Peer Evaluation TR pages 535, 541 Math Learning Log, TR page 541 Chapter 10 Foldable, TR page 541	TR pages 538, 541	
Chapter 10 Review • 40–50 minutes (TR page 542)		• compass • protractor • ruler • tracing paper	BLM 10–5 Section 10.1 Extra Practice BLM 10–7 Section 10.2 Extra Practice BLM 10–10 Section 10.3 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 10 Foldable, TR page 543	TR page 543	
Chapter 10 Practice Test • 30–40 minutes (TR page 544)		• compass • protractor • ruler	BLM 10–12 Circles Template BLM 10–13 Chapter 10 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:** #1–6	*MathLinks 9 CAB*	TR page 545	TR page 545	BLM 9–12 Chapter 10 Test
Chapter 10 Math Link: Wrap It Up! • 40–50 minutes (TR page 546)		• compass • protractor • ruler • grid paper • coloured pencils or markers	Master 1 Project Rubric Master 8 Centimetre Grid Paper Master 9 0.5 Centimetre Grid Paper BLM 10–1 Chapter 10 Math Link Introduction BLM 10–6 Section 10.1 Math Link BLM 10–8 Section 10.2 Math Link BLM 10–11 Section 10.3 Math Link BLM 10–14 Chapter 10 Math Link: Wrap It Up!		Online Learning Centre			TR page 547 Master 1 Project Rubric
Chapter 10 Challenge • 50–60 minutes (TR page 549)		• compass • ruler • protractor	Master 1 Project Rubric BLM 10–15 Making a Dream Catcher (optional) BLM 10–16 Chapter 10 BLM Answers		Online Learning Centre		TR page 551	TR page 551 Master 1 Project Rubric