UNIT 4

Systems of Equations

General Outcome

Develop algebraic and graphical reasoning through the study of relations.

Specific Outcomes

RF1 Interpret and explain the relationships among data, graphs and situations.

RF3 Demonstrate an understanding of slope with respect to:
- rise and run
- line segments and lines
- rate of change
- parallel lines
- perpendicular lines.

RF7 Determine the equation of a linear relation, given:
- a graph
- a point and the slope
- two points
- a point and the equation of a parallel or perpendicular line

to solve problems.

RF9 Solve problems that involve systems of linear equations in two variables, graphically and algebraically.

***Mathematics 10*, pages 410–413**

Suggested Timing

30–40 min

Blackline Masters

BLM U4–1 Unit 4 Project
BLM U4–2 Unit 4 Project Checklist

What's Ahead

In Unit 4, students extend their knowledge of linear relations to investigate systems of linear equations. They learn how to identify the solution to a system of linear equations shown on a graph and how to use algebraic manipulation to solve a linear system. Students use both the substitution and elimination methods. Throughout the unit, students model real-life situations using systems of linear equations. Students interpret the information shown on the graphs and in the equations and discuss how the information relates to the particular situation. In this unit, students analyse various types of linear systems where the system of equations may have no solution, one solution, or an infinite number of solutions. Students learn several strategies for predicting the number of solutions.

Planning Notes

Introduce Unit 4 by pointing out the systems of equations organizer on page 410 of the student resource. This organizer shows the topics in this unit—solving systems of linear equations graphically and algebraically. It encourages students to record different ways to solve linear equations. The organizer is repeated at the beginning of each chapter and is shaded to show which topics are covered in that particular chapter.

In the opening paragraphs, you may wish to discuss specific decisions that business owners need to make that may be represented using a system of linear equations. Some examples are employee salaries, selling prices of products or services, or use of business supplies.

The Looking Ahead box at the bottom of page 411 identifies the types of problems students will solve throughout the unit. You may wish to reactivate students' knowledge of intersection points.

Unit 4 Project

The Unit 4 project focuses on the real-world application of water conservation and how linear systems can be applied to analyse information related to water use, wildlife that depends on water sources, and water conservation through retrofitting.

Introduce the Unit 4 project by reading and discussing the introductory notes on page 412 of the student resource as a class. Consider distributing **BLM U4–1 Unit 4 Project** to inform students about how the project develops throughout the unit. This master provides an overview of the project.

The Unit 4 project questions are identified throughout Chapters 8 and 9 with a project logo. These questions are not mandatory but are recommended because they provide some of the background needed to complete the Unit 4 project. The questions are also available on masters, one for each chapter. You may decide to use these masters to create a student booklet and have students record their finalized answers in the booklet. They can do this after they have completed their in-class work, during assigned project work time, or in conjunction with chapter assignments. Alternatively, you may wish to provide students with **BLM U4–2 Unit 4 Project Checklist**, which lists *all* of the related questions for each chapter. Students can use the checklist to monitor their progress and prepare their presentation. Have students collect all their work for the Unit 4 project in a portfolio.

Career Connection

Use the collage of photographs to direct a discussion about decisions made in daily life and in the careers of people who may need to make similar decisions. For example, in a fast-food sandwich shop, the manager may need to determine how many scoops of tuna can go on one sandwich, or a construction crew may need to monitor the fuel efficiency of its fleet of vans. Students will likely be able to name many careers that involve mathematics. Ask them what decisions they think need to be made in these careers and discuss whether the relationships involved are linear.

Web Link

For information about careers related to mathematics, go to www.mhrmath10.ca and follow the links.