# Table of Contents

## Introduction
- Series Welcome ........................................ 5
- Fostering Content-Area Literacy .................... 6
- The Importance of Strong Mathematical Content . . . 11
- Differentiating for All Learners .................... 13
- Using Technology to Improve Literacy ............... 14
- How to Use This Product ............................. 15
- About the Books ..................................... 25
- Introduction to Standards Correlations .............. 33
- Correlations to Standards ........................... 34

## Unit 1: Number and Operations

**Travel Adventures: Komodo National Park: Operations with Whole Numbers**
- Lesson Plan ............................................. 38
- Student Activity Sheets .......................... 43

**Art and Culture: Origami: Dividing Fractions**
- Lesson Plan ............................................. 49
- Student Activity Sheets .......................... 54

**The Hidden World of Urban Farming: Operations with Decimals**
- Lesson Plan ............................................. 60
- Student Activity Sheets .......................... 65

## Unit 2: Ratio and Proportion

**STEM: Living with Type 1 Diabetes: Understanding Ratios**
- Lesson Plan ............................................. 71
- Student Activity Sheets .......................... 76

**Money Matters: School Fundraisers: Problem Solving with Ratios**
- Lesson Plan ............................................. 82
- Student Activity Sheets .......................... 87

**Fun and Games: The Wild World of Birding: Using Ratios**
- Lesson Plan ............................................. 93
- Student Activity Sheets .......................... 98

## Unit 3: Rational Numbers

**Spectacular Sports: Motocross: Rational Numbers**
- Lesson Plan ............................................. 104
- Student Activity Sheets .......................... 109

**Fun and Games: Disc Golf: Rational Numbers**
- Lesson Plan ............................................. 115
- Student Activity Sheets .......................... 120

**On the Job: Underwater Investigators: Plotting Rational Numbers**
- Lesson Plan ............................................. 126
- Student Activity Sheets .......................... 131

## Unit 4: Expressions and Equations

**The Hidden World of Hackers: Expressions**
- Lesson Plan ............................................. 137
- Student Activity Sheets .......................... 142

**On the Job: First Responders: Expressions, Equations, and Inequalities**
- Lesson Plan ............................................. 148
- Student Activity Sheets .......................... 153

**STEM: The Remarkable Ringed Planets: Problem Solving with Variables**
- Lesson Plan ............................................. 159
- Student Activity Sheets .......................... 164
## Introduction

**Engineering Marvels: Muscle Cars: Graphs, Tables, and Equations**
- Lesson Plan: 170
- Student Activity Sheets: 175

**Engineering Marvels: Buildings Around the World: Nets and Surface Area**
- Lesson Plan: 214
- Student Activity Sheets: 219

**Fun and Games: Escape Rooms: Polygons**
- Lesson Plan: 192
- Student Activity Sheets: 197

**The History of Listening to Music: Displaying Data**
- Lesson Plan: 236
- Student Activity Sheets: 241

**Amazing Animals: Terrarium Pets: Volume**
- Lesson Plan: 203
- Student Activity Sheets: 208

**Appendix**
- Culminating Activity: Carnival Planning: 258
- Answer Key: 264
- References Cited: 283
- Digital and Audio Resources: 285
- Commonly Used Materials: 292
How to Use This Product

Kit Components

6 copies of 20 books

Teacher's Guide

Digital and Audio Resources
How to Use This Product

Teacher’s Guide

Each five-day lesson sequence is organized in a consistent format for ease of use.

Overview

- The overview page includes learning objectives, a materials list, and a suggested timeline for each lesson.

Day 1

- Students are introduced to the book and the math concept or skill.
- Students build, expand, and apply understanding of the math skill with concrete, representational, and abstract activities.

Days 2, 3, and 4

- Students complete reading and writing activities, as well as the “Let’s Explore Math” sidebars.

Day 5

- Students take what they’ve learned and apply it in context in the Problem-Solving activity.
- Students take the reading and mathematics assessments.
How to Use This Product (cont.)

Student Activity Sheets and Assessments

clear directions and activities that promote higher-order thinking skills

reading and math quizzes with text-dependent questions
How to Use This Product (cont.)

Pacing and Instructional Setting Options

The following pacing and instructional setting options show suggestions for how to use this product. *Mathematics Readers* is flexibly designed and can be used in tandem with a core curriculum within a mathematics block, literacy block, or both. Teachers should customize pacing according to student need (instruction may need to be extended over more days) and the teacher’s preferred instructional frameworks, such as Guided Math or Guided Reading. This suggestion reflects one lesson per book for each of the 20 books. Each lesson spans 5 instructional days and requires 30–45 minutes, for a total of approximately 65 hours over the course of 100 days.

<table>
<thead>
<tr>
<th>Day</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Activity</strong></td>
<td>Before Reading and Mathematics Investigation</td>
<td>During Reading</td>
<td>During Reading (cont.)</td>
<td>After Reading</td>
<td>Problem Solving and Assessments</td>
</tr>
<tr>
<td><strong>Instructional Time</strong></td>
<td>45 minutes</td>
<td>30 minutes</td>
<td>30 minutes</td>
<td>45 minutes</td>
<td>45 minutes</td>
</tr>
</tbody>
</table>

*Mathematics Readers* within the Guided Math and Balanced Literacy Frameworks

**Classroom Environment of Numeracy and Literacy**—The books in *Mathematics Readers* contribute to an environment of numeracy and literacy by immersing students in real-world connections to mathematics and by giving students the opportunity to learn outside of content-area silos.

**Whole-Class Instruction**—The Before Reading activity in each *Mathematics Readers* lesson is a great opportunity to activate students’ prior knowledge and capture their interest in a topic.

**Small-Group Instruction**—The lessons in *Mathematics Readers* offer flexibility that allows students to complete Before Reading, Mathematics Investigation, During Reading, and After Reading activities in small groups or any other preferred instructional setting, depending on student need. These activities have differentiation suggestions and targeted objectives and give students time to work with manipulatives and models.

**Workshop**—The During Reading, After Reading, and Problem-Solving activities in each *Mathematics Readers* lesson can be completed during Math or Reading Workshop, in centers or at workstations, depending on students’ previous learning experiences and their need for teacher support.

**Conferencing**—The Problem-Solving activity and assessments in each *Mathematics Readers* lesson offer multiple opportunities for teachers and students to confer about concepts and ideas.

**Assessment**—*Mathematics Readers* offers multiple formative and summative assessment opportunities. Teachers can gain insight into student learning through reading and mathematics quizzes, small-group observations, analysis of written assignments, and a culminating activity.
Fun and Games: Escape Rooms: Polygons

Materials
- *Fun and Games: Escape Rooms: Polygons* books
- copies of student activity sheets (pages 197–202)
- centimeter cubes, 6 per student
- coordinate planes on \( \frac{1}{2} \) inch graph paper, 1 per student

Learning Objectives
- Analyze, make inferences, and draw conclusions about text and provide textual evidence to support ideas.
- Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.
- Draw polygons in the coordinate plane, and solve problems involving geometry.

Mathematical Practices and Processes
- Look for and make use of structure.
- Attend to precision.
- Model with mathematics.

Lesson Timeline

<table>
<thead>
<tr>
<th>Activity</th>
<th>Before Reading and Mathematics Investigation (pages 193–194)</th>
<th>During Reading (page 195)</th>
<th>During Reading (cont.) (page 195)</th>
<th>After Reading (page 195)</th>
<th>Problem Solving and Assessments (page 196)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructional Time</td>
<td>45 minutes</td>
<td>30 minutes</td>
<td>30 minutes</td>
<td>45 minutes</td>
<td>45 minutes</td>
</tr>
<tr>
<td>Students will...</td>
<td>Identify examples of explicit information and inferences. Use graph paper, centimeter cubes, and coordinate planes to solve geometry problems.</td>
<td>Find explicit information in the text, make inferences with textual evidence, and respond to the “Let’s Explore Math” sidebars.</td>
<td>Write informative newspaper articles about the characters’ escape room experience.</td>
<td>Review the vocabulary, complete the problem-solving activity, and take the assessments.</td>
<td></td>
</tr>
</tbody>
</table>
Before Reading

1. Write explicit information and inference on the board, and ask students to share what they know about these two words. Note their responses on the board. Make sure students understand explicit information is stated directly in a text, while inferences are made based on “clues” given in the text. Discuss with students why both are important in a text.

2. Distribute the Escape Rooms: Polygons books to students. Have them quickly share any prior knowledge or experiences with escape rooms. Give students a moment to preview the book.

3. Read page 4 together. Help students begin to make inferences by asking questions, such as: How do people feel when they are in an escape room? Why might polygons be important to escape? Encourage students to defend their answers with the text.

Mathematics Investigation

Build Understanding

1. Read the mathematics vocabulary words aloud. Guide students to create student-friendly definitions.

2. Have students examine the images of the chessboard and coordinates on pages 12–13 of the Escape Rooms: Polygons book. Ask students to imagine that they are trying to escape using clues in the room.

   • What information on these pages might be helpful when trying to escape?
   • What do you think the numbers on the door represent?
   • Are there negative numbers on a coordinate plane?

3. Have students imagine they need to plot points on a coordinate grid so they can exit an escape room. Distribute coordinate planes on 1/2-inch graph paper and centimeter cubes. Display the coordinates for students. Have students place a centimeter cube on each point.

   (-3, 1), (1, 4), (0, 1), (4, 0), (-1, -2), (2, -3)

   • Have above-level learners find vertices of a polygon on the coordinate plane. Have students name the polygon and all the coordinates that make up the vertices.
   • Have below-level learners begin by only plotting points in quadrant I with guidance, as needed.
   • Confirm that English language learners understand quadrants and the movement of x and y when plotting points.

4. Ask students guiding questions to build understanding:

   • Where do you start when plotting points?
   • Which direction do you move first? Second?
   • How many quadrants are there?
   • Is every point in a quadrant? If not, where are they?
Escape Rooms: Polygons (cont.)

Mathematics Investigation (cont.)

Expand Understanding

1. Tell students that plotting points on a coordinate plane is helpful when solving problems. Polygons, vertices, and side lengths can also be used to solve problems involving geometry on a coordinate plane.

2. Explain to students that a team of players needs help solving puzzles to exit the escape room. Display the coordinate plane for students. Explain that they must find the other two vertices of the rectangle to escape. Tell students the area of the rectangle is 48 and the short side is 6.

3. Ask students guiding questions to expand their understanding:
   - What do you know about rectangles that could help you?
   - How does the area and length of the short side help you find the missing vertices?
   - Are the numbers of the vertices positive or negative numbers? How do you know?

Apply Understanding

1. Distribute Polygon Plots (page 197) to students. Explain that students will be plotting points of polygons on a coordinate plane and finding missing vertices.

2. Ask students questions to assess understanding:
   - How do you find missing vertices of a rectangle if you are given the area and side lengths?
   - What strategy can you use to plot points on a coordinate plane?
   - What type of numbers are the coordinates in each quadrant?
   - How does knowing the type of polygon help you find missing points on a coordinate plane?
Escape Rooms: Polygons (cont.)

During Reading

1. Review explicit information and inferences with students. Distribute the Escape Rooms: Polygons books to students. Read page 4 together. Ask students to find explicitly given information that could be important later in the story (e.g., three clues from Aaliyah). Then, ask students to make an inference supported by the text (The friends are confident about their escape. The text says they are ready to win and they do not have any last-minute questions for Aaliyah before beginning.)

2. Tell students they will be looking for explicit information and making inferences as they read the book. Distribute Room by Room (page 198) to students. Remind students to look at the math sidebars for clues or explicit information about the escape room. Allow students time to read the book and complete their activity sheets.

   • You may choose to display the Interactiv-eBook for a more digitally enhanced reading experience.
   • For below-level learners and English language learners, you may choose to play the audio recording as students follow along to serve as a model of fluent reading. This may be done in small groups or at a listening station to help readers practice fluency and build comprehension.
   • Help below-level learners look through the glossary and index for any unfamiliar words, focusing on words or phrases relating to the escape room such as keep, usurper, and heir.
   • Challenge above-level learners to create clues like the one on the scroll in the book. Then, have them trade with partners and solve.

3. Have students complete the “Let’s Explore Math” sidebars as they read the book. Or, you may choose to have them revisit the text a second time to complete the sidebars. Review student responses as a class.

After Reading

1. Distribute the Escape Rooms: Polygons books to students. Brainstorm the 5Ws and H questions together (Who? What? When? Where? Why? How?). Write them on the board. Have students work with partners to answer these questions about the book.

2. As a class, discuss the importance in answering these questions when writing informative pieces, such as newspaper articles. Distribute Read All About It! (page 199) and go over the directions with students. Allow them time to complete their articles.
**Problem Solving**

1. Display a coordinate plane for students.
2. Have students describe the coordinate plane using the terms *quadrant* and *vertices*. Support students with sentence frames:
   - *To plot coordinates on a coordinate plane, I always start at _____.*
   - *When the x and y axes intersect, the coordinate plane is divided into _____.*
   - *Coordinate planes help me solve problems when I _____.*
   - *I can use a coordinate plane to find vertices because _____.*
3. Read the Problem Solving prompt aloud from page 28 of the *Escape Rooms: Polygons* book. Distribute *Problem Solving: Polygons* (page 200) to students. Have students use the workspace to solve the problem.

**Assessments**

1. A short posttest, *Escape Rooms: Polygons Reading Quiz* (page 201), is provided to assess this lesson’s reading objective.
2. A short posttest, *Escape Rooms: Polygons Mathematics Quiz* (page 202), is provided to assess this lesson’s mathematics objective.
3. The Interactiv-eBook activities in the Digital Resources may also be used for assessment purposes (optional).
Photo Inferences

**Directions:** Record your observations of the photographs listed in the table. Then, read the text and make inferences.

<table>
<thead>
<tr>
<th></th>
<th>Observations</th>
<th>Inferences</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Assistance Dogs (page 6)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Hearing Dogs (page 11, bottom photo)</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Service Dogs (page 15, bottom photo)</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Therapy Dogs (page 18)</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Search and Rescue Dogs (page 24, top photo)</td>
<td></td>
</tr>
</tbody>
</table>