

PREFACE

This book provides challenging tasks for elementary school students, tasks that can engage them in problem-solving experiences. Children’s awareness of seasons and holidays makes the problems in the book authentic and engaging. These tasks can be easily related to other topics and themes that are being studied and discussed in the classroom, providing occasions for cross-disciplinary connections.

The situations in this book provide occasions in which students can engage with content through problem solving. Each problem connects to at least one Common Core content standard at a particular grade level. These problem-solving tasks furnish opportunities for students to explore strategies and make sense of important mathematics. Allowing students time and freedom to engage in this kind of sense making, reasoning, justification, and pattern searching allows them to engage in the processes identified in the Common Core Standards for Mathematical Practice. We see these tasks as invitations for students to learn important mathematical ideas in relevant contexts as they engage in the mathematical practices that are at the heart of the Common Core State Standards for Mathematics (CCSSM; National Governors Association Center for Best Practices and Council of Chief State School Officers [NGA Center and CCSSO] 2010).

WHAT TO EXPECT IN THE FOLLOWING CHAPTERS

The four chapters in this book are organized by season: fall, winter, spring, and summer. Each chapter includes three problem-solving tasks for each grade level; these are arranged in grade-level order from third through fifth grade. The Introduction provides a discussion of problem solving that will set the stage for the seasonal tasks and the implementation guide that is provided for each.

We hope that teachers find some flexibility for differentiation by using problems at different grade levels. If a situation for the students’ grade level seems too challenging or too simplistic, alternatives may be found by examining—and potentially adapting—the tasks for other grade levels.

We also hope that teachers take advantage of the possibilities for manipulating the contexts of the problems to better suit their local circumstances. However, we urge caution in manipulating tasks. It is easy to change aspects of a situation in ways that remove the challenge of engaging in relevant and meaningful mathematics. Be sure to maintain the mathematical core of the tasks themselves, preserving students’ opportunities to work through the mathematics, even though this may be a struggle.

Each lesson is composed of several components. For each task, blackline masters and other materials are available for downloading and printing on NCTM’s More4U website (nctm.org/more4u). The teacher may find that a handout is unnecessary at times; instead, the worksheet may be used as a class display, and students may be encouraged to use alternatives for recording their work.

The discussion of the problem presents the primary content standards and mathematical practices from CCSSM that include the mathematics and processes that students can be expected to employ as they work through the task. The Problem Discussion provides greater detail about the mathematics of the task and ways in which mathematical practices are employed as students solve the problem. Understanding the mathematics is important, and we hope that the problem discussion for each task effectively highlights the mathematical ideas around which each task is structured.

Sections on Strategies and Misconceptions/Student Difficulties identify potential student solution strategies and the challenges and misconceptions that students may encounter as they work through the problem. Following these sections is a detailed description of how teachers might engage students in the task at hand by using the Launch/Explore/Summarize format. In each of these sections, we have highlighted ways to apply the characteristics of the three-phase lesson format in relation to the specific task.

Finally, a section on Differentiation identifies ways in which a task may be expanded or simplified for the variety of learners found in any classroom. Students should be provided with ample time to make sense of and engage in the problems. For students who derive a solution quickly, this section provides suggestions for how their thinking regarding this particular content might be deepened. For students who are unable to engage in *productive struggle* with the task, this section provides suggestions for how the task might be modified without significantly reducing students' opportunity to engage in mathematical reasoning.

WHAT TO EXPECT IN THE ONLINE COMPONENTS

The online components for this book include a Microsoft Word version of the problem handouts as well as other materials associated with each problem. The Word version of the handout can be used to change the names of characters in the tasks so that students may make a more personal connection with problem situations. Similarly, changes can be easily made to the contexts of the problems so that they are more relevant to students' local environments and lives.

Thank you for your interest in this book. We hope that it is a valuable resource for you and opens the door to rich and engaging problem solving for your students!