

PREFACE

The purpose of this book is to provide challenging and engaging problem-solving tasks for children in the primary years. All children are aware of seasons and holidays, and these provide authentic and engaging backgrounds for the problems. 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 children can engage in content on a problem-solving level. Each problem is tied to at least one Common Core content standard at a particular grade level. Consider these problem-solving tasks as opportunities for children to explore strategies and make sense of important mathematics. Allowing children time and freedom to engage in this kind of sense making, reasoning, justification, and pattern searching provides them the openings to engage in the Common Core State Standards for Mathematical Practice. Thus, we see these tasks as invitations for children 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).

WHAT TO EXPECT IN THE FOLLOWING PAGES

The Introduction provides a discussion of problem solving that sets the stage for the tasks and the implementation guide that is provided for each one. The book has four chapters organized by season: fall, winter, spring, and summer. Each of these chapters includes two problem-solving tasks for each grade level; these are arranged in grade-level order from prekindergarten to second grade.

We hope that teachers find some flexibility for differentiation by using problems at different grade levels. If a situation for the children's 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 ability to alter the contexts of the problems to better suit their local circumstances. However, we urge caution with manipulating tasks. It is easy to change aspects of a situation that remove the challenge of engaging in relevant and meaningful mathematics. Be sure to maintain the mathematical core of the tasks themselves, preserving children's opportunities to struggle through the mathematics.

Each lesson is comprised of several components. Blackline masters as well as other materials for each task are available for downloading and printing on NCTM's More4U online resource (nctm.org/more4u). The teacher may find that a handout is unnecessary at times, especially with emerging readers. 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 each problem provides the primary content standards and mathematical practices from CCSSM that students can be expected to employ as they work through the task. When CCSSM content standards are not available—as is the case with prekindergarten

students—*Principles and Standards for School Mathematics* (NCTM 2000) and other resources are referenced for important mathematical concepts. The Problem Discussion provides greater detail about the mathematics of the task and ways in which mathematical practices are employed as children 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 they may encounter through the problem. Following these sections is a detailed description of how students might engage in the task using the Launch/Explore/Summarize format. In each of these sections, we have featured 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. Children should be provided with ample time to make sense of and engage in the problems. For children who derive a solution quickly, this section offers suggestions for how their thinking regarding the particular content might be deepened. For others who are unable to engage in *productive struggle* with the task, the section provides suggestions for modifying the task without significantly reducing the children's 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 problem handouts as well as other materials associated with each problem, such as figure cutouts, ten-frames, and task cards. The Word version of the handout can be used to change names of the characters in the tasks so children may make a more personal connection to problem situations. Similarly, changes can be easily made to the contexts of the problems so they are more relevant to children's local environments and lives.

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