

Preface

The mathematics curriculum in kindergarten through grade 2 provides many rich opportunities for children to learn and do mathematics through problem solving. Hands-on, minds-on, appropriate experiential activities pique children's interests and curiosity, and they contribute to building mathematical problem-solving skills and strategies. As stated in *Principles and Standards for School Mathematics*: "Problem solving in the early years should involve a variety of contexts, from problems related to daily routines to mathematical situations arising from stories" (National Council of Teachers of Mathematics 2000, p. 116). The six different contexts described in chapter 1 provide the settings for the tasks presented in each of the chapters that follow it.

Building on NCTM recommendations (NCTM 2011), the Common Core State Standards for Mathematics (CCSSM) further develop the standards for how children go about doing mathematics, and thus include standards for "mathematical practice" in addition to standards for "mathematical content." Teachers have the new challenge of maintaining an environment conducive to problem solving in their classrooms while meeting the requirements of the CCSSM.

The purpose of this book is to guide teachers in kindergarten through grade 2 in their efforts to implement these standards, both for mathematical content and for mathematical practice. As the title suggests, the emphasis here is on meeting the standards through a problem-solving approach, not only as a means of practicing what has been learned but also as a tool to "build new mathematical knowledge" (NCTM 2000, p. 52).

This book contains a total of nineteen problems, identified here as "tasks," some of which include variations and extensions. These tasks are organized by grade level within the following chapters: Number, Computation, and Algebra; Geometry; and Measurement and Data. Modeling does not have its own chapter, because it is incorporated within each task. Each of these tasks is related to a specific domain and cluster of standards within the Common Core. Examples of student-teacher interactions are provided to illustrate how to develop mathematical problem-solving skills and support the Common Core Standards.

The collection of tasks in this book is not meant to be a complete curriculum. These tasks are designed to highlight engaging ways to involve children in exploring mathematical relationships, and in modeling and expressing their ideas orally, in diagrams, in tables, and with manipulative materials. Not every CCSSM domain and cluster is represented, and only interesting problems that lend themselves to meaningful implementation of content standards have been included. Where appropriate, the Standards for Mathematical Practice that best meet the intent of the problem are discussed. Depending on teachers' knowledge of their students, tasks may be modified to meet children's needs.

This book is intended for use by teachers in kindergarten through grade 2, providing a source of rich problems to develop early mathematical concepts as well as to exemplify mathematics learning through problem solving. Teacher educators may use this book as a supplemental text in a mathematics methods course for primary grade teachers or in a curriculum course for preservice teachers. This would help preservice teachers become increasingly familiar with the Common Core State Standards for Mathematics and how they may be implemented. Readers should find the CCSS Overview for Mathematics in Kindergarten through Grade 5 in appendix 1 helpful in providing a “vertical” overview of the major content areas and how they are emphasized through the elementary grades. Finally, the two-dimensional and three-dimensional diagrams and vocabulary for geometric shapes in appendix 2 may serve as a resource for naming and discussing geometric shapes.