

Preface

The three-book series *Reasoning and Sense Making in the Mathematics Classroom* maintains the National Council of Teachers of Mathematics' (NCTM) focus on teaching that promotes and supports mathematical reasoning and sense making, and they emphasize implementation of the Common Core State Standards for Mathematics (CCSSM; NGA Center and CCSSO 2010) Standards for Mathematical Practice (SMP) and the Process Standards (PS) from NCTM's *Principles and Standards for School Mathematics (Principles and Standards; NCTM 2000)*. To illustrate the nature of mathematical reasoning and sense making in prekindergarten–grade 8 and the critical role that reasoning and sense making play in learning and using mathematics, these books show—through student and classroom vignettes as well as instructional tasks—how instruction can support students in their development of reasoning and sense making. (All student and classroom dialogues in the books are either edited versions of actual student/classroom dialogue or composites of dialogue from research and classroom observation. Student names have been changed throughout.)

Throughout the series, research on student learning is used to help teachers understand, monitor, and guide the development of students' reasoning and sense making about core ideas in elementary school mathematics. Research on teaching and learning mathematics, as cited in the chapters, is the basis of all the discussions and recommendations in these books. To illuminate the connection between reasoning and mathematical content, all three books concentrate on sense making as it is implemented for specific content areas in prekindergarten–grade 8 mathematics learning. In this first book, targeting prekindergarten–grade 2, we focus on number and operations, early algebraic thinking, and decomposing and composing geometric shapes.

In chapter 1, Michael Battista discusses the nature of reasoning and sense making in prekindergarten–grade 2 and why they are critically important in the development of mathematical thinking. He illustrates the nature of young

children’s mathematical reasoning with examples of children attempting to make sense of the concepts of place value and length measurement.

In chapter 2, Arthur Baroody focuses on how early childhood instruction can engage students in mathematical reasoning while helping them to construct rich number and operation sense. He also demonstrates how reasoning builds on conceptual understanding and illustrates the important use of a learning progression to understand and guide students’ reasoning and sense making.

In chapter 3, Ana Stephens, with Maria Blanton, identifies core algebraic ideas and illustrates how young children can explore and engage with these ideas in ways that lay the foundation for the future study of algebra while strengthening and deepening their existing understanding of arithmetic.

In chapter 4, Michael Battista examines children’s reasoning and sense making as they decompose and compose geometric shapes—including reasoning about area—and how instruction can support the development of this reasoning. He also discusses the use of learning progressions in understanding students’ reasoning and in guiding their sense making with appropriate teaching.

For your convenience in following discussions of practices and standards cited within the text, two appendixes consisting of abbreviated and labeled versions of the CCSSM Standards for Mathematical Practice and the Process Standards from NCTM’s *Principles and Standards* are included in the book. There are also two appendixes of instructional tasks specific to chapter 4, “Pattern-Block Frame Tasks” and “Predict-and-Cover Tasks.” You can download all four by visiting NCTM’s More4U website (nctm.org/more4u). The access code can be found on the title page of this book.