
Introduction

Throughout our collective years as mathematics educators, we have found that new teachers are concerned about many of the same issues surrounding mathematics education. We realized that there is a critical need to ease the transition to teaching mathematics, and it goes beyond the teacher preparation programs that new teachers have completed. Our goal with this book is to supplement what new teachers of mathematics have already learned about teaching mathematics and to focus on the key elements of successful teaching.

In this book we have used a combination of research, personal experiences, and observations of other mathematics teachers. We present all the ideas that we have found to be extremely important to the developing teacher of mathematics. We have included many of the common problems and big ideas in mathematics in many vignettes sprinkled throughout the book. The vignettes were inspired by real teachers in real classrooms, and we hope they encourage thought-provoking discussion on important issues in content as well as pedagogy in mathematics lessons for Grades 6–12.

We would like you to keep in mind as you read this book that there is no one right way to approach teaching and that you are already in the process of developing your own philosophy of teaching and learning. This book is meant to be used as a tool to help you think about the important issues that can shape the kind of teacher you are meant to be. We hope that by reading this book you will get a better understanding of the strong connections inherent in mathematics as a body of knowledge and begin to see how everything you teach can be connected to other concepts or understanding.

HOW THE BOOK IS ORGANIZED

Chapter 1: “A Glimpse at Mathematics Instruction.” This chapter provides a look at mathematics instruction in two classrooms. With two vignettes we set the stage for the rest of the book by introducing elements of successful mathematics instruction.

Chapter 2: “Standards-Based Teaching.” In this chapter we build on the elements of successful mathematics instruction from Chapter 1 by discussing standards-based teaching in mathematics. We look at the standards set forth by the National Council of Teachers of Mathematics, as well as discuss the importance of standards created at the state and district levels. We also provide examples of standards-based teaching relative to algebraic reasoning.

Chapter 3: “Engaging Students in Learning Mathematics.” In this chapter we take a look at the three interrelated components of engagement: the affective, behavioral, and cognitive. We begin with the affective component in light of Glasser’s categorization of a human being’s five basic needs: (1) survival, (2) love and belonging, (3) fun, (4) freedom, and (5) power. We describe how each of these basic needs is reflected in the classroom and how you can use knowledge of these basic needs to create an inclusive classroom environment.

Chapter 4: “Engagement Strategies for Special Populations.” This section of the book takes an in-depth view of strategies for engaging several special populations: special needs students, gifted students, and English language learners. We discuss strategies for engagement that are specific to these special populations. We then present an engaging activity involving permutations and discuss how this activity may engage special populations of students.

Chapter 5: “Assessment.” This book would be incomplete if it did not address assessment and its importance in the instructional process. We look at the purposes of assessment, and we discuss different means of assessing mathematical understanding and give examples of each. We also discuss the backward design model for assessment and present suggestions for assessing special needs students.

Chapter 6: “Putting It All Together.” In this last chapter, we discuss ways for you to incorporate the strategies in this book throughout your mathematics curriculum. We suggest ways to connect big ideas within mathematics as well as present ideas for you to connect mathematics across the grades.

Your first few years of teaching mathematics are a very exciting time. Whether you are a new teacher or simply want to take a fresh look at teaching mathematics, we hope that this book will provide you with a structure to plan and guide you through your teaching. We wish you the very best for a long and rewarding career.