

# Introduction

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In 2014 the National Council of Teachers of Mathematics (NCTM) released *Principles to Actions: Ensuring Mathematical Success for All (PtA)* to describe “the conditions, structures, and policies that must exist for all students to learn” (p. vii). *PtA* articulates eight guiding principles and five essential elements that are necessary for effective mathematics teaching and learning—regardless of the standards, curriculum, type of school, age of students, or other circumstances. This book was commissioned as a companion to *PtA* to enact NCTM’s longstanding commitment to linking research and practice. In the remainder of this introduction we describe the purpose of the book, its intended audiences, and suggestions for how this book might be used by a range of mathematics education professionals.

## Purpose of this Book

The purpose of this book is to summarize and synthesize the research behind each of the guiding principles and essential elements and to offer examples of what they might look like in classroom practice. While each of the principles and elements is backed by an extensive body of research, our goal was not to offer a comprehensive, exhaustive, or detailed review of the literature. Rather, the goal was to give readers a sense of where the field stands in its knowledge and its hypotheses about the big ideas put forth in *PtA*. In addition, the goal was to make the principles and elements—as well as the research—concrete for readers by offering examples from classroom practice. Again, however, our goal was not to be comprehensive and detailed, so the examples do not cover every grade level or every content area, nor do they contain full-fledged lesson plans. Rather, the illustrative examples are meant to give readers a flavor of what a principle or element might look like in practice. It is up to the reader to tailor the examples to a particular context.

Many of the chapters in this book were written collaboratively by school-based mathematics educators and university-based mathematics educators in a deliberate effort to exemplify NCTM’s commitment to linking research and practice. Working together in teams allowed the authors to combine and integrate their expertise, to craft chapters that reflect a balance of research and practice examples in ways that meet the needs of practitioners in both schools and universities. To further ensure that the book would meet the needs of practitioners at both levels, every chapter was reviewed by both school-based and university-based mathematics educators.

## Audience for and Uses of this Book

This book was designed to be useful to many audiences, including preservice teachers, in-service teachers, instructional coaches, administrators, professional developers, and mathematics teacher educators. For example, preservice teachers might read the tasks chapter as part of a mathematics methods course to gain a sense of how tasks with high cognitive demand can be implemented on a daily basis in classrooms. Administrators might read the discourse chapter to gain a lens for thinking about what to expect when observing a teacher who is trying to create a discourse-rich classroom environment. A group of teachers in a school might use the equity chapter as a springboard for ongoing critical conversations about the ways the practices they enact in their classrooms, as well as school-wide practices related to tracking, are or are not supportive of all students learning mathematics. Instructional coaches and professional developers might suggest particular chapters to teachers who are trying to grow their practice in specific areas or to gain ideas for how to support teachers.

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And some readers may wish to read the entire book in order to gain a high-level overview of the professional commitments of mathematics educators and how those commitments play out in classrooms.

Whatever use is made of this book, readers might wish to read the relevant section of *PtA* along with the corresponding chapter in this book in order to gain a full picture of NCTM's recommendations, the research that supports those recommendations, and the implementation of the recommendations in classrooms. It is important to note that chapter authors did not reproduce *PtA* in its entirety in this book. In most cases, only a very short summary of the principle or element from *PtA* is included, so we encourage readers to visit the *PtA* document for full details of the recommendations.

## Conclusion

As noted in *PtA*, we all have a role to play in ensuring that every student is engaged in mathematics learning that is a vibrant, dynamic, enriching experience. This book is but one small part in supporting mathematics educators and other professionals in developing the knowledge base, attitudes, beliefs, and skills to make that vision a reality.

## Reference

National Council of Teachers of Mathematics (NCTM). *Principles to Actions: Ensuring Mathematical Success for All*. Reston, Va.: NCTM, 2014.