

Preface

The National Council of Teachers of Mathematics (NCTM) has a long history of involvement in reporting results from the National Assessment of Educational Progress (NAEP), beginning with a monograph published by NCTM on the results of the very first mathematics NAEP in 1973 (Carpenter et al. 1978). Most of the early NAEP reports were developed by teams representing a variety of universities, until the 1990s when individuals at the University of Michigan took the lead on NAEP reports (Kenney and Silver 1997; Silver and Kenney 2000). Starting with the 2000 assessment, individuals at Indiana University took over major roles in reporting the assessment (Kloosterman and Lester 2004, 2007). Throughout much of the twentieth century, NCTM monographs and other print reports were the primary source of NAEP results; these publications also included commentary on what the results meant for teachers, school officials, curriculum developers, and the public. With the introduction of the Internet near the end of the century, overall NAEP results became available online (see <http://www.nationsreportcard.gov>), but it was beyond the purview of NAEP developers to provide interpretations of these results. For this reason, NCTM, along with affiliated individuals and groups, have recently focused more and more on an explanation of the results.

Along with publishing interpretations of the NAEP results, in 2006 the Indiana University group worked with NCTM to publish a volume that examined how analyzing student work on NAEP constructed-response items can help teachers understand student thinking (Brown and Clark 2006). This present volume, *Mathematical Thinking*, goes even further by providing classroom activities for elementary and middle school students based on NAEP items. As explained in the introduction, some of the activities here start with NAEP items and provide extensions of those items that help students internalize the understanding needed to solve them. Other activities build the understanding necessary to solve some of the most challenging items in NAEP. All of the activities provide guidance for encouraging students to think deeply about mathematics concepts while at the same time mastering the mathematics content in the Common Core State Standards (National Governors Association Center for Best Practices and Council of Chief State School Officers [NGA Center and CCSSO] 2010). The activities were written by a variety of authors but all follow the same format and style, making it easy to understand the overall focus and flow of the activities once one or two of them have been reviewed.

Acknowledgments

We begin by acknowledging the National Science Foundation (NSF), which, through the REESE Program, grant no. 1008438, funded the conceptualization of this volume and the writing of some of the activities. This NSF grant also supported the development of the companion to this volume, *What Mathematics Do Students Know and How Is That Knowledge Changing? Evidence from the National Assessment of Educational Progress* (Kloosterman, Mohr, and Walcott 2016), which reports the NAEP results by mathematics topic from the early 1990s through 2013. We deeply appreciate this support but also need to be clear that the opinions, findings, conclusions, and recommendations expressed in this book are those of its authors and do not necessarily reflect the views of the foundation.

We also thank the activity authors who put aside other projects to volunteer their expertise and to complete their activities in a timely fashion. Working together as a team led to consistent style in development of the tasks and format of the activities. This project was housed in the Center of Evaluation and Education Policy (CEEP) at Indiana University and the support of CEEP staff made it

possible for us to focus on writing the activities rather than the logistics of running a funded project. We are also deeply appreciative of support we received from members of our project advisory board: John Dossey, Linda Dager Hall, Jonna Kulikowich, Frank K. Lester Jr., Sarah Theule Lubienski, and Mark Wilson. Finally, we acknowledge the comments and help we received from NCTM staff and the members of the NCTM Publications Committee. In particular, Rick Hudson provided substantial feedback from the time of the original proposal through final publication of this volume.

Doris Mohr
University of Southern Indiana

Crystal Walcott
Indiana University–Purdue University Columbus

Peter Kloosterman
Indiana University Bloomington