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Principles to Actions: Ensuring Mathematical Success for All

What it will take to turn the opportunity of the Common Core State Standards for Mathematics into reality in every classroom, school, and district.

Continuing its tradition of mathematics education leadership, NCTM has undertaken a major initiative to define and describe the principles and actions, including specific teaching practices, that are essential for a high-quality mathematics education for all students.

This landmark new title offers guidance to teachers, mathematics coaches, administrators, parents, and policymakers:

- Provides a research-based description of eight essential Mathematics Teaching Practices
- Describes the conditions, structures, and policies that must support the Teaching Practices
- Builds on NCTM's *Principles and Standards for School Mathematics* and supports implementation of the Common Core State Standards for Mathematics to attain much higher levels of mathematics achievement for all students
- Identifies obstacles, unproductive and productive beliefs, and key actions that must be understood, acknowledged, and addressed by all stakeholders
- Encourages teachers of mathematics to engage students in mathematical thinking, reasoning, and sense making to significantly strengthen teaching and learning

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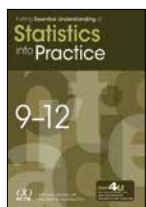
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FROM NCTM

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Putting Essential Understanding into Practice: Statistics, 9–12, Terry Crites, Roy St. Laurent, Barbara J. Dougherty, eds., 2015. Foreword by Linda M. Gojak. 152 pages, \$36.95 paper. ISBN 978-0-87353-737-7. Stock no. 14547. National Council of Teachers of Mathematics; <http://www.nctm.org>.



Intended for teachers of students in grades 9–12, this volume in NCTM's Putting Essential Understanding into Practice series has a goal of “detailing and exploring best practices for teaching” the big ideas presented in *Developing Essential Understanding of Statistics in Grades 9–12*.

The introduction reviews the importance of pedagogical content knowledge that teachers use daily. The authors emphasize the importance of activities that are engaging and designed to “bring to the surface students’ understandings and misunderstandings about statistics.” Chapters 1 through 4 focus on the five big ideas that are difficult to teach and learn. Each chapter presents scenarios that teachers can use to help guide their classroom discussions. These chapters also contain tasks and activities that can be implemented immediately or modified, if desired. Chapter 5 draws connections between statistics that students study in grades 9–12, what they studied in grades 6–8, and what they will study in

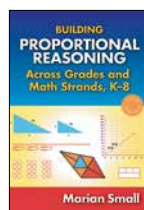
Prices of software, books, and materials are subject to change. Consult the suppliers for the current prices. The comments reflect the reviewers’ opinions and do not imply endorsement by the National Council of Teachers of Mathematics.

postsecondary courses. The appendixes outline the big ideas and essential understandings, provide an extensive list of resources for teachers, and feature tasks for students, with sufficient instruction so teachers can implement these tasks.

I enthusiastically recommend this book for new and experienced statistics teachers. The material presented helps teachers better teach the statistical concepts that are generally considered difficult to learn and difficult to teach. The student-centered activities and tasks provide a foundation designed to take students beyond computational fluency and into the realm of deeper understanding.

—Stephen J. Miller
Winchester Thurston School
Pittsburgh, PA

Building Proportional Reasoning across Grades and Math Strands, K–8, Marian Small, 2015. 128 pp., \$26.95 paper. ISBN 978-0-8077-5660-7. Stock no. 15031. Co-published with Teachers College Press, Nelson Education, and National Council of Teachers of Mathematics; <http://www.nctm.org>.



This book addresses the critical issue of how students develop proportional reasoning. It is well organized, providing an overview of proportional thinking with grade-specific chapters describing the important underlying ideas with regard to proportional thinking and reasoning. These descriptions are centered on the Common Core State Standards, and each chapter includes suggested questions and tasks to use during instruction or for assessment as well as a brief chapter summary.

The author suggests that this book may be used by mathematics teachers as a resource for instruction, math coaches in their work helping teachers transition to addressing the Common Core State Standards in their instruction, and preservice teachers as they develop an understanding of teaching mathematics

for conceptual understanding. The book is well designed for use by each of these groups; it is mathematically rigorous and well written, and the contents and organization make it user friendly.

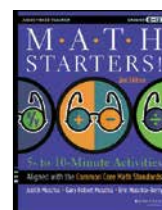
Particularly outstanding features include the clearly identified Common Core Standards that are addressed in each chapter, the rich mathematical tasks that accompany each grade-specific standard, and the descriptions and associated standards for the development of proportional thinking in grades whereby proportional thinking is developed in a more implicit than explicit way.

Because the book is organized in a vertical progression, it would be useful for instructors or teams who are developing curriculum maps or unit or lesson plans; differentiating instruction; or developing assessment items.

—Christine Trinter
Virginia Commonwealth University
Richmond, VA

FROM OTHER PUBLISHERS

Math Starters! 5- to 10-Minute Activities Aligned with the Common Core Math Standards, Grades 6–12, Judith A. Muschla, Gary Robert Muschla, and Erin Muschla-Berry, 2013. 2nd ed. 448 pp., \$32.95 paper. ISBN 978-1-118-44979-0. Jossey-Bass; <http://www.josseybass.com>.



This collection of more than 650 questions—aligned to the Common Core State Standards for Mathematics and arranged in order of the standards—are spring-

board problems for teachers to use at the beginning of their class to promote engagement in the lesson. *Math Starters* is a compilation of starter questions that can be used in both middle school and high school classrooms.

Math Starters is well organized; teachers can easily find an example based on the standard that they are addressing in class. The problems are presented in

Mathematizing the World: An Invitation to Modeling

Modeling can mean many things. It is the mathematical representation of real-world behavior, but it also describes relationships among experiment, data, form, and function. What does mathematical modeling mean to you? How does modeling evolve in your classroom? What kinds of tasks invite students into the world of mathematical sense making?

The Editorial Panel of *Mathematics Teacher* invites teachers to share their experiences with modeling. We especially encourage submissions that help *MT* readers wrestle with complexities of mathematical modeling in classrooms. How do we help students discover a dynamic relationship between physical phenomena and mathematical structure?

Here are some prompts to get you started thinking and writing:

- How does your classroom culture promote modeling?
- How does the process of modeling unfold from initial assumptions to final conclusions?
- How do students proceed as they refine their models?
- How do you or your students determine whether a model is successful?
- How can assessment of a model be reconciled with assessment of student learning?
- How does our interest in modeling span the grades?

You may submit your completed manuscript for review by accessing mt.msubmit.net. Indicate that the manuscript is being submitted in response to the call Mathematical Modeling. Be sure to enter the call's title in the Department/Calls field. No author identification should appear in the text of the manuscript. For additional guidelines for preparation of manuscripts, see nctm.org/mtcalls.



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varying formats, such as short-answer and multiple-choice responses and activities requiring students to create models. An answer key is provided for all the questions along with sample responses for the short-answer questions.

Math Starters is an excellent resource for middle school and secondary school teachers to help design a lesson focused on a standard with engaging questions start a class. The beginning sections provide classroom procedural advice and suggestions on how to incorporate group work while using the starter questions.

Any 6–12 classroom teacher will find the organization of the text pleasantly easy to use. Each standard from grades 6–12 is addressed and labeled next to the question, and the table of contents presents the topic, standard, and grade level. *Math Starters* will be a useful and helpful book for all classroom teachers looking to increase student engagement in their classroom.

—Raeann Kyriakou
St. John's University
Queens, New York

Proven Programs in Education: Science, Technology, and Mathematics (STEM), Robert E. Slavin, 2014. Foreword by Rodger Bybee. 136 pp., \$25.95 paper. ISBN 978-1-4833-5121-6. Corwin; <http://www.corwin.com>.



This book is well organized, with three distinct sections that address mathematics pedagogy, the latest classroom technologies, and science pedagogy. Each of the twenty-

six chapters begins with a summary and then provides the essence of evidence found to support the best practices hypothesized. At the end of each chapter is a bulleted list of findings, followed by author biographies and references.

Succinctness is the word that best describes each chapter (the book is an easy read). Mathematics educators, who are familiar with pedagogical terminology such as *differentiation*, *scaffolding*, *activating prior knowledge*, *cooperative learning*, and more, will nod in acknowledgment

while reading these abstracts provided by each author, each one an expert who has contributed original and complete research papers to the journal *Better: Evidence-Based Education*. However, details are omitted so that preservice readers can visualize and question (an invitation to research further) the claims of the experienced authors; novice teachers are bound to be convinced by the reiterated material that certain practices work.

I really appreciated the common theme that STEM education should enable students to contextually connect their learning to their personal lives. The emphasis on inquiry, communication, persistence, rigor, ownership of learning, and blended education clearly synchronizes with the vein running through the current subjects of the Common Core Standards. This book would make a good initial reference for beginning teachers and students in a teacher-education program.

—Prema Radhakrishna
Fremont Unified School District
Fremont, CA

MATHEMATICS teacher

Connect with teachers who find Joy and Inspiration in the Mathematics Classroom

Recent and upcoming bloggers share the everyday wonder and satisfaction involved with mathematics and learning:

Andrew Freda, Deerfield Academy, Deerfield, MA
Daniel Teague, North Carolina School of Science and Mathematics, Durham, NC

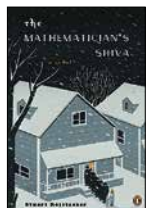
www.nctm.org/MTblog/Inspiration

COMING IN
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ISSUE

Creating
Classroom
Communities

The Mathematician's Shiva, Stuart Rojstaczer, 2014. 366 pp., \$16.00 paper. ISBN 978-0-14-312631-7. Penguin Books; <http://www.penguin.com>.



This book surprised me: I had thought I would not like it. How arcane could a book's subject be? But the story crept into my heart, and although the novel is far from perfect, it is very enjoyable. Although readers need not know Judaism or a lot about mathematics to appreciate the story, those who have familiarity with at least one will derive more pleasure from their reading.

The plot is simple. The narrator's mother, a world-class mathematician on the cusp of discovering a solution to the Navier-Stokes problem, has died. (This problem, described by the Clay Institute as one of the seven most important unproved conjectures, deals with fluid dynamics. This is all the mathematics readers need to know to appreciate this novel.) Her mentors, students, and rela-

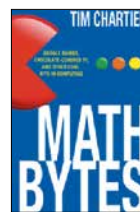
tives as well as a large group of international colleagues gather for her funeral and for the period of shiva that follows (*shiva* is the weeklong period that is the most immediate of the three stages of mourning that observant Jews undergo). How the son deals with these mathematicians, the loss of his mother, his family, and the solution of Navier-Stokes make the story line.

I see no practical use of this book in the mathematics classroom, unless the class is one on mathematics literature. However, it would be an appropriate gift for a colleague or student (high school or older), especially a woman, with an interest in mathematics.

—Albert Goetz

George Mason University (adjunct)
Annandale, VA

Math Bytes: Google Bombs, Chocolate-Covered Pi, and Other Cool Bits in Computing, Tim Chartier, 2014. 152 pp., \$24.95 cloth. ISBN 978-0-691-16060-3. Princeton University Press; <http://www.press.princeton.edu>.



Math Bytes is a fun collection of mathematical applications that has something for everyone, even mathphobes. Topics include Fermat's last theorem; Sierpinski's triangle;

the Euler characteristic; the Traveling Salesman problem; TSP art; M&M's® and domino mosaics; facial recognition and celebrity eigenfaces; Google's PageRank algorithm; March Madness; Angry Birds®; tweeting the news; and creating fractal landscapes. The analysis of each problem is both rigorous and readable.

The book is visually appealing, with numerous color pictures to illustrate points, and its organization—chapters are arranged from easy to hard—draws in readers. As a bonus, solutions are included at the end.

All these features will convince students of the real-world relevance of mathematics. I thoroughly enjoyed the book.

—Anne Quinn

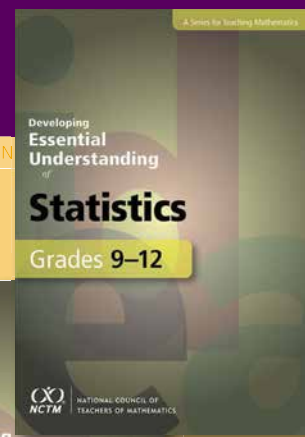
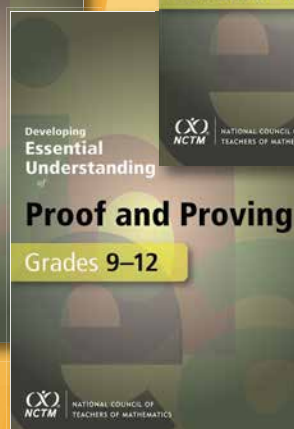
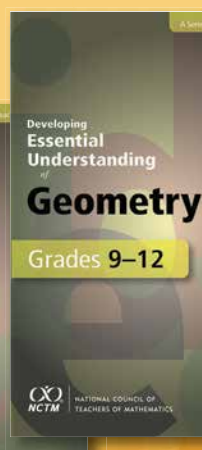
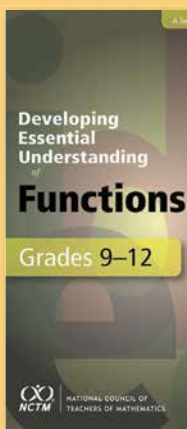
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