window on resources

BOOKS

FROM NCTM
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More Good Questions: Great Ways to Differentiate Secondary Mathematics

Marian Small and Amy Lin, 2010. Gr. 9–12, 216 pp., $29.95 paper. Stock no. 13782. ISBN 978-0-8077-5088-9. National Council of Teachers of Mathematics; www.nctm.org.

This book is intended for secondary mathematics teachers wanting to integrate differentiation into their teaching. The authors begin by introducing two approaches to differentiation that are the foundation of the book: open questions and parallel tasks. The remainder of the book demonstrates how these two approaches can be applied across the five NCTM Content Standards.

The text's organization is a definite strength. Each Content Standard is given a chapter, which begins with a brief overview of the strand and how it develops over the grade bands. The remainder of the chapter is split between open questions and parallel tasks that are separated into grades 6–8 and grades 9–12 examples. Each example is related to one of the strand's big ideas and includes possible scaffolding questions and variations.

Another strength is Small and Lin's attempt to make differentiation manageable. The open questions are designed to afford access to all learners. Parallel tasks are developed so that they can be discussed together during whole-class discussions. Two typical differentiated instruction issues (the time required to develop and debrief tasks) are considered and addressed. Insights into designing open questions and parallel tasks are provided throughout the text, along with a framework for developing your own.

I have already recommended this book to several teachers with whom I work who want to learn more about a reasonable approach to using differentiated instruction in their math classrooms.

—David Coffey,
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Navigating through Reasoning and Proof in Grades 9–12

Maurice J. Burke, Jennifer Luebeck, Tami S. Martin, Sharon M. McCrone, Anthony V. Piccolino, and Kate J. Riley, 2008. 198 pp., $42.95 paper. Stock no. 13047. ISBN 978-0-87353-604-2. National Council of Teachers of Mathematics; www.nctm.org.

This book provides a glimpse into how proof is used in each of the five NCTM Content Standards of Number and Operations, Algebra, Geometry, Data Analysis and Probability, and Measurement. Activities within each chapter allow students to move from exploration to conjecture to reasoning and explanation of mathematical statements within each of the Content Standards.

Although the ideas presented in the text focus on helping high school students further their understanding of reasoning and proof, the activities could easily be used with elementary and secondary preservice teachers. For instance, the "Probing Products" activity in chapter 1 allows students to explore patterns and relationships among the figurate numbers, such as triangular and square numbers, which are often introduced in mathematics courses for preservice elementary teachers. By representing figurate numbers using arrays of dots, students can visualize and understand that a square number is composed of two consecutive triangular numbers. This in turn leads to writing an algebraic expression for the nth triangular number. The algebraic expression can be used to develop the relationship between oblong numbers and triangular numbers. This leads to understanding relationships between factors and products.

Some activities in the text allow

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students to reason and make conjectures using technology, such as a graphing calculator or a dynamic geometry software program. In "A Hex on Pythagoras" in chapter 3, students use Cabri® Geometry or The Geometer's Sketchpad® to generate a Pythagorean hexagon and explore the relationships found among the four triangles formed in the given figure.

Simulations on the graphing calculator allow students to explore phenomena in probability and then use statistical reasoning to confirm or disprove their results. The "Derek Jeter Steps into the Box" activity in chapter 4 is an expected-value problem. The activity uses simulation, statistics, and averaging to determine the expected number of boxes that one would need to buy before obtaining a Derek Jeter baseball card. These activities as well as many others provide a good introduction to the proof process and help students understand why proof is important in mathematics.

The solutions to the activities in each chapter and blackline masters are provided in both the appendix and on the CD. The CD also contains applets corresponding to some of the activities for students' use. Selected readings from the reference section provide additional information on the topics and investigations discussed in the text.

—Carol J. Bell,
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Promoting Purposeful Discourse: Teacher Research in Secondary Math Classrooms

Beth Herbel Eisenmann and Michelle Cirillo, eds., 2009. 232 pp., $35.95 paper. Stock no. 13484; ISBN 978-0 87353-621-9. National Council of Teachers of Mathematics; www.nctm.org.

Over the course of four years, eight secondary mathematics teachers

participated in a professional development program to enhance discourse in their classrooms. This book is an outgrowth of the project, describing how these teachers transformed instructional practices.

Two introductory chapters describe each element of the project and how teachers became action researchers. The sections that follow present a chapter describing the process of change. The teachers discuss how analyzing their beliefs and studying artifacts such as articles and book chapters, as well as videos and transcripts of their own teaching, influenced them to take their students to deeper levels of discourse. The book concludes with two chapters that summarize the results.

Readers will find the beginning and ending chapters to be rich in research and teaching philosophy; the middle chapters contain practical information. Specific problems used with students, as well as classroom dialogues, are cited throughout the book. Insights shared by these teachers can motivate a reader, with plenty of practical examples to try in the classroom. The teacher-authors address topics ranging from using technology to allowing student ownership of their learning to effectively listening to students.

The authors have nicely blended research and practice, using data and examples that will stimulate readers to reflect on their own classroom practices. I recommend the book for university-level mathematics educators as a resource on classroom discourse, as well as for teachers seeking ways to improve classroom communication.

—Daniel J. Brahier,
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FROM OTHER PUBLISHERS

Adventures with Mathematics: Climbing from Algebra 1 to Geometry

Tiffany Stob, Karen Novotny, Charlene Beckmann, eds., 2010. 76 pp., $12.50 paper. Michigan Council of Teachers of Mathematics Scholarship Endowment Fund Committee; www.mictm.org.

Adventures with Mathematics is a collection of activities for students to complete over the summer to solidify their learning of algebra 1. The book includes a clear layout of the connections to Michigan's algebra 1 content expectations and addresses most of the expectations with one or more activities, including games, puzzles, and such activities as finding patterns in quilt designs. Although the book's subtitle is *Climbing from Algebra 1 to Geometry,* the emphasis is on algebra 1, making it potentially valuable in the summer before algebra 2.

In looking closely at some of the activities, I identified several potential concerns. First, the book contains mathematical errors, such as a typo replacing a plus sign with an equals sign. In another case, the geometric design of the quilts does not appear to follow a pattern or match the solutions shown in the back of the book, which do follow a clear pattern. Second, only selected answers and minimal conceptual explanations are included; more information is needed to deepen students' understanding, especially absent a teacher. Third, some problems are unclearly stated. Fourth, the material seems relatively advanced. Considering these concerns, imagining students doing this work on their own without some form of teacher support is difficult, unless they are already high-achieving math students. Overall, this resource has promise, but teachers and parents

interested in using it should carefully examine it.

—Mathew D. Felton,
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Adventures with Mathematics: Climbing from Grade 6 to Grade 7

Lorraine Males, Joshua Males, Charlene Beckmann, eds., 2010. 64 pp., $12.50 paper. Michigan Council of Teachers of Mathematics Scholarship Endowment Fund Committee; www.mictm.org.

This workbook comprises activities designed for students to complete at home as a way to engage them in mathematical learning experiences connected to sports, games, and other everyday activities. The activities are based on the Michigan State Standards and are designed to help students transition from grade 6 to grade 7.

The activities apply mathematical thinking and reasoning outside the classroom, giving added credibility to the learning of math concepts; however, many activities are wordy and require materials that are possibly unavailable to students in many homes. Some problems require the following:

- Decks of cards (not permitted in some homes)
- Family car (some families do not own a car and/or it is unavailable because a parent or older sibling uses the car for employment, etc.)
- Fluency in the English language (many problems are wordy and difficult for ELLs)
- Hair dryer (not everyone has a hair dryer)
- Baking cookies (which seems appropriate and fun, but consider making something healthy instead)

Parents who are already engaged in their student's learning may find this activity book helpful and would make good use of it. Parents who struggle with math themselves may find this book difficult to use. A limited audience would benefit from having this activity book.

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Math Problem-Solving Skills: Developing Successful Strategies, Grades 5–6

2010. 120 pp., $16.95 paper. Item no. 211022W. Didax; www.didax.com.

Math Problem-Solving Skills: Developing Successful Strategies is one book in a series created for grades 1 through 6. The book created for grades 5–6 presents mathematical investigations to improve students' problem-solving skills and strategies.

The investigations guide students through the problem-solving process of analyzing the problem, exploring a means to a solution, and trying a solution strategy. The investigations were developed to meet the NCTM Standards appropriate to the fifth and sixth grades, with a focus on the Standards of Problem Solving and Data Analysis and Probability. Each set of investigations includes a teacher's notes page with problem-solving objectives, solution strategies, information about areas where students might have difficulties, and extension questions.

Most of the problems are developed around real-life situations, such as an athletic event. Although the topics are appealing, the structure and content of the problems are even more engaging. My students were more interested in the process and strategy of solving the problems than the actual problem topics.

The investigations involve students solving a series of problems that focus on a Standard and mathematical concept, such as number operations of multiplication and division and mathematical reasoning. The problems build on previous problem-solving strategies and then increase in difficulty. The investigations progress in complexity, allowing teachers to differentiate instruction for all students. More advanced students will be challenged while developing problem solvers will be able to build on what they know. Overall, although the problems are identified by mathematical concepts and standards, they guide students' thinking to focus on the development of problem-solving strategies, skills, and thinking.

The teacher's notes pages that accompany each investigation feature helpful discussions and insights. The identification of "problem difficulties" gives teachers some trouble areas to observe while working with their students. This helps teachers be on the lookout for, and understand why, students are not being successful. It also explores ideas about how to change the learning experience.

The physical format of the problems was a small obstacle for classroom use. As a classroom teacher, I retyped the word problems so that only one or two problems were presented to students and also provided a "thinking" place for students to create charts and diagrams. *Math Problem-Solving Skills* will be a valuable addition to any fifth-grade and sixth-grade mathematics program.

—Desiree Olivas,
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Mathematical Literacy: Helping Students Make Meaning in the Middle Grades

Denisse R. Thompson, Gladis Kersaint, Janet C. Richards, Patricia D. Hunsader, and Rheta N. Rubenstein, 2008. 208 pp., $23.00 paper. ISBN 978-0-325-01123-3. Heinemann; www.heinemann.com.

Sharing research and teaching practices related to building a communication-rich mathematics classroom, this book helps teachers establish a culture where students are expected to explain their thinking, question and debate responses from their peers, and assume responsibility for their learning.

Mathematical Literacy is divided into three sections: Chapters 1–3 cover a theoretical perspective on the issue of mathematical literacy. Chapters 4–7 apply these theories and focus on literacy strategies. Each strategy is introduced with a rationale, and the subsequent chapters provide vignettes of what this would look like in the classroom. Chapters 8–12 provide classroom practices that address each of the literacies (reading, writing, speaking, and listening).

Many mathematics textbooks in use in the middle-grades classroom require little use of written explanations or communication of students' ideas. Chapter 6 of this book introduces the strategy "Multiple Representations Charts." Students have an opportunity to make connections among terms, symbols, concepts, and procedures. A paper is simply sectioned into fourths and labeled as Mathematical Example, Real-life Example, Visual Example, and Explanation in Words, and students complete each section. Using this charting method could enhance any curriculum by engaging students in writing about mathematics on a regular basis. It also allows the teacher great insight into student understanding of the concept being taught.

I highly recommend *Mathematical Literacy* and feel it is a great addition to any mathematics teacher's library. It is a guide that can be used to help students understand mathematics deeply.

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Savings and Investment Information for Teens: Tips for a Successful Financial Life

Karen Bellenir, ed., 2009. 400 pp., $62.00 cloth. ISBN 978-0-7808-1064-8. Omnigraphics; www.omnigraphics.com.

The second edition of the book *Savings and Investment Information for Teens: Tips for a Successful Financial Life* comprehensively addresses finance in its 404 pages. The text begins with an introduction to the economy, including the history of money, with subsequent chapters addressing investments, how to avoid scams, how banks work, how to advocate for oneself with the appropriate agencies, and many other topics.

The text is well written, so teens could gain valuable information about the economy and finance. I had difficulty finding evidence that the authors targeted teen readers, as the title indicates. For example, students often struggle with understanding exchange rates between countries. Providing an example of the purchasing power of items that teens use could have helped illustrate the difference in exchange rates and how they relate to the economies of each country.

The examples that are presented are often typical ones that I have read in other adult finance books, such as the amount saved by eliminating a cup of coffee each day. The book explains some strategies for monitoring a credit report and getting out of credit card debt, but I would have expected a book for teens, who should not yet be in debt, to offer more information about how to avoid the situation in the first place.

For several topics, the book supplies a better explanation than I have seen elsewhere:

- A step-by-step scenario of "How a Stock Is Bought and Sold"
- A chart comparing synonyms that different brokerage firms use
- Explanations of risks and benefits of online financial services
- Tips for protecting oneself while using online financial services

In addition, the editor includes many sources where students could obtain additional reliable information.

Teens motivated to learn about the history of money, the economy, and other financial issues might read the book chapter by chapter. Most teens would expect the book to show more quickly and directly how the economy affects their current lives and their future.

I have taught consumer math courses at the high school level, and I see how situations in the text could be used to introduce a teacher-designed activity to explore the mathematics, which is not a focus of the book. I recommend the book as a reference or as a text for a personal finance class.

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