Powerful practices, proof, and numeracy

Books

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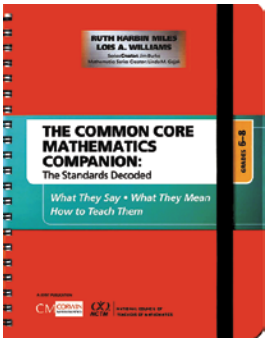
The Common Core Mathematics Companion: The Standards Decoded, Grades 6–8
Ruth Harbin Miles and Lois A. Williams; Series Creator: Jim Burke; Mathematics Series Creator: Linda M. Gojak, 2016. 304 pp., $33.95 paper. ISBN 978-1-50633-219-2. Stock no. 15190; jointly published by National Council of Teachers of Mathematics and Corwin Mathematics; http://www.nctm.org



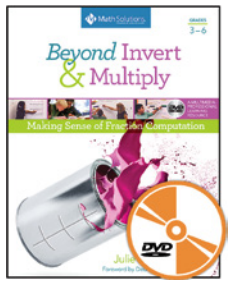
The purpose of this book is to provide middle-grade teachers and administrators with a guide to understanding the Common Core State Standards for Mathematics as well as the Standards for Mathematical Practice in a practical way. The book goes beyond simply listing the standards and practices by including specific tasks for teachers and students along with common misconceptions for each standard. The sample lesson-planning section provides a framework that prompts teachers to ask higher-order-thinking questions and ways to differentiate instruction. The sample planning page is also a great resource for administrators to gain an understanding of what mathematics should look and sound like in the classroom. Both the teacher and the administrator can have meaningful conversations about related standards and student learning.

Students will also benefit from the sample activities included in this book. They will learn how to think conceptually and engage in mathematical practices without the burden of doing extra work.

I recommend this book to new teachers, teachers who are unfamiliar with the Common Core State Standards, and teachers who might struggle with a particular domain, such as ratios and proportional relationships. Teachers will gain an understanding of the standards across grade levels rather than in isolation. Overall, this book is a great start for helping teachers, administrators, and students gain a deeper understanding of the major works in middle-grades mathematics.—*Vernita Glenn-White, Stetson University Department of Education, DeLand, Florida.*

From other publishers

Beyond Invert & Multiply: Making Sense of Fraction Computation, Grades 3–6
Julie McNamara, 2015. Foreword by Deborah Loewenberg Ball. 206 pp., $62.95 paper, includes DVD. ISBN 9-781-93509-957-4. Math Solutions; http://www.mathsolutions.com



Beyond Invert & Multiply extends the learning from Ms. McNamara's previous publication, *Beyond Pizzas & Pies*, which addresses understanding what fractions are, to the computation required in working with fractions. Each chapter addresses a specific skill with regard to addition, subtraction, multiplication, or division, beginning with a video clip of a classroom with students at work. Each also inclues a written transcript of the video, a short description of the concept with which

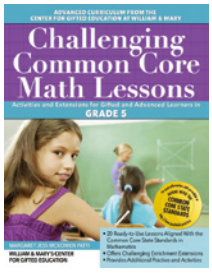
students are working (including sections entitled "What's the Math?" and "What's the Research?"), followed by classroom activities and complete instructions for incorporating the activities into a classroom immediately. Teachers are also given ideas, possible lesson questions, and study questions for reflection at the conclusion of each chapter.

Reproducible masters are included for each classroom activity, and the included DVD allows teachers to see actual students working on the same activities that are included in the book. Other resources included in the publication are "Six Strategies for Fostering Student Talk about Fractions" with video references, and "Author's Video Reflections," in which McNamara introduces the classroom setting for each scenario and includes her observations from the video. Overall, this is a strong resource for classroom teachers of grades 3–6, giving them a look into student learning and resources to build on that learning in their classroom.

Beyond Invert & Multiply is a clear, well-organized resource for classroom teachers. The chapters of the book can be referenced and used in any order without students losing understanding or teachers dealing with confusion. Video notes allow teachers to envision the classroom accomplishments from the author's viewpoint and can be skipped at the reader's discretion, on the basis of the reader's needs. The reproducibles make the activities "classroom ready," every teacher's dream.

I recommend this book for any classroom teacher of grades 3–6 who may need a resource to help him or her understand how to build students' computational understanding with regard to fractions, who may be looking for classroom activities to help increase students' conceptual understanding in fraction work, or who may need some scaffolding to facilitate student conversations.—*Teresa Ryan, Napa Valley Unified School District, California.*

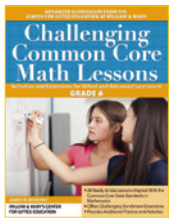
Challenging Common Core Math Lessons: Activities and Extensions for Gifted and Advanced Learners in Grade 5
Margaret Jess McKowen Patti, 2016. 188 pp., $39.95 paper. ISBN 978-1-61821-487-4. Prufrock Press; http://www.prufrock.com



This workbook consists of twenty challenging lessons that build on and extend students' understanding of already-introduced fifth-grade mathematics content. Each lesson has been intentionally created to address specific Common Core State Standards for Mathematics. It includes teaching instructions with objectives and consists of three copy-ready sections: opening activity, practice, and assessment. Many of these lessons focus on engaging advanced students in small groups or individually with the Common Core's Standards for Mathematical Practices, such as pushing for student explanations and reasoning as well as having students critique one another's work. Although these lessons aim to bring in real-world contexts to make the content more relatable and useful, teachers will need to prepare supports, such as visual aids or background information, to ensure equitable opportunities and access to content for all students. Additionally, these lessons will be better used to supplement previously taught lessons rather than to introduce new topics.

I recommend this book to those who have strong mathematical knowledge for teaching. It is a great resource but requires some expertise in planning and implementing meaningful lessons because of vague instructions for the teacher and lack of clarity in the wording of some problems.—*Jiwon Lee, University of California–Irvine.*

Challenging Common Core Math Lessons: Activities and Extensions for Gifted and Advanced Learners in Grade 6
James M. Moroney, 2016. 268 pp., $39.95 paper. ISBN 978-1-61821-489-8. Product code 4898. Prufrock Press; http://www.prufrock.com

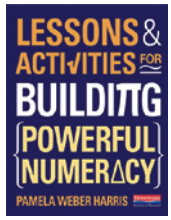


Intended to supplement an existing sixth-grade math curriculum, *Challenging Common Core Math Lessons: Activities and Extensions for Gifted and Advanced Learners in Grade 6* offers activities and practice problems that extend the Common Core's content standards, giving students the opportunity to delve deeper into the content rather than accelerate ahead.

The book is well organized: Activities are grouped by strand and include information about the content and practice standards they address, key vocabulary words, time required to complete them, and several multiple-choice "Common Core Assessment Practice" questions. Answers to all problems can be found at the end of the book.

Lessons include hands-on activities and real-world scenarios. One lesson, for example, has students analyze their own diets for 1–2 weeks and compare them to the FDA food pyramid, comparing the percentages of different foods that comprise their diet and thinking about what they could change to meet FDA percentage recommendations. Some of these "real-world" activities seem a bit forced, like the literal mapping on a coordinate grid of key locations in a story or the "code-writing" activity of generating equivalent algebraic expressions. Many of the activities also are made less challenging by heavy scaffolding; more open explorations would allow for greater variety and depth of student thought. That said, this book offers plenty of ideas for thought-provoking explorations of math topics that could benefit all students, not just those deemed gifted or advanced.—*Abby Gordon, Bank Street College of Education, Philadelphia, Pennsylvania.*

Lessons & Activities for Building Powerful Numeracy
Pamela Weber Harris, 2014. Grades 6–12, 320 pp., $37.50 paper. ISBN 978-0-32504-804-8. Heinemann; http://www.heinemann.com



This book follows *Building Powerful Numeracy for Middle and High School Students* and is designed to continue that work, providing classroom resources for teachers. The purpose of both books is to help students construct and use numerical relationships so mathematics will include less meaningless memorization and more meaningful reasoning. Students use models and problem strings to develop efficient problem-solving strategies. Included are teacher-directed activities as well as student workouts (reproducible sheets to provide conversation starters for students) that use open number lines for addition and subtraction and open arrays for multiplication. To initiate powerful conversations, students are presented with a variety of solutions to the same task and are asked to describe each and tell how or why it works. Example questions are suggested so the teacher can plumb the depths of student thinking. Teacher-directed activities include these:

- Problem Strings—a series of problems presented in a specific order to construct numerical relationships in the student's mind
- As Close as It Gets—multiple-choice questions for which students must use estimation and number sense to choose an answer as close as possible to the correct one
- Relational Thinking—equation-solving problems where students use numerical relationships to either complete the equation or decide if it is true or false

If you are looking for a resource to help your students become confident, competent problem solvers, this

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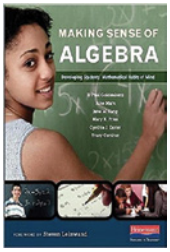
book belongs in your professional library.—*Dinah Chancellor, Independent Mathematics Consultant, Southlake, Texas.*

Making Sense of Algebra: Developing Students' Mathematical Habits of Mind
E. Paul Goldenberg, June Mark, Jane M. Kang, Mary K. Fries, Cynthia J. Carter, and Tracy Cordner, 2015. Foreword by Steven Leinwand. Gr. 6–10, 183 pp., $22.50 paper. ISBN 978-0-32505-301-1. Heinemann; http://www.heinemann.com

Based on a curriculum project designed to help at-risk students succeed in high school algebra, this book outlines practical ways of helping students develop understanding of foundational algebra concepts while building specific habits of mind:

- Describing repeated reasoning
- Puzzling and persevering
- Seeing and using structure
- Using tools strategically
- Communicating with precision



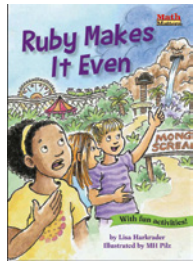
Making Sense of Algebra provides a detailed roadmap for growing students' proficiency with these mathematical ways of thinking. It describes classroom structures that develop algebraic habits of mind: mental math, puzzles, explorations, use of mathematical tools, and classroom discussions. Multiple classroom-ready examples of each activity type are offered.

Although written primarily for teachers of grades 6–10, this book has value for all educators interested in strengthening students' mathematical mindsets. Many of the activities can be adapted for use with elementary school students. It is a worthwhile read for educators charged with improving elementary school math education, including coaches, curriculum coordinators, and preservice teacher educators. *Making Sense of Algebra* offers a vision of mathematics education in which students expect mathematics to make sense. According to the authors, our responsibility as educators—

> means engineering our instruction so that students look for that logic and coherence in each new situation they encounter, treating new problems as puzzles, looking for strategic starting places, and fitting the clues together. (p. 14)

They make a strong case for investing in the development of our students' mathematical habits of mind as a critical component of their mathematics achievement.—*Sue Chapman, University of Houston–Clear Lake, Texas.*

Math Matters®: Ruby Makes It Even
Lisa Harkrader, 2015. Ages 6–8, Gr. 1–3. ISBN 978-1-57565-805-6. Kane Press; http://www.kanepress.com

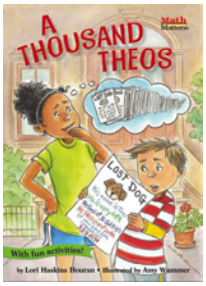


Ruby and her two friends have waited all year for their school trip to Rainforest Park. They start the rides and realize that most of the rides have seats for only two people not three. So, one person will have to ride alone for all the rides. They decide to take turns as to who rides alone until another friend joins them and makes them an even number of people.

The storyline allows students to explore the meaning of odd and even. Students realize that when they have an odd number of people, they are unable to sit with a friend on a ride. Having an even number of people makes going on rides more fun. Finally, when they have four people, everyone is able to have fun on the ride and not sit alone.

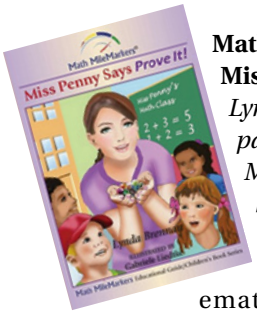
Second graders loved this story and were able to fully comprehend the meaning of odd and even. They understood that when you have an odd number of riders, not everyone has a friend to sit next to, and that can be a strange feeling. We illustrated on chart paper how Ruby and her friends were sitting on the rides. This allowed us a way to determine if numbers were odd or even. The illustrations throughout showed how an odd number of people were on the ride. The plot of being an odd number was engaging for students on the even and odd concept. Overall, this is a great story to start a discussion of even and odd numbers.—*Vinita Prasad, Cobb County School District, Marietta, Georgia.*

Math Matters®: A Thousand Theos: Doubling
Lori Haskins Houran, 2015. Ages 4–8, Preschool–Grade 3. ISBN 978-1-57565-803-2. Kane Press; http://www.kanepress.com



Benny is upset because he has lost his puppy, Theo. Benny's mom tapes a sign on their front door stating that Theo is lost. Benny is worried about Theo, and he does not know how he will be able to find him. His friends decide to help by posting signs throughout town. Each person posts one sign, and they tell two other people to post a sign. Before you know it, a thousand signs about Theo appear all over town. Finally, the ice cream man delivers Theo to Benny and says he saw a sign, so he knew Benny was missing his puppy.

Second graders did a great job with the doubling concept after listening to this story. We created an anchor chart displaying each doubling problem so they could see how easy it is to get to 1000. The book models addition problems as well, making working on them with your students quite easy. Illustrations throughout the story are engaging. Students were active participants throughout the story because they were solving the addition problems. Overall, this is an entertaining story on doubling and how doubling makes getting to such a big number easy.—*Vinita Prasad, Cobb County School District, Marietta, Georgia.*



Math MileMarkers®: Miss Penny Says Prove It!
Lynda Brennan, 2014. 61 pp., $23.99 paper. ISBN 9781-503-21854-3. Math4Minors LLC/Create Space; http://www.mathmilemarkers.com

This is a short story of a mathematics lesson followed up with instructional materials and content standards. This lesson was prompted by a teacher's response to a student bringing his marble collection to school. Students estimate the size of the collection. Miss Penny teaches how the collection can be counted and that the number of marbles does not change even when the collection may look large or small in comparison to its surroundings.

After the short story is a detailed analysis of different ways that this singular lesson could be applied and used for future teaching. The analysis begins with a broad discussion of the Common Core's mathematical practices and content standards, then puts them into terms that teachers can use and activities that will engage students.

Overall, the book helps teachers see the ease of using students' knowledge and interest to lead into a lesson. The detail and analysis that comes from the lesson helps educators understand how the Common Core learning standards can be readily accessed through an activity-driven teaching style rather than a lecture. The contents are directed at educators of the youngest students in formal schooling situations, but the depth of the discussion can be useful for all educators.—*Shay Kidd, University of Wyoming–Laramie.*

Ten Pigs in Bed
Steven Anderson, 2016. 24 pp., $7.95 cloth. ISBN 978-163290-385-3. Cantata Learning; http://www.cantatalearning.com

An adaptation of the children's song "*Ten in the Bed,*" this book explores the pattern of one less each time a pig rolls over and falls out of bed. After reading the book with multiple preschool and kindergarten classes, I found that preschoolers were more likely to use fingers to visually count "one less" than kindergartners. The bright colors and comedic faces in the book engaged students with the feelings and actions of the pigs on the ground. Illustrations showing pigs both in and out of bed helped students see number patterns within ten (e.g., when four pigs were in bed, six pigs were out). The words can be sung as an illustrated song with the sheet music (p. 23), enclosed CD, website, or QR code.

The change in word pattern partway through was a challenge that disrupted student participation. The first seven pigs are consistent with the original lyrics. The lyric pattern changes for the eighth and ninth pigs, then changes again for the last pig. The loss of the sing-song pattern affected student counting with preschoolers.

Overall, I recommend this book to preschool and kindergarten teachers as an interactive read-aloud or small group discussion. However, I suggest reading it without a sing-song intonation first and adding the music later.—*Kristy Litster, Utah State University–Logan.*