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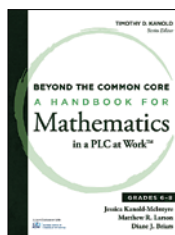
BOOKS

FROM NCTM

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Beyond the Common Core: A Handbook for Mathematics in a PLC at Work, Grades 6–8

Jessica Kanold-McIntyre, Matthew R. Larson, and Diane J. Briars, 2015. 224 pp., \$29.95 paper. ISBN 978-1-936763-48-1. Stock no. 14968. NCTM, co-published with Solution Tree; www.nctm.org.



Systematic approaches to teacher collaboration in a school setting are typically structured in continuous improvement cycles. These cycles involve such practices as backward planning, examination of student work, and lesson study. This book, a companion to the 2012 *Common Core Mathematics in a PLC at Work™*, serves as an overarching process guide for teacher teams. The handbook demonstrates eight high-leverage team actions (HLTA) with discussion tools and examples.

HLTAs are clustered for use before, during, and after a unit. For example, before a unit, these actions focus on making sense of standards, identifying

quality tasks, and developing assessments. During the unit, HLTAs involve effective task implementation and discuss using assessment to adjust instruction. Postunit HLTAs describe evidence-based goal setting. The handbook includes examples of middle-level mathematics tasks that are grounded in research and aligned with practices found in the Common Core State Standards for Mathematics.

The tools and rubrics, although specific to the *PLC at Work™* process, are adaptable to a range of potential users. Chapter 1 provides detailed connections between the NCTM *Principles to Actions* framework and backward design. Chapter 2 touches on multiple ideas in limited space. Readers interested in key ideas, such as maintaining the cognitive complexity of a task or learning about strategies for effective group work, could benefit from further examination of the extensive references.

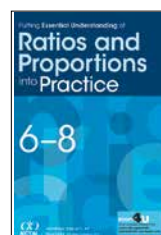
Missing in this volume is attention to equity-based practices that support the mathematical learning of all students. One option for interested educators would be to consider how the tools in this volume might be adapted to include these practices.

—Susan Gregson

University of Cincinnati
Cincinnati, Ohio

Putting Essential Understanding of Ratios and Proportions into Practice, 6–8

Travis A. Olson, Melfried Olson, Hannah Slovin, Hannah Slovin, and Barbara J. Dougherty, eds. 2015. 142 pp., \$34.95 paper. ISBN 978-0-87353-717-9. Stock no. 14349. NCTM; www.nctm.org.



This book, an extension of *Developing Essential Understanding of Ratios, Proportions, and Proportional Reasoning, Grades 6–8*, does exactly what the title implies: It offers practical ways to apply the Big Idea and several of the Essential Understandings introduced in the first book. The use of Pedagogical Content Knowledge, its definition in the introduction (knowledge of the learner, of the curriculum, of instructional strategies, and of assessment), and its application to the Big Idea and each essential understanding explored will be helpful to math teachers of all levels.

The vertical alignment contained in chapter 6: “Looking Back and Looking Ahead with Ratios and Proportions” covers the foundations necessary from grades 3–5 and the extensions into grades 9–12, making this book an excellent resource for mathematics teachers of many levels. The appendixes include additional resources and blackline masters of the tasks discussed in the book. A code for additional online, printable resources are included with the “More4U” feature.

Different chapters cover invariance and Essential Understandings 3, 7, 8, and 9. Each chapter begins with a discussion for the teacher-reader’s own knowledge and understanding, with reflective questions to help clarify the teacher’s own understanding of the math, and to anticipate what evidence is needed to determine student understanding. Tasks (problems) are posed, with midlevel student work shown.

“Show work” does not imply only

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procedural steps, but also includes a written explanation by the students of their thinking. The written explanation is extremely important in assessing the depth of student understanding. Correct, partially correct, and incorrect examples are included.

“Grading” each student’s work before proceeding with reading the text was very helpful in developing my own assessment skills in determining the level of student understanding. I found student work for Essential Understanding 3 to be the most surprising.

Students were asked which figure was “larger”? I assumed figure A with the larger area would be the obvious choice. Students in the midlevel grades who are moving from additive to multiplicative reasoning did not think the same way. Some students defined “larger” with diameter-type measurements, whereas others used perimeter. The need for well-defined attributes became apparent to the students who were used in the study as seen by the notes taken by one of the students.

These notes also make clear that the discussions and explanations of other students’ work is important for the growth of all students’ understanding. The discussion in chapter 5 on Essential Understanding 9 should be used in teacher education classes. Many would consider the explanations of Alison, Sheryl, and Keith concerning the way to determine the best buy to be incorrect or useless, yet they all exhibited progress toward sound proportional reasoning.

I will use this book as well as *Developing Essential Understanding of Ratios, Proportions, and Proportional Reasoning, Grades 6–8* (NCTM 2010) in math content classes for preservice teachers for grades 4–8 math specialists. Preservice teachers will grow in their own knowledge and understanding of ratios and proportional reasoning and in the assessment process by working the tasks, sharing their work

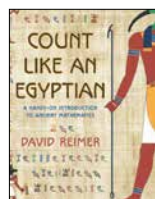
and listening to others, then examining and discussing the student work examples given.

—Lymeda Singleton
Texas A&M University—Commerce
Commerce, Texas

FROM OTHER PUBLISHERS

Count Like an Egyptian: A Hands-on Introduction to Ancient Mathematics

David Reimer, 2014. 256 pp., \$29.95 cloth. ISBN 978-0-691-16012-2. Princeton University Press; www.press.princeton.edu.



Count Like an Egyptian is exactly what it claims to be: a hands-on introduction to ancient methods of arithmetic computation. The author focuses primarily on Egyptian techniques, but he also includes brief descriptions of the mathematics of the Babylonians, Maya, and Greeks.

Many people have heard that Egyptian mathematics consisted solely of doubling and halving numbers and that this system used only unit fractions, fractions with a numerator of 1. Reimer uses this information as a starting point to show that doubling and halving form the basis, but not the entirety, of Egyptian computational techniques. He explains how the Egyptian version of a fraction makes perfect sense within its system. The Egyptian system could be easily dismissed because it was so different from our current one. Such an attitude severely undermines what the Egyptian scribes were able to compute with easy-to-understand techniques. The author emphasizes that Egyptian mathematics is not a series of rules to follow. Rather, it requires thinking and intuition. It takes very little time to understand the basics of the system. Within minutes, you will find yourself

thinking about numbers differently.

This book is a must-read for anyone interested in alternative algorithms. However, the text can get technical, which is the author’s stated purpose. He does not shy away from any complexities. If you are looking for a light read, this is not the book for you; if you want to learn some new math, this is the book for you.

—Michael Manganello
Downingtown High School
East Campus
Exton, Pennsylvania

Innovators in Action! Leonardo da Vinci Gets a Do-Over

Mark P. Friedlander, Jr., 2014. 208 pp., \$12.95 paper. ISBN 978-0-9678020-6-0. *Science Naturally!* www.ScienceNaturally.com.



Mark Friedlander’s book is a clever read for students and teachers in a primarily middle school setting. In some cases, entry-level high school students could tackle the book and carry ideas through to collaboration with classmates. Clever in design, the story covers all content areas of curriculum to the point at which students will be engrossed in learning and fascinated with content that they may neither appreciate nor truly understand.

The book can assist students in how to collaborate on and discuss content areas and problems that are typically not engaging or presented in a way in which students can actually experience their connections. It is an easy read filled with deep opportunities for teachers to help students explore, just as the characters do in the story. Because the characters are comparing and contrasting situations throughout the entire story, students will be engaged. It will also give teachers multiple entry points into the discussion. This book is

a fascinating way to introduce STEM into your classroom.

—Cassandra Zielinski
Mercer University
Atlanta, Georgia

KaZoon Kite Kit

\$6.95 Kit (W56772). Pitsco Education; www.pitsco.com.



This product, an engaging and inexpensive middle school activity, allows participants to use

straws, string, glue, and tissue paper to create different kites. The kit contains all materials (except a ruler and scissors) to complete the kite and includes detailed, easy-to-follow instructions for each step in the assembly. Illustrations are also included for the more detailed steps.

Assembling the kite takes approximately thirty to forty-five minutes. I recommend that instructors create the kite before the students attempt it. In a few steps, prior knowledge will help reduce assembly time and mistakes (e.g., guiding the string through the straws and lining the template on the fold of the tissue paper).

The assembled kite is four small connected tetrahedrons that form the shape of a larger tetrahedron. Four of these completed kites can also be tied together to make an even larger flying tetrahedron kite. My students were excited and motivated to make the kites and use them in their math project. They remained engaged, and the hands-on learning increased their understanding of the math concept I was teaching.

Many extensions are possible, including STEM activities. This product can help students understand the concepts

of angle measurement, area and volume, angles and polygons, and material strength. They will also be able to differentiate between similar and congruent figures, understand tetrahedral and polyhedral design, and problem solve in general.

—Denise Mirich
East Valley Middle School
Nampa, Idaho

Understanding and Enriching Problem Solving in Primary Mathematics

Patrick Barmby, David Bolden, and Lynn Thompson, 2014. 160 pp., \$29.32 paper. ISBN 978-1-909330-69-6. Critical Publishing; www.criticalpublishing.com.

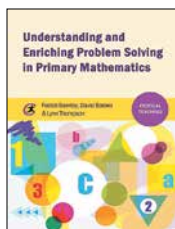
This book is a valuable resource for novice and experienced teachers of primary-age students as well as teachers

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interested in learning about problem solving. The first chapters review the concept of problem solving by defining what it is and what it

is not. Other chapters review methods of problem solving that are not limited by the age of the learner. Of particular note is the discussion on the role of prior knowledge in the problem-solving process. Using specific examples, the authors demonstrate the role and importance of making connections between what is known and what needs to be known. The potential drawbacks of prior knowledge are also explored.

Anyone teaching students math has most likely felt the struggle of teaching problem solving. Problem solving is often erroneously thought of as only solving word problems. Within this book, problem solving takes on a much broader definition. Additionally, the authors pose a series of critical questions and reflections that could easily serve as a guide to reflective practice.

Too often, math teachers have thought of problem solving as finding an answer that is either right or wrong. In the past, it often did not matter how one found the answer. Too little attention was also given to the process of problem solving. This book aims to assist teachers in transitioning their thinking and includes a chapter on assessing problem solving and on helping teachers begin to think about how they can assess children's problem solving.

The content of this book is appropriate for teachers at all levels of training and experience. It provides ample research to support the concepts presented. Although worthwhile reading for all educators, this book is particularly important reading for students in teacher education programs.

—Joanne C. Basta

*Edward Town Middle School, Sanborn
Niagara University, New York*

answers to palette

(Continued from pp. 82–83)

1. About 10.4 in.³
2. Approximately 21,900 ft.³ (rounding from alternative calculations may give slightly different answers)
3. 30 meters
4. Conjecture: The triangles all appear to be right triangles.
5. The angles are opposite the congruent sides of isosceles triangles.
6. The result is known as Thales' theorem. The proof is in the solutions.
7. About 8 miles per hour (mph)
8. December
9. No
10. 49/432
11. 5 inches
12. 8
13. 110
14. The sum of the side lengths
15. 2/9 miles
16. \$51

mathematics
teaching in the MIDDLE SCHOOL

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