

# NCTM Review of Pictorial Mathematics

tors can design curriculum and instruction for the mathematics classroom. At its core, it relies heavily upon AAAS (American Association for the Advancement of Science) project work along with NCTM's *Principles and Standards for School Mathematics*. It provides a framework where educators are encouraged to "help themselves" by engaging in a cycle of "inquiry, study, and reflection" to inform their decision making where "practice" decisions are concerned. A number of contexts are proffered for its use: to increase mathematics content and knowledge; design curriculum; inform instruction; influence assessment; advise preservice, in-service, and professional development; and facilitate leadership efforts in guiding decision making.

Approximately half of this book contains a thorough background that carefully explains the genesis of this project and its applications as they relate to instruction. Some of the more useful graphic organizers include the "Learning Cycle" circle (summarizing useful questions to ask) and a four-square template titled "Prior Knowledge Related to Topic." Visual aids of this type clarify the content for the reader and render the material easier to use. In addition, the practice vignettes do much to help teachers understand how this model may be used individually.

The second portion of the text details the actual study guides themselves; they broadly tackle everything from the knowledge needed to teach concepts to its implications for instruction through implications of research on student learning, clarity, and alignment with larger (state and district) curriculum mandates. This information is organized by content area and is very specific in citing sources, referenced page numbers, and so on.

As a model for curriculum design, it makes a good tool and is worthy of consideration by those engaged in these and related tasks. For the individual classroom practitioner, its content may be on the daunting side (if not overwhelming). Sifting through the information, though, should be a worthwhile and rewarding task for those interested enough to give it a try. For those charged with designing curriculum, there is much of value to consider.—*Kim A. Anderson, Birdville Independent School District, Haltom City, TX 76117.*

## **PICTORIAL MATHEMATICS: AN ENGAGING VISUAL APPROACH TO THE TEACHING AND LEARNING OF MATHEMATICS**

*Guillermo Mendieta Jr., 2005. 400 pp., \$34.95 paper. ISBN 0-9773212-8-2. Meaningful Learning Press; (909) 730-7312; www.PictorialMath.com.*

Modifying one's instructional practice to reflect the NCTM's Standards is challenging. It is particularly true when creating ways for students to "see" mathematics in more than the rote symbolic manner that dominated the classrooms in which most teachers (myself included) learned mathematics as children. Mendieta's *Pictorial Mathematics* represents the experience of more than fifteen years as a mathematics teacher in the diverse classrooms of Los Angeles and the insights gained from studying and enacting a concept-focused approach to mathematics learning. It also contains a wealth of high-quality, classroom-tested ideas that teachers can explore on their own and easily implement in their classrooms. In the author's words, "This book is grounded on the research of the role that multiple representations plays in the development of conceptual understanding" (p. 21).

The importance of multiple representations in mathematics learning is evident by the prominence of Representation as one of the Process Standards in *Principles and Standards for School Mathematics* (NCTM 2000). Using multiple representations to help students gain access to important concepts and relationships is critical to improving students' understanding of mathematics. This book provides tremendous help in supporting students in working toward this goal.

*Pictorial Mathematics* is not simply a compendium of visual representations that one decides how and when to insert into the curriculum. Rather, it is written by a teacher, for use by other teachers, with an appreciation that important in students' developing conceptual understanding is their ability to "transform" and "translate" within and between representations. Thus, Mendieta provides exercises that require students to generate equivalent representations within the same model (transformations) as well as those requiring trans-

lations from one form of representation to another. This feature makes the book exceptional in terms of its pedagogical value and potential to positively impact student learning.

The book's accompanying "teacher notes" make transparent what are often subtle yet pedagogically powerful modifications to the way in which students are asked to engage in thinking about, and reasoning with, the representations. What is more, the resources inside the book go beyond visual representations to include games and investigations that support the development of conceptual understanding. The material appears as blackline masters, making it easy for teachers to adapt it for use on an overhead projector or in printed form.

I strongly recommend this book for teachers who want to expand their ability to support students' development of conceptual understanding through the use of visual representations. Although the resources offered are drawn from several content strands—Number and Operations (including whole numbers, integers, and rational numbers), Algebra, Geometry, and Probability and Statistics—the book has just over one-half its pages devoted to decimals, fractions, ratios, and algebra. This makes sense, given that students often find these topics challenging to understand. Although useful to teachers from K–12, *Pictorial Mathematics* is invaluable to those who teach mathematics from grade 4 through algebra.—*Mark Ellis, California State University—Fullerton, Fullerton, CA 92834-6868.*

## **SHARING SUBMARINE SANDWICHES: A CONTEXT FOR FRACTIONS, GRADES 5–8**

*Catherine Twomey Fosnot, Maarten Dolk, Antonia Cameron, and Sherrin B. Hersch, 2006. ISBN 0-325-00898-1. 88 pp.*

## **WORKING WITH THE RATIO TABLE: MATHEMATICAL MODELS, GRADES 5–8**

*Catherine Twomey Fosnot, Maarten Dolk, Antonia Cameron, Sherrin B. Hersch, and Bill Jacob, 2006. ISBN 0-325-00896-5. 112 pp. \$49.50 ea., paper. Greenwood Heinemann Publishing Group; (800) 255-5800; www.heinemann.com.*