**G IS FOR GOOGOL: A MATH ALPHABET BOOK**


This book is written by David M. Schwartz, who is also the author of *How Much Is a Million?* and *If You Made a Million*. In this selection, from a for abacus to z for zillion, each letter of the alphabet serves as the foundation for a definition and a whimsical narrative of a mathematical term or application. Historical information, artistic correlations, and scientific applications strengthen students' understanding of the mathematical vocabulary. Colorful illustrations, such as dancing jelly beans, a Möbius man, bunches of broccoli, and graphs of the race between the hare and the tortoise, enhance the text. Unlike in most alphabet books, for each letter the author lists one to thirteen additional mathematical terms, which are then defined in the glossary.

Middle school students and teachers who read *G Is for Googol* enjoyed the book but found some errors in the material. Specifically, *odds* and *probability* are used interchangeably, and a dodecahedron is defined in the text as a figure that has twelve faces ("all hexagons") but in the glossary, as having regular pentagonal faces. In addition, the glossary definitions of *circle* and *parallel lines* do not include the qualifier "in a plane." Finally, prime numbers are listed as 2, 3, 5, 7, 11, 13, 17, and so on, but the next sentence states, "No even numbers are primes because they are all divisible by 2."

Although finding errors in the material is somewhat disappointing, I would still recommend this book to middle school and high school teachers. The book is fun to read and visually pleasing and offers many possibilities for cross-curricular activities.—Barbara A. Cain, Thomas Jefferson Middle School, Merritt Island, FL 32955.

**TEACHING AND LEARNING MATHEMATICS: A TEACHER’S GUIDE TO RECENT RESEARCH AND ITS APPLICATION**


This book offers a broad overview of recent studies in mathematics teaching and learning. As the title suggests, the book is intended for teachers who would like to integrate research into their classroom practices. One of the strengths of the book is that it covers a wide range of research, spanning the primary grades through secondary school, and the scope of research is international. The chapters are organized according to topic, such as number and calculation or algebra.

As a teacher, I had several problems with the book. First, I thought that the research focused on the constructivist paradigm at the expense of other frameworks. Although constructivism and related perspectives have much to say about instruction and learning, I would have liked a more balanced approach. Second, the book relates the results of a large number of studies with less emphasis on how teachers might easily use these findings in the classroom. Third, the language of the book is technical, aimed more at the researcher or academic than the classroom practitioner. This perspective makes transferring the reported research into action difficult for the typical teacher.

Although this book is of interest to teachers and administrators who want to broaden their knowledge of current research in mathematics education, it seems less useful for teachers who want practical suggestions about improving instruction.—William M. Carroll, Chicago, IL 60657.

**COMPREHENSIVE ASSESSMENT OF MATHEMATICS STRATEGIES BOOKS AND TEACHER’S GUIDE**


The Comprehensive Assessment of Mathematical Strategies (CAMS) program is designed to help students use mathematical strategies to strengthen their understanding of number, identify their levels...
of mastery for twelve mathematical strategies, and provide practice with self-assessment and goal setting. The teacher’s guide contains information about the program to help the teacher identify students’ levels of mastery of the mathematical strategies. The guide also includes a reproducible student handout for understanding the strategies, reproducible student self-assessment and teacher assessment forms, and a class performance chart. A management-software CD can be used to generate student and class reports and to analyze student performance.

Ten lessons appear in each book. Each lesson requires sixty minutes and begins with a short scenario to spark student interest. Twelve multiple-choice questions emphasize each of the twelve mathematical strategies follow the scenario. The strategies, which are the same for all grade levels, are building number sense, using estimation, applying addition, applying subtraction, applying multiplication, applying division, converting time and money, converting customary and metric measures, using algebra, using geometry, determining probability and averages, and interpreting graphs and charts. After completing the fifth and tenth lessons, students complete a self-assessment in which they rate their success, identify areas of improvement, and determine their need to search in the back of the book to find solutions. Appropriate materials are listed at the beginning of each chapter. Each chapter also includes blackline masters for student handouts and overhead transparencies, eliminating the need to search in the back of the book to find these materials. This book does not “tell” students how to do things but rather gives them the power to make decisions and arrive at logical conclusions that are based on observations and insights made while working on the activities. The appendix gives suggestions for videocassettes, posters, Web sites, and other useful resources that can be used for each chapter.

The author, Jill Britton, is a teacher who understands middle school students. This book is the result of her extensive work with middle school students who participated in author-directed summer camps in which explorations of mathematical patterns and beach biology provide the themes for learning. The activities in the book are those that have proved to be successful with the middle school campers. Britton recommends these activities as “a break from daily math routine.”

The projects are organized in order of difficulty. The first part of each chapter outlines a specific sequence for the activity. Adherence to the sequence is recommended because the activities contain subtle complexities that lead to understanding the projects that follow. Important vocabulary lessons are built into each project. Each project also offers opportunities for students to develop insights and perceptive skills through activities that connect mathematics with topics that they understand, such as the alphabet, flags, sign symbols, company logos, mirrors, bubbles, food, and kaleidoscopes. Geometry connects with tessellations, Islamic tessellations connect with social studies, and many other connections can be made by the astute student. Lessons about the art of M. C. Escher connect art, geometry, iterative patterns, art history, and imagination. Such lessons require keen perceptive skills that students have been building as they progress through the book. The last chapter suggests an activity using Tessellmania computer software and iron-on transfers to make T-shirts. Students who are creative and imaginative can explore symmetry and tessellations further after using this book.

I highly recommend this book to teachers who are looking for interesting activities that engage students in thinking about mathematics, provide opportunities for creativity, and allow students to enjoy the patterns of mathematics.—Elaine de Wet, Canyon Hills Junior High School, Chino, CA 91711.

MATH GAMES: CALC! DECK C: WHOLE NUMBERS, DECIMALS, INTEGERS, GR. 5–10


The CALC! classroom game includes two decks of double-sided cards that resemble calculators. The purpose of the game is to form a mathematical expression that is equal to the value shown in the card’s “display” using the marked number and operation “keys.” Deck C is recommended for grades 5–10 and includes whole numbers, decimals, and integers. Deck D adds exponents to the mix. I used Deck C with all my seventh-grade students and Deck D, only with honors classes.

CALC! encourages mathematical
thinking and the development of skills in number manipulation, and my students thoroughly enjoyed playing it. One student wrote, “It is the kind of game that stimulates the brain without the person playing the game knowing it.” I used the game both as a whole-class activity and for small-group play. I was gratified to see the students communicating in conversations that were based on mathematics.

Deck D is recommended for grades 6-10, but some of the cards in this deck were difficult for my seventh-grade algebra students. I would recommend using this deck with second-year algebra students or those who are more advanced. I do not think that either deck reaches a ceiling of difficulty. My students and I also observed that the level of difficulty varied greatly in each deck.

My students enjoyed playing this game and have asked to play it again. Any educational activity that students ask to play gets an A in my gradebook!—Linda King, Windsor Middle School, Imperial, MO 63052.

METRIC FOR ME!

This low-key booklet is nonthreatening and clearly meets its goal of presenting metric concepts in such a way that a layperson can understand and apply them to everyday life. The reader can choose from several levels of learning, ranging from a quick overview to the full course. In addition, a section introduced in this second printing addresses the needs of readers in technological fields.

Metric for Me! is well written, easy to read, and contains minimal symbols. Three main chapters teach about length, volume, and mass. A brief section at the end discusses temperature. Each chapter includes a section on concepts, hands-on exercises, review problems with answers, and estimations. Some blank pages are provided for notes, and a large wall chart summarizes the main thrust of the booklet.

The author encourages the reader to gain insight and confidence in using metric units through a series of activities that focus on measuring or estimating various quantities. For example, the reader develops a sense of the length of a kilometer by estimating distances in kilometers between major cities in the United States.

Although the author counsels readers to avoid it, he also provides a section devoted to conversion of metric and English units. The technology supplement explains certain basic units that are used in applications of mass, weight, force, pressure, heat, energy, work, power, and torque.

This booklet is self-contained and could be used by a teacher with little or no additional preparation. The body of the booklet could be used as an introduction for middle school or junior high students who have difficulty in mathematics and science. I encourage teachers to explore its possibilities.—Elisabeth Fraser, The Peck School, Morristown, NJ 07960.

3D PROBLEM SOLVING: DRAWING, BUILDING AND EVALUATING WITH OMNIFIX CUBES

This set includes 125 Omnifix cubes and an activity book. The cubes are plastic and about a half-inch wide. The activity book contains an introduction on how to use the cubes and forty-eight activity worksheets. The book also has an appendix with copies of grid paper of different sizes.

These materials can be used to help develop essential spatial relation skills in middle school students. The activities extend students’ thinking by providing challenges that help them to generalize and draw inferences while engaging in higher-order thinking and problem solving.

My students enjoyed working with these manipulatives and activities. They were curious and imaginative in their problem solving. At the end of the unit, the students had a much better understanding of three-dimensional space and its use in mathematics.

We encountered several problems with the cubes. First, the cubes had to be linked to make a larger cube but several were deformed and useless. Students wanted to open and close the cubes, but they are not particularly sturdy and broke easily. A teacher would need 250 cubes to allow each student in a classroom to manipulate them freely. The art teacher and I worked together with these materials. She gave me examples of three-dimensional artwork, which I showed the students. They enjoyed seeing the connection between art and mathematics, and I plan to do a more visual “art” activity with the students at the end of the year.

I would highly recommend these activities for any level of mathematics student in grades 6–9.—Matthew Tucker, Nichols Middle School, Evanston, IL 60201.

WHEN IS AN A NOT AN A? ASSESSING LEVELS OF MATHEMATICAL THINKING

This selection presents a process to evaluate students’ work on the basis of mastery of levels of mathematical thinking, including the abilities to recall, apply, understand, and extend information. The author’s opinion is that “an A is an A” when a student has attained at least 80 percent mastery of material at the highest level of thinking when solving extensions of given problems.

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Tests and performance tasks are designed sequentially, from recalling to extending knowledge, to facilitate scoring. Scored examples and detailed charts of percents provide grading guidelines. I recommend using this book with other teachers to share the test-design responsibilities and the scoring and interpretation of results. Adopting this evaluative procedure will be easier for those who use specific behavioral objectives in their units. Teachers who use 4MAT lesson design will recognize the four levels of student learning.

Activities for designing level-specific tasks, as well as master copies of tasks and tests, are given. Staff development instructors could assign practice work for teachers directly from this book rather than create instructional materials. A wide range of topics from the middle school mathematics curriculum is presented. The example of a test record sheet contains errors, but these do not affect understanding of the method.

This set of activities is a valuable resource to help a teacher master the techniques of assessing students’ thinking.—Nancy W. Lewis, Thurmont Middle School, Thurmont, MD 21788.

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