

to teach the sounds they make. The animal sounds are excellent, although a "city slicker" may have trouble identifying the pig.

The order of activities within a section is random, so repeated use is instructional. The Print Reward option allows pupils to take home a concrete measure of their performance. The user can select activities in any order, quit the program, adjust the volume, or have directions and sounds repeated during an exercise. A twelve-page explanatory booklet accompanies the disks.

Strengths

Verbal responses to answers give immediate feedback, color is vivid, high-resolution graphics are appealing, and sound effects and human voices are very real. The program can be used for individual or group instruction.

Weaknesses

Initial verbal directions for a section are not consistent; that is, some are very specific and others are general. In *Bus Route*, both the streets and the border of the map are black, making the two indistinguishable. On page 7 of the booklet the pictures for *On the Farm* and *At the Aquarium* are interchanged.

Recommendation

The program has many virtues. Although only one of four sections involves strictly mathematics, the attractive graphics of all sections can be used by a creative instructor to teach many mathematics ideas.—*Glenn D. Allinger.*



For Teachers

From NCTM

20 percent discount for individual NCTM members on NCTM publications

Mathematics Projects Handbook, *Adrien L. Hess, Glenn D. Allinger, and Lyle E. Andersen.* 1989, v + 52 pp., \$5 paper. ISBN 0-87353-283-X. National Council of Teachers of Mathematics, 1906 Association Dr., Reston, VA 22091.

Mathematics Projects Handbook is a short booklet designed to help junior high and high school teachers direct their students in the

Edited by Grace M. Burton
University of North Carolina
at Wilmington
Wilmington, NC 28403

Hilde Howden
Mathematics Consultant
Albuquerque, NM 87114

development of a mathematics project. This booklet gives guidance in selecting, researching, developing, and presenting a project. A bibliography on suggested topics is given.

This handbook has three main chapters: "Developing a Mathematics Project," "Looking for Ideas," and "General Topics." A section on resources is also included. The handbook explains the purpose of a project and what a student should accomplish while carrying out the project. It directs the student in the selection of a topic and tells how to do research once a topic is chosen. The final step in a project is the preparation of the exhibit. Ideas about use of material and methods for designing the exhibit are given. The evaluation criteria used to judge mathematics projects are included and discussed.

The selection of an appropriate topic is probably the most important step in the project. In the chapter "Looking for Ideas," the authors give an extensive list of ideas for a high school project and a brief list of ideas for a junior high school project. This chapter should be extremely helpful to students and teachers.

The chapter "General Topics" gives examples of the way in which a particular project can be selected and developed. Group theory, the golden section, four-dimensional geometry, and numerical analysis are a few of the topics discussed. Suggestions are given to stimulate further thought and study in each area. Resources are included for each topic.

In a brief booklet, the authors give insight into what a mathematics project should be, how it should be chosen, and how the project should be executed. This booklet is an excellent reference for any teacher who is involved with mathematics projects in junior high and senior high school.—*Sandra McLaurin, University of North Carolina at Wilmington, Wilmington, NC 28403.*

From Other Publishers

Building Thinking Skills: Book 3 Verbal, Workbook, and Teacher's Manual, *Howard Black and Sandra Black.* 1985, 1988 (*lesson plans and teacher's manual*); 350 pp. (*workbook*), 327 pp. (*teacher's manual*); \$19.95 *workbook*, \$15.95 *teacher's manual*. ISBN 0-89455-300-3 (*workbook*), 0-89455-301-1 (*teacher's manual*). Midwest Publications, P.O. Box 448, Dept. 17, Pacific Grove, CA 93950.

This workbook, the fourth in a series on thinking skills, deals specifically with the verbal areas of similarities, sequences, and classification. A companion *Book 3*, not being reviewed here, deals with the figural area. Although the exercises can be used as supplementary material for an existing course, the authors recommend that thinking-skills activities be implemented in a structured, sequential manner in conjunction with content objectives.

Teachers who recognize that content materials often prescribe a cognitive task, such as classification, without explaining the subtle

steps that are involved in the ability to classify will be delighted with the orientation of this volume. Knowing that the thinking process is likely to be de-emphasized when dealing with content objectives, the authors designed the workbook pages to preserve the goal of thinking as a separate entity.

Since the failure specifically to address and cultivate higher-order thinking skills may be the source of learning difficulties as students enter the middle years, it is useful to find exercises that deal developmentally with similarities and differences, sequencing, classification, and analogies, as required in all content areas, including the arts.

Vocabulary building is the key skill being addressed in the verbal-sequences strand, although figurative illustrations are used rather than reliance made solely on degree of meaning. An excellent section on sequences involves mapping and describes locations using maps. This crossover area for mathematics and social studies is worth noting for its emphasis on locating points x and y , counting the number of blocks, and telling directions.

An overview of current programs for teaching thinking or reasoning skills, along with the types of assessment that have been used to evaluate them, substantiates the notion that addressing single skills in isolation is rarely very effective in the long run. The skills developed by the exercises in the book are so linked to content that they do not have the feel of an isolated process.

Another strength of this workbook is the accompanying teacher's manual with lesson plans. It is so systematic and explicit that even an educator not familiar with any of the techniques being used would have no trouble using and extending them. Excellent discussion tips and notes regarding application to each area of the curriculum are included. The flow-charting in the lesson-plan book would be most helpful to the mathematics educator who is implementing an understanding of computer programming. It helps students to see the logical flow of ideas, which is necessary to efficient problem solving.

Although not designed specifically for the mathematics classroom, much of the material contained in this workbook would prove useful for any teacher concerned with leading students to become critical thinkers.—*Ann Lockledge, University of North Carolina at Wilmington, Wilmington, NC 28403.*

Children's Mathematics, *Geoffrey B. Saxe and Meryl Gearhart, eds.* 1988, 111 pp., \$14.95 paper. ISBN 1-55542-884-3. Jossey-Bass, 350 Sansome St., San Francisco, CA 94104-1310.

"It is our hope," write editors Saxe and Gearhart, "that, through exposure to the diversity of research questions represented in this volume, readers will gain a respect for the complexity of children's mathematics learning—particularly for the intricate ways that sociocultural and affected processes are interwoven with the developmental process." This volume brings to-

gether discussions of five studies about the development of mathematical understandings in children and adults and, in four of the five chapters, includes brief discussions of recommended educational applications drawn from the research.

The chapters are very readable and present the research in a way that causes the reader to ponder current instructional practices. The thought that what is valued is of great influence comes to mind as one examines mathematics learning and the social contexts in which it is taking place.

Included in the volume are a chapter by Klein and Starkey on a three-component model of arithmetic development in young children and a discussion by Stigler and Perry about their comparative study of mathematics teaching in Japan, Taiwan, and the United States. Hatano looks at abacus experts who focus on rapid calculation but demonstrate little conceptual understanding and compares them with street vendors who demonstrate a conceptual competence.

Carraher, Schliemann, and Carraher examine out-of-school mathematical practices in which children and adults demonstrate an understanding of complex mathematical concepts. A discussion of school practices and this research view of everyday practices is definitely thought provoking. The final chapter is a discussion by Ginsburg and Asmussen on the ways in which affect, belief, and motive are interwoven into the development of mathematics understandings. Experiences and beliefs seem greatly to influence how individuals approach or avoid mathematics.—*Jeanne M. Joyner, North Carolina Department of Public Instruction, Raleigh, NC 27603-1712.*

Do Nows, *Doug Monteath and Don Volle*. 1989. 90 pp., \$9.50 paper. ISBN 0-86651-464-3. *Black-line masters*. Dale Seymour Publications, P.O. Box 10888, Palo Alto, CA 94303.

Do Nows is a book of ninety black-line masters with a variety of mathematical problems designed to nurture mental mathematics, estimation, and thinking skills. A "do now" is a five-to-ten-minute activity given to students at the beginning of mathematics class as a focus or warm-up before the day's lesson begins. It is intended for use with prealgebra and beginning algebra students; a knowledge of algebra is not required.

In selecting the items for "do nows," the authors were guided by the *Mathematics Framework for California Public Schools Kindergarten through Grade Twelve*. One of the most important features of these exercises is that they are modeled after different standardized tests that students encounter. The authors suggest that only two or three of these activity sheets be used each week, alternating with homework review, frequently missed problems, or challenging problems from other resources for variety.

The black-line masters were originally designed for use with the overhead projector, with students writing answers on notebook paper; however, they can be reproduced as handouts.

The authors believe that use of the overhead projector would encourage more mental mathematics. They recommend that teachers initially demonstrate thinking strategies for easier, more efficient methods of solution. Calculator use is *not* recommended.

A "do now" is an attractively printed eight-and-one-half-by-eleven-inch page containing four problems; skills in decimals, fractions, percentage, quantitative comparisons, geometric concepts and measurement, probability, averages, equations, and word problems are included. Additional features are an answer key and a blank do-now sheet for teachers to generate their own problems. A great strength of this book is that students maintain important concepts by continually reviewing facts and problem-solving techniques learned in earlier mathematics courses.—*Frances Southerland, Eastern Wayne Elementary School, Goldsboro, NC 27534.*

Exploring Mathematics: Activities for Concept and Skill Development, K-3, *Jean M. Shaw*. 1990. ix + 160 pp., \$12.95 paper. ISBN 0-673-18811-6. Scott, Foresman & Co., 1900 E. Lake Ave., Glenview, IL 60025.

Exploring Mathematics is primarily a sourcebook for teachers of pupils in kindergarten through grade 3. It may also serve as a valuable resource for parents looking for motivating home activities to promote mathematics achievement and reinforce the ideas taught at school.

The activities for concept and skill development are based on the idea that young pupils learn best by doing. Entertaining, hands-on activities like "pipe cleaner numerals," "fingerprint graphs," and "punch-a-shape" give pupils the opportunity to learn mathematics the way they learn best—through meaningful experiences. Each activity is written in a standardized, easy-to-read format. Introductory information alerts the reader to the potential of each activity. Objectives tell specifically what the pupils will accomplish. Instructions for preparing and conducting each activity give the teacher a clear idea of what to do both before and during the exercise.

The book addresses topics deemed important by the National Council of Teachers of Mathematics in their *Curriculum and Evaluation Standards for School Mathematics* (Reston, Va.: The Council, 1989). The chapter on numeration emphasizes meanings of numbers as well as work with symbols. Ideas for teaching computation and basic facts are found throughout, and the chapters on problem solving and using calculators furnish extended exercise in mathematical thinking and computation. Chapters on data collection and analysis, fractions, geometry, and measurement present many high-quality experiences for young pupils that can extend and deepen their understanding and appreciation of mathematics.

Shaw's book is an easy-to-use resource for teaching mathematics. Her approach is creative and her vision clear. The activities and topics are consistent with current research in mathematics education and should help teachers meet

the challenge of preparing pupils for the twenty-first century.—*Kathy Sabella, New Hanover County School, Wilmington, NC 28403.*

Exploring Mathematics: Activities for Concept and Skill Development, Grades 4-6, *Jean M. Shaw*. 1990. ix + 160 pp., \$12.95 cloth. ISBN 0-673-18812-4. Scott, Foresman & Co., 1900 E. Lake Ave., Glenview, IL 60025.

This book is designed for teachers of grades 4-6. It furnishes many activities for use with mathematics classes, including advanced primary-grade students and remedial middle school students. The book covers eight areas: numeration, computation, problem solving, calculators, fractions and decimals, graphs and statistics, geometry, and measurement. Five activities are presented for each area. All visual aids, charts, worksheets, or game boards needed for patterns are supplied. The activities are divided into six parts: objectives, materials, preparation, conducting the activity, evaluation, and extension; this format is very helpful. Most of the activities seem appropriate for the intended grade levels, although I suspect that fourth graders would be less able to do some of the activities at independent work stations. This book seems a perfect resource for learning centers.—*Jodi A. Davis, Camp Lejeune Dependents' Schools, Jacksonville, NC 28542-5005.*

Language and Mathematics Education, *Raymond Zepp*. 1989. x + 262 pp., \$29 paper. ISBN 962-308-007-9. UEA Press, Office Tower, Shun Tak Centre, 200 Connaught Rd. Central, Hong Kong, China.

Language and Mathematics Education by Raymond Zepp presents an introductory survey of linguistic issues in the teaching of mathematics to "introduce teachers to the idea that language does play a major role in the formation of mathematical concepts, in the use of logical inference, and in the social structure of the classroom." Although the book ranges widely over topics drawn from language acquisition, linguistics, sociolinguistics, and mathematics, the central question addressed is the extent to which language affects the teaching and learning of mathematics.

In chapters 1 through 4, Zepp explores relationships among thought, language, and mathematics, pointing out important differences between the fuzziness and contextual dependency of everyday language and the precision and abstraction of mathematical language. Chapter 6 surveys evidence from correlational studies concerning these relationships but draws no clear conclusions. Chapters 4 and 5 deal with the role of language in logical inference and in problem solving. Chapters 7 through 11 investigate the effects of different languages, cultures, and forms of representation on the learning of mathematics. The last chapter is a review and synthesis of ideas, with some useful suggestions, especially for persons teaching mathematics to students from non-Western cultures and linguistic traditions.

On the one hand, the persistent reader will