

Making Sense of Mathematics

EDITOR Beverly J. Robinson-Rumble

SENIOR CONSULTANTS Humberto M. Rasi
Reo E. Ganson
C. B. Rock

CONSULTANTS

SOUTH AMERICA Roberto C. Azevedo

AFRICA-INDIAN OCEAN Phenias Bahimba

SOUTH PACIFIC Lester Devine

INTER-AMERICA L. Herbert Fletcher

SOUTHERN ASIA K. Jesuratnam

MIDDLE EAST Svein Johansen

EASTERN AFRICA Hudson Kibuuka

NORTH AMERICA Gordon Madgwick
Gilbert Plubell

EURO-ASIA Harry Mayden

GENERAL CONFERENCE Enrique Becerra
Agrisino Segovia

EURO-AFRICA Ronald Strasdowsky

FAR EAST Shozo Tabuchi

SOUTHERN AFRICA V. S. Wakaba

TRANS-EUROPE Orville Woolford

BOOK REVIEW EDITOR Clarence Dunbein

RESEARCH EDITOR Jerome D. Thayer

DESIGN DIRECTOR Howard Bullard GraphicDesign

ADVISORY BOARD Reo E. Ganson
John Fowler
Kathy Goddard
Marion Hartlein
Dunbar Henri
Betty Howard
Gordon Madgwick
Wallace Minder
Humberto M. Rasi
Michael Ryan
Janice Saliba
Agrisino Segovia
Virginia Smith
Don Weatherall



THE JOURNAL OF ADVENTIST EDUCATION publishes articles concerned with a variety of topics pertinent to SDA education. Opinions expressed by our writers do not necessarily represent the views of the staff or the official position of the Department of Education of the General Conference of Seventh-day Adventists.

THE JOURNAL OF ADVENTIST EDUCATION (SSN 0021-8480) is published bimonthly, October through May, and a summer issue for June, July, August, and September by the Department of Education, General Conference of Seventh-day Adventists, 12501 Old Columbia Pike, Silver Spring, MD 20904-6600. TELEPHONE (301) 680-5075. FAX (301) 622-9627. Subscription price, U.S. \$15.75. Single copy, U.S. \$3.25. Second-class mailing paid at Silver Spring, Maryland, and additional mailing office. Please send all changes of address to Southwestern ColorGraphics, P.O. Box 677, Keene, TX 76059, including both old and new address. Address all editorial and advertising correspondence to the Editor. © Copyright 1994 General Conference of SDA. POSTMASTER: Send address changes to THE JOURNAL OF ADVENTIST EDUCATION, P.O. Box 677, Keene, TX 76059.

Why devote an entire issue of the JOURNAL to mathematics? Consider the following incidents:

Some researchers asked a number of students to solve this problem: "There are 125 sheep and 5 dogs in a flock. How old is the shepherd?" Three-quarters of the students divided or otherwise manipulated the numbers provided to produce a numerical answer to this nonsensical word problem.¹

In another study, students were given the following problem: "The army has 1,123 soldiers that need to be transferred from one base to another. Each bus will hold 36 soldiers. How many buses are needed?" Twenty-nine percent of the students answered, "31, remainder 12."² These students apparently didn't realize that they had given the 12 soldiers in the "remainder" a long walk to the new base.

What do these illustrations have in common? They highlight some of the shortcomings of the traditional curricula of elementary mathematics classes during the past few decades. Math textbooks tend to emphasize the mastery of algorithms—sets of rules and procedures that, once memorized, can be applied directly to math problems. This approach places little emphasis on constructing knowledge, justifying answers, encouraging divergent solution strategies, or *understanding* what one is doing when he or she tries to solve a problem.

Not only public education, but also Adventist schools can use some help in improving their mathematics teaching, as Reo Ganson points out in his lead article.

To help raise standardized test scores, and to address a variety of other concerns about current mathematics curricula and teaching methods, the National Council of Teachers of Mathematics has proposed new curriculum and evaluation standards for mathematics. The articles in this issue of the JOURNAL offer some ideas for implementing these recommendations.

For the early grades, the NCTM standards recommend that teachers place less emphasis on complex pencil-and-paper calculations and give more attention to developing number sense, as well as working together cooperatively and using manipulatives. Robert Moore's article on number sense, Beverley Bucknor's on manipulatives, and Helene Hubbard's on teaching math in a multigrade classroom provide some strategies relating to these areas. Kenneth Shaw gives us some insights into what the revitalized mathematics classroom will look like.

The NCTM standards also stress the importance of relating mathematics to the real world. Many of the articles in this issue address this concern, but the one by Hans-Joachim Vollrath on Patch Pictures suggests a novel way to help students make direct connections between geometry and real life.

Shirley Freed's and Ruth Pope's articles, which offer some practical, hands-on strategies for effective use of writing and language in the mathematics classroom, and Ted Hodgson and Robert Moore's article, with its variety of suggestions for integrating faith and learning in creative secondary math teaching, complete the cluster of articles in this issue.

We feel sure that you will find some ideas in this potpourri that will make your math teaching more effective and enjoyable.—B.J.R.

1. Kurt Reiser, "Problem Solving Beyond the Logic of Things: Textual and Contextual Effects on Understanding and Solving Word Problems." Paper presented at the annual meeting of the American Educational Research Association, San Francisco, 1986.

2. This problem, taken from the National Assessment of Educational Progress, was reported by Gerald W. Bracey in "Elementary Curriculum Materials: Still a Long Way to Go," *Phi Delta Kappan* 74:8 (April 1993), p. 655.

The JOURNAL staff wishes to express its appreciation to Dr. Robert Moore, the unofficial advisor and coordinator for this issue on mathematics. Dr. Moore provided a list of potential authors, read manuscripts, offered suggestions, and wrote or cowrote several of the articles, which helped us present a comprehensive and balanced view of the changes needed in mathematics teaching. And he cheerfully participated in this blizzard of letters and faxes while he was moving from Southern College of SDA to his new post as a visiting professor at Montana State University.