

Contents

Preface ix

Introduction:

An Agenda for Action: Status and Impact 1

Shirley Hill, University of Missouri—Kansas City, Kansas City, Missouri

Recommendation 1

1. Problem Solving as a Focus: How? When? Whose
Responsibility? 9

Peggy A. House, University of Minnesota, Minneapolis, Minnesota

Martha L. Wallace, Saint Olaf College, Minneapolis, Minnesota

Mary A. Johnson, University of Minnesota, Minneapolis, Minnesota

A model for preparing teachers to make problem solving a focus of
mathematics instruction.

2. Problem Solving: It's Never Too Early to Start 20

*Grace M. Burton, University of North Carolina at Wilmington,
Wilmington, North Carolina*

Activities that develop problem-solving attitudes and abilities in young
children.

3. Focusing on Problem Solving in the Primary Grades 33

*Francis (Skip) Fennell, Western Maryland College, Westminster,
Maryland*

Activities for involving primary pupils in problem solving.

4. An Instructional Approach to Problem Solving 41

Richard Brannan, Lane Education Service District, Eugene Oregon

Oscar Schaaf, University of Oregon, Eugene, Oregon

A sample of materials from the Problem Solving in Mathematics (PSM)
project funded under ESEA Title IV-C.

5. Eureka! A Problem-solving Course for the Pittsburgh
School District 60

Howard G. Bower, Pittsburgh Public Schools, Pittsburgh, Pennsylvania

A one-semester course for high school that stresses problem solving with an
emphasis on problems related to engineering.

6. A Senior High School Problem-solving Lesson 70
Beth M. Schlesinger, Gompers Secondary School, San Diego, California
 A model problem-solving lesson using Martin Gardner's "Social Security Number Problem."
7. Identification and Analysis of Specific Problem-solving Strategies 79
Hunter Ballew, University of North Carolina, Chapel Hill, North Carolina
 Two specific problem-solving strategies are identified and illustrated.

Recommendation 2

8. The Statistical Survey: A Class Project 89
Murray H. Siegel, Fulton County Schools, Atlanta, Georgia
 Details for using the statistical survey as a part of the elementary mathematics curriculum.
9. Estimation and Reasonableness of Results 97
Bob Underhill, Kansas State University, Manhattan, Kansas
 Models for teaching estimation through the use of ranges and parallelisms between measurements and operations.
10. Using the Front-Page News to Teach Mathematics 105
Betty Harmsen, Westside Alternative School, Omaha, Nebraska
 Specific examples of how headlines generate interesting problems for the mathematics class.
11. A Statistics Course to Lighten the Information Overload 110
Jim Swift, Nanaimo Senior Secondary School, Nanaimo, British Columbia
 Examples of problems in everyday life that require statistical techniques for investigation and interpretation.
12. Back to the Basics: One District's Response 120
Richard E. Cowan, Roanoke Rapids City Schools, Roanoke Rapids, North Carolina
 A district plan for identifying basic skills and incorporating them in instruction.

Recommendation 3

13. Teaching Place Value with the Calculator 128
Ray Kurtz, Kansas State University, Manhattan, Kansas
 Specific activities that use the calculator to develop and reinforce place-value concepts.

14. A Coordinate Graphing Microcomputer Unit for
Elementary Grades 131

Betty Collis, University of Victoria, Victoria, British Columbia

Geoffrey Mason, University of Victoria, Victoria, British Columbia

A unit combining coordinate graphing and computer literacy objectives with the use of the microcomputer.

15. Using Computers in Teaching Mathematics 143

Marjorie A. Fitting, San Jose State University, San Jose, California

A comprehensive overview of potential uses of computers at different levels in the instructional program.

Recommendation 4

16. Favorite Days in the Classroom 155

Joan Duea, University of Northern Iowa, Cedar Falls, Iowa

Earl Ockenga, University of Northern Iowa, Cedar Falls, Iowa

John Tarr, University of Northern Iowa, Cedar Falls, Iowa

Examples of instructional strategies and activities that promote an effective learning environment.

Recommendation 5

17. Diagnosing Student Error Patterns 163

Mary Ann DeVincenzo-Gavioli, Dominican College of Blauvelt,
Blauvelt, New York

An interpretation of students' mathematical capabilities from their written computations.

18. Factors That May Influence Performance on Standardized Tests . 169

Margaret McDonald, Kansas City Public Schools, Kansas City, Missouri

A report of one school's analysis of student performance on norm-referenced tests and factors that affect their performance.

19. Assessing and Improving a School's Mathematics Program, K-8 . 173

Nancy C. Whitman, University of Hawaii, Honolulu, Hawaii

A procedural model for the assessment and improvement of mathematics programs.

20. An Alternative to Conventional Methods of Evaluation 185

Hilde Howden, Albuquerque Public Schools, Albuquerque, New Mexico

A model for an innovative approach to evaluation.

Recommendation 6**21. An Enrichment Program for Students of Exceptional Capability . 191**

Eugene Jercinovic, Albuquerque Public Schools, Albuquerque, New Mexico

One school system's attempt to better meet the needs of exceptional mathematics students.

22. Statistics in the Curriculum for the 1980s 195

Gottfried E. Noether, University of Connecticut, Storrs, Connecticut

Suggested content appropriate for statistics courses in high school.

23. New Directions for General Mathematics 200

Donald L. Chambers, Wisconsin Department of Public Instruction, Madison, Wisconsin

A proposal for three years of general mathematics in high school.

Recommendation 7**24. Problem-solving Activities for Prospective Elementary School Teachers 213**

Robert G. Marcucci, San Francisco State University, San Francisco, California

A proposal for preparing teachers to teach problem solving.

25. A Problem-solving Proposal for the Preservice Elementary School Teacher 221

Lowell Leake, University of Cincinnati, Cincinnati, Ohio

Activities for the preservice elementary school teacher that promote the use of calculators and the teaching of problem solving.

Recommendation 8**26. A Model for Community and School Interaction 232**

Helen Johnson King, Lakota High School, West Chester, Ohio

Linda Pinson, Lakota High School, West Chester, Ohio

A description of one school's program for involving the community in support of the mathematics program.

27. Back to the Real Basics 239

Ann Kahn, Officer, National Congress of Parents and Teachers; Chairman, School Board, Fairfax County Public Schools, Fairfax, Virginia

The point of view of a parent and school board member on public issues and the public support of education.