Mathematics Council NEWSLETTER

The Alberta Teachers' Association

From the Editor

This newsletter being the last for the 1988/89 school year, I would like to wish you the very best for the summer season. I really hope you have a rest and a good time. After all, you have earned it. I hope the school year has been one that you can look back on with joy and satisfaction.

I also hope that you have found the newsletter, along with the other MCATA publications, to be worthwhile. I would appreciate any materials or ideas you may have for making the newsletter more meaningful for you.

We are still looking for an outstanding educator for the 1989 Mathematics Educator of the Year Award. How about helping us out? I am sure many of you would qualify. A nomination form was included in the last newsletter.

Problem solving has in the 1980s received some attention. Teacher training programs, inservice projects and many publications relating to mathematics education have put significant emphasis on this important area. Unfortunately, many teachers do not make problem solving an integral part of their lessons. Possibly they are just not comfortable with this important area.

The following article by Florence Fisher, taken from the Illinois Mathematics Teacher, vol. 40, no. 2, April 1989, has some excellent and stimulating ideas for making problem solving more exciting and meaningful.

- **Involve students**--as much as possible
- **Challenge students**--always
- **Amaze students**--just a little
- **Frustrate students**--just enough
- **Tell students**--as little as possible
- **Encourage students**--for every step forward, no matter how small
- **Accept students' ideas**--even crazy ones
- **Have fun**--enjoy the problems yourself

1. Involve students

Present problems to which the students can relate. Use ideas and situations that are familiar. Get every student to try the problem. Problems that can be solved by trying lots of examples are useful; every child can be working on a different example. Problems that use manipulative materials also invite all to take part.

2. Challenge students

Problems that are too easy can become boring. The students should have a sense of accomplishment when the problem is solved. This does not happen if there is no challenge. However, what challenges one child may not challenge another. Some may be challenged by a list making problem, others by geometrically oriented ones and others by complicated calculations. The teacher must choose problems appropriate for each child.

3. Amaze students

Using a "trick" to solve a question can be amazing to the students. The problem then is to figure out what the trick is or how it works.

4. Frustrate students

This is probably the easiest thing for a teacher to do. The difficult part is to frustrate just enough to make the student take one step beyond the familiar. Small frustrations can stretch the mind; large ones can destroy it.

5. Tell students

Again, this is an area where teachers excel. Teachers by nature seem to be people who like to tell someone else how to do it. It is difficult to keep the mouth shut and let the student do most of the talking and thinking. Problems that are obvious to teachers are not so obvious to children. Keep quiet and let the child think and work.

6. Encourage students

Children need to feel good about themselves. Teachers can create these good feelings by encouraging even the smallest progress. A child does not have to solve the problem to learn about problem solving. Remember that the thinking skills developed are more important than the answer to the problem.

7. Accept students' ideas

Brainstorming is a viable technique to use in problem solving. Sometimes the wildest ideas can lead to solutions.

8. Have fun

If the teacher does not enjoy working on problems, there is little chance the students will. Let the children know that the fun is in the process to arrive at a solution, not in the solution itself.

--Art Jorgensen

Winners of the 1988-89 Alberta High School Mathematics Competition

- FIRST ROUND -

Major Individual Prizes

W.H. Freeman Scholars
- Mischa Hooker, Sir Winston Churchill High School, Calgary.
- John Yoon, Sir Winston Churchill High School, Calgary.

Third prizes
- Michael Roy, Salisbury Composite High School, Sherwood Park.
- David Koch, Strathcona Composite High School, Edmonton.
- Marc Mulligan, Salisbury Composite High School, Sherwood Park.

Grade 11 prizes
- Teviet Creighton, Western Canada High School, Calgary.
- Adon Crook, Harry Ainlay Composite High School, Edmonton.

Grade 10 prize
- Michael Coward, Old Scona Academic High School, Edmonton.

Major School Prizes

Peter H. Denham Memorial Plaque Winners Team
- Sir Winston Churchill High School, Calgary, with Mischa Hooker, John Yoon and Jason Nicholson, managed by Mr. D. Cantrill.

Second team prize
- Salisbury Composite High School, Sherwood Park, with Michael Roy, Marc Mulligan and Chris Harrison, managed by Mr. R. Broemling.

Third team prize
- Strathcona Composite High School, Edmonton, with David Koch, Richard Wan and Carl Kovithavongs, managed by Ms. J. Frost.

Other Prizes

Zone I first prize
- Jason Nicholson, Sir Winston Churchill High School, Calgary.

Zone I second prizes
- Heidi Petersen, Sir Winston Churchill High School, Calgary.
- Craig Story, Dr E.P. Scarlett High School, Calgary.

Zone II first prizes
- Gregory Letal, Olds Junior-Senior High School, Olds.
- Steven Nygard, Carbon School, Carbon.

Zone III first prizes
- Walter Lai, St. Joseph Composite High School, Edmonton.
- Jennifer Zou, Harry Ainlay Composite High School, Edmonton.

Zone IV first prize
- Tony Bayduza, F.G. Miller Junior-Senior High School, Elk Point.

Zone IV second prizes
- Chris Harrison, Salisbury Composite High School, Sherwood Park.
- Ian Harrison, St. Albert High School, St. Albert.
- Kendal Seaton, Sturgeon Composite High School, Namao.
- Christopher Sudyk, Lamont Junior-Senior High School, Lamont.

Zone I team prize
. Western Canada High School, Calgary, with Suresh Pillai, Teviet Creighton and Paul Malik, managed by Mr. M. Milner.

Zone II team prize
. Olds Junior-Senior High School, Olds, with Gregory Letal, Virginia Whitehair and Andrea Coupal, managed by Mr. D. Remillard.

Zone III team prize
. Harry Ainlay Composite High School, Edmonton, with Jennifer Zou, Adon Crook and Mark Fokema, managed by Mr. L. Lindenberg.

Zone IV team prize
. St. Albert High School, St. Albert, with Ian Harrison, Rachel Harrison and Allan McDonald, managed by Mr. H. Reinbold.

Geoff J. Butler Memorial team prize
. Dr. E.P. Scarlett High School, Calgary, with Craig Story, Ronda Grey and Parmjit Basra, managed by Mr. M. Falk.

- SECOND ROUND -

The second round was written by 78 students representing 25 schools. Here are the five olympians who won scholarships, and their place in the competition.

Nickle Family Foundation Fellowship ($500)
1st: Peter Yang, Western Canada High School, Calgary.

Peter H. Denham Memorial Fellowship and
Canadian Mathematical Society Fellowship ($200 each)
2nd: Teviet Creighton, Western Canada High School, Calgary
2nd: Jeffrey Kinakin, Western Canada High School, Calgary.

MCATA Grade 11 Fellowship ($50)
10th: Jason Colwell, Old Scona Academic High School, Edmonton.

MCATA Grade 10 Fellowship ($50)
10th: Michael Roy, Salisbury Composite High School, Sherwood Park.

These 17 students are also eligible to write the Canadian Math Olympiad:

4th: Patrick Ng, Sir Winston Churchill High School, Calgary.
5th: Robyn Sorensen, Western Canada High School, Calgary.
6th: Suresh Pillai, Western Canada High School, Calgary.
7th: Sidney Chan, Western Canada High School, Calgary.
8th: Jason Nicholson, Sir Winston Churchill High School, Calgary.
9th: Richard Wan, Strathcona Composite High School, Edmonton.
12th: Yong Shao, Victoria Composite High School, Edmonton.
13th: Marc Mulligan, Salisbury Composite High School, Sherwood Park.
13th: Winnie Sia, Harry Ainlay Composite High School, Edmonton.
15th: Chris Harrison, Salisbury Composite High School, Sherwood Park.
16th: Jennifer Zou, Harry Ainlay Composite High School, Edmonton.
17th: Paul Malik, Western Canada High School, Calgary.
17th: Daniel Ryder, Sir Winston Churchill High School, Calgary.
19th: Andrew McKee, St. Albert High School, St. Albert.
20th: Charles Cruden, Harry Ainlay Composite High School, Edmonton.
20th: Adon Crook, Harry Ainlay Composite High School, Edmonton.
20th: Corinne Mullan, Western Canada High School, Calgary.

University of Lethbridge Summer Courses

Elementary Mathematics Workshop
Advanced Level Curriculum and Instruction
(Education 4051)

> Date: July 4 to 14
> Time: 9 a.m. to 12 m. and 1 to 3 p.m.
> Room: W-630
> Instructor: A.O. Jorgensen

The course will be available to university students and practising teachers. The instructional day will be divided into lectures and production sessions. Curriculum materials will be available for course participants' examination. The content of the elementary mathematics curriculum, numeration, operations and properties, measurement, geometry and graphing will be examined. The focus of the course will be on the strategies, or processes, that enable the teacher to effectively teach the content. Enabling strategies include:

- Thinking (problem solving)
- Manipulating materials
- Estimating
- Developing for instruction

- Organizing for instruction
- Using technology
- Applying mathematics
- Learning cooperatively

Junior High School Mathematics Workshop
Advanced Level Curriculum and Instruction
(Education 4053)

> Date: July 31 to August 11
> Time: 9 a.m. to 12 m. and 2 to 4 p.m.
> Room: B-730
> Instructor: J.B. Percevault

This course is designed to assist teachers implement the newly authorized junior high school mathematics program. The rationale for the new program will be explored, as will issues in problem solving in its relationship to thinking skills and to the development of the language of mathematics. Problem solving, estimation, alternate approaches, technology and application will be related to each of the following content areas.

- Number systems and operations
- Ration and proportion
- Measurement and geometry
- Data management
- Algebra

For further information on these workshops, contact:

John Percevault, Faculty of Education, University of Lethbridge, Lethbridge, Alberta T1K 3M4; telephone: 329-2725 (work) or 328-1259 (res.)

Registration procedures

Persons wishing to enroll in these workshops may take them as a credit course or for general interest as a workshop participant. This option is available to persons who wish to receive credit towards a university degree. Persons choosing this option must meet the University of Lethbridge admission criteria and register through the Registrar's Office. The fee for each course is $136, plus services, students' union and admission fees as applicable.

The "General Interest Registration" option is open to those who do not wish to pursue a university degree. There are no admission criteria and registration is through Conference Services at a fee of $150.

To receive the appropriate registration form, please contact the Summer School Office at the University of Lethbridge, 4401 University Drive, Lethbridge, Alberta T1K 3M4; telephone: 329-2248.

Elementary Mathematics Needs Assessment Survey

Summary of Key Findings

In February 1989, Alberta Education Curriculum Design Branch sent a survey regarding elementary mathematics to all jurisdiction superintendents and elementary school teachers. Five regional meetings, attended by the jurisdiction superintendents, were also held. Of the 550 surveys returned, 484 were received from school teachers while 66 were collected at the regional meetings. There were no significant differences between the teachers' and the superintendents' responses, although the positions taken at the regional meetings were sometimes more polarized than those of the mailed-in responses. The following statements summarize the main findings of the survey.

Respondents expressed strong agreement with the philosophy and rationale of the current elementary mathematics program of studies, agreeing with the importance of active learning (99.6%), the integral role of problem solving (99.2%) and the need to address the impact of technology (78.8%). In addition, 98% of them agreed that students should understand the relevance of mathematics in real-life situations. A number of people commented that we need to decrease the emphasis on superficial and mechanical performance of calculations and guide students to a deeper understanding of the processes of mathematics.

The majority of respondents indicated that they were happy with the level of specificity of the objectives and the general distribution of content of the current program. Respondents listed several objectives that are difficult for many children at the grade level at which the objectives are placed. They suggested that there be enough flexibility built into the program to allow time for exploration of concepts at the concrete level and to allow children to progress at their own rates.

There was support for a greater emphasis on estimation and mental mathematics in curriculum (77.6%), statistics and probability (59.8%) and the use of manipulatives (88.9%), and 77.8% supported the inclusion of objectives related to the use of the calculator but asked that the latter only be seen as a tool. Comments on the importance of the mastery of basic skills were made.

Respondents saw the importance of attitudes in learning mathematics, although there was more support for providing guidance in teacher support documents (78.4%) than for including more specific attitudinal expectations in the program of studies (56.1%). Some commented that attitudes will be increasingly positive as mathematics is made more meaningful.

Respondents requested that problem solving skills and strategies be integrated with other topics in mathematics curriculum rather than be treated as an isolated topic (80.5%). They indicated that the program of studies should be organized by grade level (68.9%) rather than by division (22%). They were interested in a developmental format (70.2%), although the high percentage of people who did not respond to that question (19.1%) suggests that the concept needs to be clarified. There was also support for the cross-referencing of mathematics skills and concepts with other areas of the curriculum (79.5%) to facilitate integration.

Teacher resource books (90%), manipulatives (96.9%) and student textbooks (86%) were seen as the most important learning resources, although a need for good computer software (80.3%) and audiovisual aids (75.9%) was also expressed.

There was considerable interest in teacher support documents. Respondents indicated that sample activities (93.2%) rather than detailed lesson plans (45%) would be most appropriate. Respondents requested assistance in using manipulatives (96.3%) and were also interested in guidelines with respect to child development and mathematics learning (88.2%). Some commented that they would like help in the evaluation of problem solving. Other suggested topics included cooperative learning, the role of language in the consolidation of mathematical concepts, individual differences, communication with parents and the transition to junior high school.

Respondents suggested that minor changes would improve the current program of studies, but that the major need is the area of teacher support materials.

Conference Update

How about making the Lethbridge MCATA conference a priority for this coming fall. The dates are November 2 to 4, 1989. This is shaping up to be an excellent conference. There will be over 60 sessions covering a wide range of topics. All we need to make it a real success is you.

Registration forms will be in the September MCATA newsletter, as well as in a September issue of The ATA News.

Digit Shuffle

Mathematics teaching objective:

 . Estimate products involving two two-digit numbers.

Problem solving skills pupils might use:

 . Make reasonable estimates.
 . Determine limits and/or eliminate possibilities.
 . Look for properties and patterns.
 . Search for and/or be aware of other possibilities.

Materials needed:

 . None.

Comments and suggestions:

 . Begin the activity with a few minutes of teacher-directed class work.
 . Let pupils spend another 15 to 20 minutes working individually.
 . Finish the activity with a sharing session in which pupils can discuss their results along with any conclusions they are willing to make.

Answers:

1. 1598

2. $94 \times 71 = 6674$
   $91 \times 74 = 6734$

3. $17 \times 49 = 833$
   $19 \times 47 = 893$

4. $47 \times 91 = 4277$
   $41 \times 97 = 3977$

5. $63 \times 52 = 3276$
   $62 \times 53 = 3286$ ← (largest product)

The larger product is associated with the numbers with the smaller difference; for example, the difference between 62 and 53 is less than between 63 and 52.

Extension for problem 5, for pupils who like to look for patterns:

A capable youngster might be asked to find a system for quickly predicting the difference between products as noted above. For your benefit, the difference can be determined by finding the difference between the digits in the units place and multiplying by the difference between the digits in the tens place multiplied by ten. (See example below)

$5 - 3 = ②$ and $6 - 2 \times 10 = \boxed{40}$

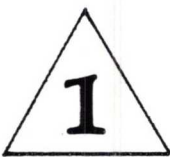$$② \times \boxed{40} = 80$$

$$\begin{array}{cc} 25 & 23 \\ \underline{\times\ 63} & \underline{\times\ 65} \\ 1575 & 1495 \end{array}$$

$1575 - 1495 = 80$ Same answer!

The Four-Square Puzzle

Cut out the shapes shown below. Then rearrange them into a 4 by 4 array so that no numeral or no geometric figure of the same shape appears in any row, column or diagonal more than once. After you have done this, paste the figures on another piece of paper to show your arrangement.
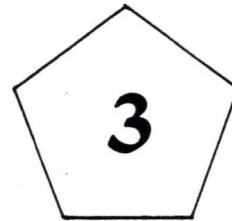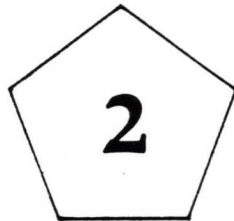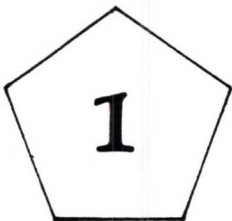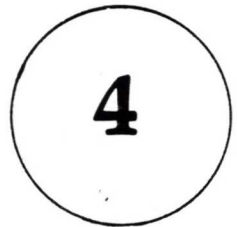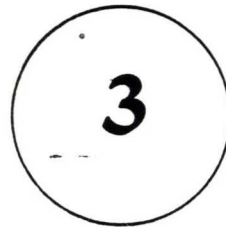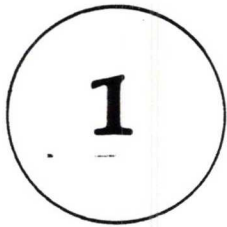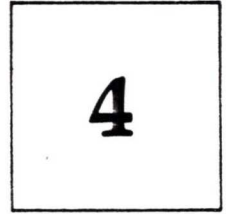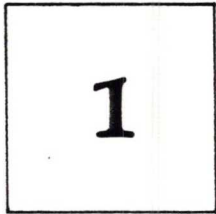
The Right Angle

The Right Angle is a new column that will appear regularly in the Mathematics Council Newsletter and will provide teachers with an update of happenings in the area of mathematics with Alberta Education.

TEACHER RESOURCE MANUAL

Teacher Resource Manuals will replace the present curriculum guides. It will provide ideas, activities, examples and suggestions for problem solving using technology, and for evaluation. It will also include a correlation of the approved resources to objectives.

JUNIOR HIGH MATHEMATICS PROGRAM

The junior high mathematics program was implemented in September 1988. All student resources and teacher resources are now available.

Recommended Resources

Ginn and Company, Journeys in Math 7, 8 and 9:
Blackline Master Teaching Aids

Holt, Rinehart & Winston, Holtmath 7, 8 and 9:
Drill & Application Masters
Resource Centre

Houghton Mifflin Canada, Mathématiques 7:
Matrices – Tests et Exercises – Guide de l'enseignant –
Résolution de problèmes

Houghton Mifflin Canada, Mathématiques 8:
Résolution de problèmes, tests et exercises.

SENIOR HIGH MATHEMATICS COURSES AND TEACHERS' MANUALS

The recently approved Mathematics 10, 13 and 14 courses will be implemented in September 1989. Copies of the Mathematics 10, 13 and 14 Program of Studies will be mailed to schools at the beginning of June 1989. Alberta Education will also distribute a draft of the Mathematics 10, 13 and 14 Teacher Resource Manual to all schools in June 1989 and its finalized version in late summer.

Courses	Basic Resources
Math 10	Addison-Wesley Publishers, Mathematics 10
	Éditions Beauchemin, Mathématiques 10
	Holt, Rinehart & Winston of Canada, Holtmath 10
	Nelson Canada, Advanced Level Mathematics 10: Principles & process

Math 13	Gage Publishing, Mathematics for a Modern World, Book 2, 3rd edition revised
	Gage Publishing, Mathematiques pour un monde moderne, Livre 2
	Nelson Canada, Math Matters, Book 2, Alberta edition.
Math 14	Merrill Publishing Company, Applications of Mathematics (Note: A copy of this resource will be sent to each school in June 1989).

Courses	Recommended Resources
Math 10	Addison-Wesley Publishers, Mathematics 10 Teacher Resource Book
	Dale Seymour Publications, Exploring Data, student's edition
	Dale Seymour Publications, Exploring Data, teacher's edition
	Holt, Rinehart & Winston of Canada, Holtmath 10, Teacher Resource Manual
	Nelson Canada, Advanced Level Mathematics 10 – Mathematics principles & process, Teacher Resource Masters
Math 13	Dale Seymour Publications, Exploring Data, student's edition
	Dale Seymour Publications, Exploring Data, teacher's edition

Additional student and teacher resources are being considered for authorization. A list will appear in the final copy of the Mathematics 10, 13 and 14 Teacher Resource Manual.

MATHEMATICS 20, 23 AND 24

Current plans call for Mathematics 20, 23 and 24 to be field tested during the first semester of the 1989-90 school year with implementation planned for September 1990. A draft Mathematics 20, 23 and 24 Teacher Resource Manual will be distributed in May 1990.

Resources can be obtained from the Learning Resource Distributing Centre, 12360 142 Street, Edmonton, Alberta T5L 4X9. Telephone: (403) 427-2767. FAX: 422-9750.

For more information, please contact: Florence Glanfield, acting coordinator, Mathematics, Curriculum Support Branch, 5th Floor, Devonian Building, West Tower, 11160 Jasper Avenue, Edmonton, Alberta T5K 0L2. Telephone: (403) 422-4872.

MCATA Executive 1988/89

President
Louise Frame
36, 2323 Oakmoor Drive SW
Calgary T2V 4T2
Res. 251-5841
Bus. 278-3633

Past President
Robert Michie
149 Wimbledon Crescent SW
Calgary T3C 3J2
Res. 246-8597
Bus. 230-4743

Vice President
Marie Hauk
315 Dechene Road
Edmonton T6M 1W3
Res. 487-8841
Bus. 492-4146
or 422-5480

Secretary
Mary-Jo Maas
Box 484
Fort MacLeod T0L 0Z0
Res. 553-4848
Bus. 553-4411

Treasurer
Dick Kopan
23 Lake Crimson Close SE
Calgary T2J 3K8
Res. 271-5240
Bus. 271-8882

***delta-K* Editor**
John Percevault
2510 22 Avenue S
Lethbridge T1K 1J5
Res. 328-1259
Bus. 329-2725

***delta-K* Coeditor**
Linda Brandau
2109, 1200 Sixth Street SW
Calgary T2R 1H3
Res. 265-5395
Bus. 220-5635
or 220-6288

Newsletter Editor
Art Jorgensen
Box 2619
Edson T0E 0P0
Res. 723-5370

1989 Conference Director
Dennis Burton
3406 Sylvan Road
Lethbridge T1K 3J7
Res. 327-2222
Bus. 328-9606

1990 Conference Director
George Ditto
2713 17A Street NW
Calgary T2M 3S9
Res. 282-6682
Bus. 294-6309

Department of Education Representative
Pat McLaughlin
12216 Elbow Drive SW
Calgary T2W 1H2
Res. 281-4279
Bus. 297-6353

Mathematics Representative
Alvin Baragar
Department of Mathematics
University of Alberta
Edmonton T6G 2G1
Res. 469-5626
Bus. 492-3398

PEC Liaison
Cliff R. Youngs
2110 26 Avenue SW
Calgary T2T 1E6
Res. 245-4415
Bus. 228-5363

ATA Staff Adviser
Bill M. Brooks
200, 540 12 Avenue SW
Calgary T2R 0H4
Bus. 265-2672
or 1-800-332-1280

Directors
Diane Congdon
146 Fourth Street SW
Medicine Hat T1A 4E3
Res. 526-7563
Bus. 548-7516

Bill Davidoff
P.O. Box 574
Pincher Creek T0K 1W0
Res. 627-4283
Bus. 627-4414
or 627-4415

George Ditto
2713 17A Street NW
Calgary T2M 3S9
Res. 282-6682
Bus. 294-6309

Nancy Hope
8511 96 Street
Grande Prairie T8V 3C8
Res. 532-5915
Bus. 539-0333

Wes Williamson
106 Glendale Boulevard
Red Deer T4P 2P5
Res. 347-2332
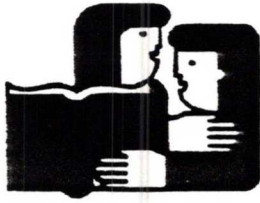Bus. 346-5010

Director and NCTM Representative
Wendy Lukawesky
1701, 9808 103 Street
Edmonton T5K 2G4
Res. 420-1466
Bus. 453-1576

Regionals
South West
Dennis Burton
3406 Sylvan Road
Lethbridge T1K 3J7
Res. 327-2222
Bus. 328-9606

FOOTHILLS EDUCATIONAL MATERIALS

13027 LAKE TWINTREE ROAD S.E., CALGARY, ALBERTA T2J 2X2
PHONE (403) 278-3175

PRESENTS

WINNING WAYS

A COMPLETE PROGRAM
FOR
FOSTERING POSITIVE ATTITUDES AND SELF-ESTEEM
IN CHILDREN

SUITABLE FOR GRADES 1 - 6 AND FOR
SPECIAL NEEDS STUDENTS AT JUNIOR HIGH SCHOOL

This award winning innovative reading, writing, and listening program was created by Frank McGeachy, a Calgary teacher and is endorsed by The Alberta Teachers' Association Educational Trust.

Winning Ways is a complete program consisting of a teacher's guide, a series of stories, all written by the author, intended to foster positive, **winning** attitudes, two audio cassettes, in which the stories are narrated, and a supplementary computer program (compatible with Apple and MS DOS).

The program is very flexible and can be used in a number of ways. Some teachers have used it as an extensive part of their Language Arts curriculum as reading, writing, speaking and listening are all integrated into the **Winning Ways** program. It can also be used as a school-based project or as a project with individuals and/or small groups of students.

Sets of additional stories are available for supplementary reinforcement.

WINNING WAYS is endorsed by the Alberta Teachers' Association Educational Trust.

Winning Ways has been piloted in several schools with excellent results and was featured in the March 28, 1989 issue of **The ATA News**. They write:

Attitudes are introduced through "personal crisis" stories that are presented on three reading levels and that explore situations with which the student is likely to be familiar. The stories invite written responses from the reader through searching questions that are integrated into the text. For those unable to read or write, the audio tapes offer an alternative. In either mode, written or aural, student creativity is valued and rewarded.

Apple and MS DOS vesrions of a computer tutorial with its 20 remedial loops support the program. The tutorial allows the student to consider up to 40 common situations and decide which positive attitudes are brought to bear in dealing with them.

Students are invited to explore personal experiences and concomitant attitudes in evidence throughout each month as they complete their diaries.

At Belvedere-Parkway Elementary, Principal Dr. Neil Bienert and A.P. Don McKay are excited about Winning Ways and its potential for catering to the affective domain. They have been working closely with Grade 5 teacher Linda Lalonde who has been monitoring the program's effect on her students.

"It has been a revelation to see how Winning Ways has transformed my students after only a couple of months. There is more cameraderie and commitment. Winning Ways works! My students are Winners!"

Dr. Gary Gay, Associate Director with Alberta Education, states:

*"If the student develops a positive attitude, he/she is guaranteed success. Until now there was no effective way for teachers to foster positive attitudes deliberately. **Winning Ways** fills the enormous vacuum with something that every teacher would do well to use."*

Complete program consists of teacher's guide, student stories, audio cassettes and computer program. Unlimited photo-copying privilege within school allowed. Student certificates and monitor sheets included.

ORDER FORM

Individual orders **must** be prepaid. Only institutional orders on official letterhead or purchase orders will be accepted without payment. Please add 8% for shipping and handling.

Send your order to:
Foothills Educational Materials
13027 Lake Twintree Road S.E.,
Calgary, Alberta T2J 2X2
(403) 278-3175

Name _____

Address _____

City _____

Province _____ Postal Code _____

Please send __copy(ies) of the complete

WINNING WAYS program

@ $99 per complete set = _____

Shipping and handling (8%) _____

TOTAL ENCLOSED _____

PENNSYLVANIA COUNCIL OF TEACHERS OF MATHEMATICS

You are invited to <u>submit a manuscript</u> for possible publication in the

1989 PCTM YEARBOOK

"NEW DIRECTIONS FOR MATHEMATICS INSTRUCTION"

Calls for reformulation of school mathematics focus on empowering students
to become articulate, confident, and able users of mathematics and
mathematical reasoning. How can mathematics instruction best
focus on helping students create, apply, reason with and
communicate about mathematics? What mathematical topics
are most suited to fostering these goals?

We want and need articles from:

Elementary Teachers
Secondary Mathematics Teachers
College and University Teachers
and others who will identify and discuss issues
and/or present their perspectives.

We encourage articles cooperatively produced by authors
at several levels of instruction.

While no specific length of manuscript is mandated, we suggest that they be <u>limited to
six to eight</u>, typewritten (double-spaced) pages with generous margins on $8\frac{1}{2}$ x 11 paper.
All figures, art and graphics must be camera-ready. References must be accurate and
complete! Two complete copies of the manuscript should be sent to:

Editors, 1989 PCTM Yearbook
167 Chambers Building
The Pennsylvania State University
University Park, PA 16802

<u>by November 1, 1988</u>

If you have any questions, please contact: Dr. Glen Blume or Dr. M. Kathleen Heid
(814/865-2430)