From the Editor

Is Mathematics Important? You Bet It Is!

Everyone depends on the success of mathematics education, everyone is hurt when it fails. Mathematics must become a pump rather than a filter in the pipeline of education.

Everybody Counts,
Mathematical Sciences Education Board, 1989.

Mathematics is a key to leadership in our information-based technological society. Workers at all levels of the economy need to be able to think mathematically, analyze data and find solutions to unconventional problems. Yet, throughout Canada, students leave school without the mathematical knowledge they need to be personally and professionally competent in today's world.

It should come as no surprise that the majority of students in our schools do not excel in mathematics. Many graduate with minimal levels of mathematics education. Also, many of our elementary teachers teaching mathematics have had little mathematics education at the university level.

Students who graduate from our schools, having met only minimal mathematics requirements, do not know enough mathematics to survive in the twenty-first century. Our students should be made aware that they need to know more and that it is possible for them to learn more. As educators our first concern must be the improvement of students' performance in mathematics.

To achieve this goal we must have teachers who are well prepared and dedicated and supervisors who provide support and guidance. Our mathematics curriculum and instruction must reflect the changed needs of our technological age. Parents must be helped and encouraged to become aware and willing partners in this emphasis on mathematics achievement.

Another special concern is greater achievement in mathematics for the growing number of students in our schools with limited proficiency in English.

These changes will take time. Individual school systems, schools and teachers can begin the process of reform by emphasizing the importance of mathematics education and creating standards for student performance in mathematics. We will need to provide increased support to allow all students to meet these standards.

For students to meet the new graduation requirements, mathematics curriculum and instruction in the early grades must be enhanced. For all students to benefit from a curriculum relevant to the twenty-first century, we must improve the mathematics education offered to students with limited English. Action in these areas will help improve the mathematics education of the nation.

Recommendations for Action

1. Raise standards and expectations for student performance. Satisfactory completion of mathematics courses by all students in all grades should be required.

2. Improve supervision of mathematics instruction at the elementary and middle school levels. Establish a mathematics specialist position in elementary schools. Establish consistent policies and procedures for student articulation between schools.

3. Increase the professionalism of mathematics educators, by creating mathematics specialists in elementary schools (in the same way as many schools have education and music specialists), as mentioned above. It is unrealistic to expect all elementary teachers to wish, and be competent, to teach children mathematics. Teachers who do want to teach mathematics, however, should be given specialist training in this field. Unfortunately, there seems to be a trend within education departments and school systems to have elementary teachers teach all the core subjects.

4. Base mathematics curriculum objectives and instructional tools at all levels on the Curriculum and Evaluation Standards for School Mathematics, NCTM, 1989. Redesign all mathematics tests to include performance as well as paper-and-pencil components.

5. Expand parents' involvement in mathematics education.

6. Enhance the mathematics achievement of students with limited proficiency in English.

7. Seek private support for mathematics initiatives.

8. Investigate critical areas further.

9. Encourage schools to make improving mathematics education a priority at the local level. Make staff development available to all teachers in the schools. Provide more opportunity and encouragement for teachers to attend professional conferences and meetings.

This editorial was adapted from an article by Phyliss Pullman, in UFT Math, Vol. III, No. 1, September 1990.

Art Jorgensen

Letter to the Editor

Dear Editor:
    Some of the teachers in our school spend a period after an exam is returned going over the questions on the exam. Others check totals only and proceed with new material. In terms of value to students is the time spent going over the exam worthwhile?

Bryan Quinn

I would like readers' reaction to this question. We will publish your answers in a future newsletter.

--Editor

delta-K

Because of Linda Brandau's illness, John Percevault has volunteered to take chief responsibility for collecting material for the next issues of delta-K. Craig Loewen of the University of Lethbridge will help him.

They hope to have the copy for the issues to Barnett House by the following dates in 1991: March 15, June 15 and September 15.

Without a doubt they need help from the members of MCATA. Many of you are knowledgeable about technology in math, use of manipulatives, estimation and number sense. How about taking the time to write an article on one of these topics--or another topic of interest--and forward it to John or Craig. (Please see the executive list at the back of this newsletter for their addresses.)

NCTM Conference a Success!

Many leading mathematics educators in North America took part in the NCTM Canadian Regional Mathematics Conference in Calgary on October 25 - 27, 1990. Approximately 2,200 delegates, speakers and presiders were in attendance, as well as representatives from publishers and suppliers of educational materials. The conference theme was "Mathematics: Into the Third Millennium." Sessions focused on changes in curriculum so that it more accurately reflects the real needs of students; teacher education that focuses on how students learn mathematics; and resources that promote mathematics as a process rather than a series of progressively more difficult algorithms to be memorized. Other sessions examined the strides that have been taken in mathematics education and assessed the need for continued change.

Many people are responsible for the success of the conference. They include those who volunteered their time and expertise to plan and organize it, those who presented workshops and sessions and the many delegates who attended. In turn, the conference organizers thank their hosts, the Mathematics Council of The Alberta Teachers' Association, for their invaluable support and assistance.

George Ditto
Conference Chairman

Upcoming Conferences

1991 NCTM Conference

The NCTM Conference will take place April 17 to 20, 1991 in--of all places--New Orleans! Plan to attend, and get into the spirit of things.

Seventh International Congress on Mathematical Education

This prestigious conference will be held in Quebec City, August 16 - 23, 1992. Its main themes were outlined in the last Newsletter. For application forms contact John Percevault, 2510 22 Avenue South, Lethbridge T1K 1J7.

Local Math Workshops

MCATA will help organize and present math workshops throughout Alberta. If you would like to see a math workshop organized in your area, please let Marie Hauk know. (See the executive list for her address and phone number.)

Math Fact

The 100 000 001st prime is 2038074751

Math Monographs

Problem Solving Monograph for Secondary Students

MCATA plans to publish a monograph in 1991 emphasizing the major role of problem solving in the secondary school. Editors Rob Midyette and Keith Molyneux need articles for this monograph. Please consider writing an article, either as an individual author or as a collaborator within a school or school system. (For the editors' addresses, please see the executive list at the end of this issue.)

Monographs Published by MCATA

Over the years MCATA has published several excellent monographs. None of the monographs will be reprinted, but the following inventory exists at Barnett House.

Make It, Take It It, Monograph No. 9. Compiled by William Bober and John Percevault, this is an extensive collection of 56 ideas submitted by teachers for teaching mathematical functions, applicable to Grades K to 12. 1987, 104 pp., $6. Discount allowed on large orders; 335 copies in stock.

Reading in Mathematics, Monograph No. 6. This examines the purpose of reading in the content areas in general and the question of reading in mathematics in particular. 1980, 132 pp., $5. 37 copies in stock.

Problem Solving in the Mathematics Classroomom, Monograph No. 7. This provides teachers with a variety of articles on teaching problem solving in the classroom. 1982, 175 pp., $6. 507 copies in stock.

Teaching Mathematics in the Early Childhood Classroom'm. This is a collection of essays, insights and recommendations on teaching mathematics to young children. 1987, 106 pp., $5. Discount allowed on multiple orders; 9 copies in stock.

Please order your copy or copies directly from the ATA, making cheques payable to the ATA.

Mathumor

An administrator walked into a classroom to observe the teacher and found the kids busily working in math groups, using manipulatives, making charts, recording results, and the teacher orchestrating the activities. "Oh," he said, "excuse me. I'll come back when you're teaching." (A True Story)

Cathy Seeley,
Board of Directors, NCTM, Texas,
speaker at the 21st Century Conference

Did you hear about the bored math student?
He sat in class twiddling his sums.

Tim Kanold, past president, CPAM, Illinois,
speaker at the 21st Century Conference
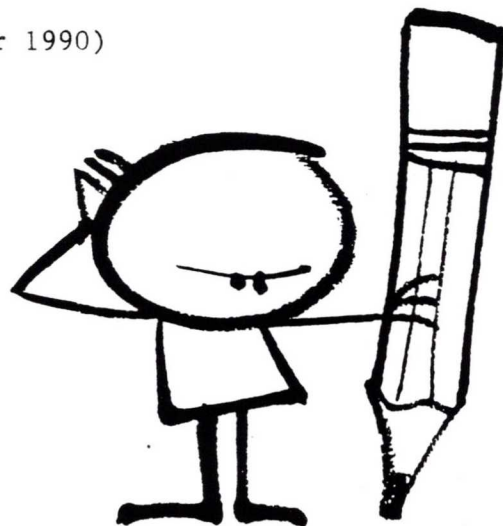
Manipulative "Junk"

by Maureen E. Farr, Delaware Valley Elementary School

(Reprinted from the Newsletter of the Alamo District Council of Teachers of Mathematics, Texas, No. 1, 1989)

This article addresses the "Getting Started" idea in the NCTM Standards.

In the modern world of technology it is important that primary school children understand math concepts to be mathematically literate. This is not a paper-and-pencil society but a technical society, and children must be able to manipulate the information they have and use it to their advantage. Children must learn to think in order to solve problems. They must learn to understand what is happening, why it is happening, and what to do with the information they are given to solve a problem. Today there are calculators and computers to get the correct answers, so reasoning has become more important than calculating. Children must also learn to work alone and in a group to solve problems. Cooperative learning is a new concept for many teachers in which the children are learning, not cheating, as some teachers may think. The new standards are common sense and do not advocate the memorizing of the rules, terms and symbols we had to learn.

School districts expect primary teachers to change their style of teaching by using manipulatives, calculators and computers, but budgets are insufficient to purchase the necessary materials. If teachers are committed to the new standards by which to teach their math lessons, they will have to be creative. It is not hard. Just look around your community, school and home and you will find junk items that can be recycled into your math program. You may even find some of your old worksheets that can be recycled into manipulative materials. Run them off, color them (laminate if possible) and cut them into manipulative math pieces. (Small children will love to color and cut these for you.)

Let's take a quick look around your environment for manipulative junk you can use.

Leaves

In the fall, children always bring in colored leaves. Give each child a bag of leaves.

A. Estimate. How many leaves are in the bag?
B. Graph. How many red, green or yellow leaves are in your bag?
C. Sequence. Put the leaves in order of size, large to small, and so on.
D. Patterns. The children can do an art project, putting their leaves in a pattern: oak, oak, maple, oak, oak, maple . . .
E. Count and Record. The children can count each color and record the numbers.
F. More and Less. The children can see this concept, then they can visualize. Logically, the concrete comes first, followed by the abstract.
G. Problem Solving. Story problems may be solved using the leaves (e.g., Jane had three red leaves and two yellow leaves. How many leaves did Jane have?).
H. Measurement. As an introduction to a unit on measuring, the children can measure a table, a bookcase, the leaves.

These are just a few examples of the concepts you can teach with leaves. There are lots of other junk items you can use: discarded keys, baseball cards, dry lima beans (use them, then plant them), M & Ms, cereal, crackers (animal crackers and others that come in various shapes), soda cans (use, drink and return for the deposit--you can use the money for a treat or to teach about money), jar lids, bottles, apples, acorns, milkweed pods, walnuts, chestnuts and cookies. The list is endless. It just takes imagination. <u>Let math be fun.</u> Don't be afraid of the new standards. Children in the primary grades will think they are playing. Teachers must learn that children can learn without a "ditto" or a workbook page. <u>Children learn through play.</u> Teachers should have fun too.

The Right Triangle Rap
by Cy Adler

(Reprinted from <u>UFT Math</u>, Vol. III, No. 1, September 1990)

"Hang loose, hypotenuse!"
We can solve them, they have great use:
All right triangles, which have three angles.

Take the C-side for the longest side,
'Cause the C-side's longer than the A- or B-side.
In any right triangle
With three sides, and one square angle,
90 degrees, if you please.

Now don't you dilly, and don't you dangle,
Just give me 90 for the squarest angle.

And we'll rap about the brilliant rule
Dreamed up by that great Greek fool,
Pythagoras. He said:
"Hang loose, hypotenuse!"
Wherever we look, we find right triangles
With two thin (we call them "acute") angles.
In every three-sided one, far and near,
A squared plus B squared is C squared.
Never fear, because everywhere
$$A^2 + B^2 = C^2$$
From Timbuktoo to Mosholu, wise men declare:
$$A^2 + B^2 = C^2.$$
To solve these problems, say we want to find C,
Just plug in the values for A and for B.
With a few calculations, coolly cool
We can solve them all with Pythagoras's rule.
So throw away your razor and your noose
And sing it loud, sing it clear:
"HANG LOOSE, HYPOTENUSE."
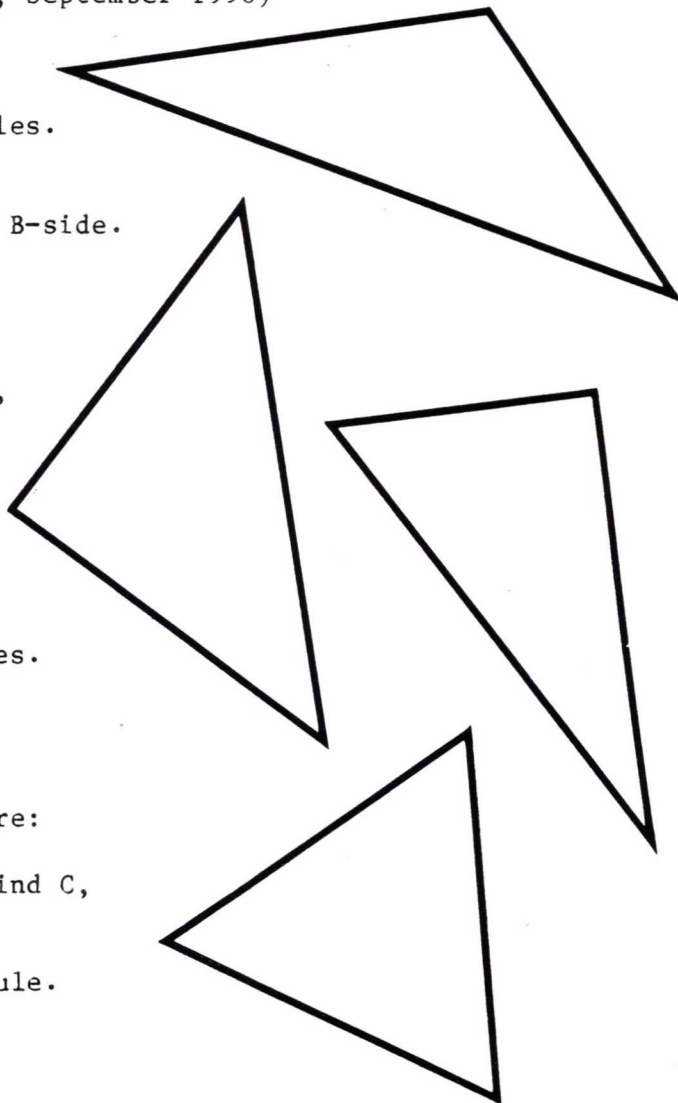
Cy Adler teaches at Martin Luther King Junior High School in Manhattan, New York.

History of Math Word Search

This word search could provide the basis for some excellent research into the history of mathematics for secondary students.

FIND AND CIRCLE THE WORDS LISTED BELOW THAT ARE HIDDEN IN THE PUZZLE.

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C  X  N  W  K  O  A  D  U  W  B  Y  I  Q  G  J  F  M  B  F
N  A  K  N  D  H  A  C  J  L  J  F  W  V  K  Y  Q  Y  I  W
Y  I  C  V  A  E  R  A  T  O  S  T  H  E  N  E  S  B  X  G
Z  X  Z  M  R  E  B  A  B  Y  L  O  N  I  A  N  S  T  H  A
J  Z  G  I  K  R  S  C  F  U  V  X  F  W  K  P  Z  B  X  M
Y  Q  E  I  L  D  R  G  A  L  I  L  E  O  O  J  T  M  T  B
D  E  R  Q  M  J  L  K  S  O  W  N  E  W  T  O  N  B  A  L
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Y  N  I  T  R  J  D  U  J  L  D  P  O  N  S  H  E  C  G  Z
P  O  B  O  M  B  H  F  C  A  R  D  A  N  J  L  K  A  L  L
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I  L  N  D  T  Y  D  B  T  B  P  I  U  E  Q  Z  W  T  A  P
A  L  A  D  X  O  M  I  M  J  T  J  S  H  B  U  I  E  A  A
N  I  C  I  S  V  W  F  Z  H  J  O  I  N  N  P  B  S  S  S
S  B  C  C  L  D  L  E  I  B  N  I  Z  Q  X  Q  L  C  Q  C
Q  W  I  E  C  F  H  Q  W  C  U  R  C  G  P  A  Y  L  J  A
X  R  H  Y  P  A  T  I  A  W  F  Y  P  E  R  F  E  C  T  L
B  E  K  E  R  V  S  L  D  I  C  F  C  E  U  C  L  I  D  H
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Eratosthenes	Babylonians	Pythagoras	Egyptians	Fibonacci
Tartaglia	Descartes	Bernoulli	Gambling	Hypatia
Galileo	Leibniz	Perfect	Euclid	Cardan
Newton	Pascal	Fermat	Plato	Dark
Pons				

History of Math Word Search

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. . . . . . . . . . . . . . . .
. . . . D . . . . . . . . . . . .
. . . . A E R A T O S T H E N E S . . G
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. . . . . . . . . . N E W T O N . A L
. B . P . . . . . . . . . . . . D R I
E E . L F . . . . . . . . . . . E T N
G R F A E . . . . . . . . . . . S A G
Y N I T R . . . . . . P O N S . . C G .
P O B O M . . . C A R D A N . . . A L .
T U O . A P Y T H A G O R A S . . R I .
I L N . T . . . . . . . . . . . T A P
A L A . . . . . . . . . . . . . E . A
N I C . . . . . . . . . . . . . S . S
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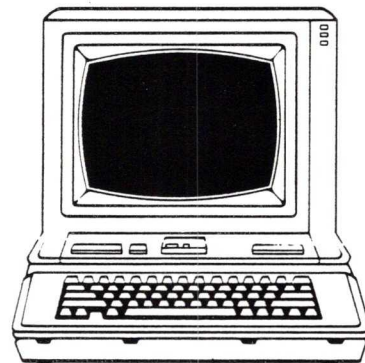
Integrating Mathematics?

This teacher resource is now available from Alberta Education.

Computer Integration Guide: A Guide for Mathematics, Grades 4 - 9

This guide contains these sections:

1. a) Planning and organizing yourself and your classroom for using computers.
   b) Suggestions and tips on grouping, using single computer of a computer lab.
   c) Classroom management and monitoring student progress.

2. Integrating problem solving through an integrated unit (Superfactory) and the use of application software (AppleWorks). Sample problems and teacher instructions for both topics are included.

3. a) Specific software to match the mathematics objectives for Grades 4 - 9.
   b) Descriptions of referenced software.

This resource is available through the Learning Resources Distributing Centre (LRDC) at 12360 142 Street, Edmonton, Alberta T5L 4X9.
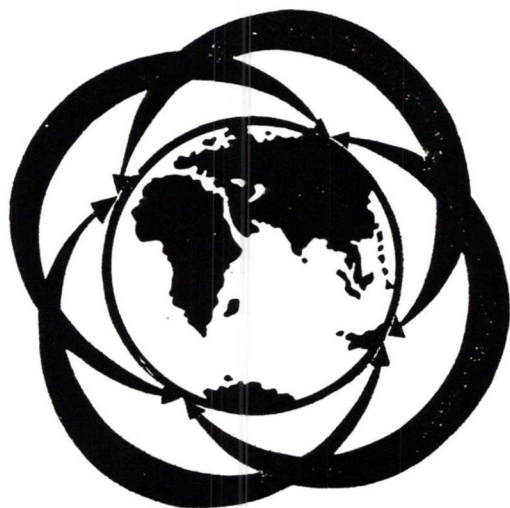
Teaching and Learning Mathematics In the 1990s

The 1990 Yearbook

Edited by Thomas J. Cooney

To help you meet the needs of a new decade and a rapidly changing world . . .

This yearbook provides insight into the various forces shaping mathematics education in the 1990s. It places the various issues and concerns in perspective and leads the way to improved techniques for the teaching and learning of mathematics.

Valuable reading for mathematics educators at all grade levels, it presents many helpful ideas for use in elementary through more advanced mathematics.

Some of the topics explored:

* effective techniques for teaching mathematics

* technology and how it affects mathematics education

* assessing students' learning of mathematics

* cultural diversity and the mathematics curriculum

* the need to reconceptualize the role of mathematics teachers

This book will help you plan your mathematics curriculum for the 1990s.

Order your copy now! 1990, 256 pp., #418, ISBN 0-87353-285-6

$18

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1991 Conference Directors
Marie Hauk
Bryan Quinn

SPEAKERS   SPEAKERS   SPEAKERS

MCATA Edmonton Convention
October 31 - November 2, 1991

As program chairmen of the 1991 MCATA Conference, to be held in Edmonton, we invite you to identify people who in your judgment could make a contribution to your conference.

Our thanks in anticipation.

Name	Address/Phone	Grade Level
1.		
2.		
3.		
4.		

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