Mathematics Council
NEWSLETTER
The Alberta Teachers' Association

Volume 11 Number 2 November 1992

From the Editor

Being Professional

To me, being a professional teacher means keeping abreast of the changes taking place in education. Like all other professions, education is not remaining static, and this is certainly evident when it comes to mathematics education. Significant changes are occurring in mathematics in what students are being taught as well as in how they are being taught and evaluated. This in turn places the responsibility on teachers to update regularly their content and teaching skills. Therefore, the Professional Development Programs for Teachers of Mathematics developed by NCTM should interest all of us.

Mathematics teachers , like all professionals, require ongoing and cumulative professional development programs that enhance and maintain their teaching skills and knowledge. Because mathematics and education are disciplines that grow and change, teachers cannot depend on what they learned as undergraduates to carry them through their entire careers. Research findings continually increase our understanding of teaching and learning. Further, social and technological changes increase the average person's need to understand and use mathematics. These forces demand reconsideration of the content and methods of mathematics instruction.

Curricular and instructional changes, however, do not occur automatically. The extent to which new ideas and techniques are integrated with current classroom practices depends on teachers' knowledge, motivation and commitment to continued professional growth. The improvement of mathematics programs depends on well-prepared and well-informed instruction.

Such changes and improvement require teachers to have opportunities for quality professional development. Providing these opportunities, which should maintain, enrich and improve the skills and abilities that teachers need to serve their students best, is the responsibility of districts, schools and individual teachers.

To help promote quality instruction in mathematics, NCTM encourages and supports developing and implementing comprehensive professional development programs. The Council recommends that such programs be developed according to the following guidelines:

1. Professional development programs for teachers of mathematics should be based on a strong commitment to professional growth.
   a. An appropriate person should be responsible and accountable for teachers' professional development.
   b. Sufficient time should be allocated for individuals to assess needs, plan activities, lead or participate in programs, and evaluate outcomes.
   c. Sufficient funds should be available to support professional development programs and ensure teachers' participation in them.

2. Professional development programs for teachers of mathematics should be carefully planned.
   a. Clear objectives should be established.
   b. The programs should improve students' learning experiences by improving the skills and knowledge of their teachers.
   c. Those whom the programs are designed to assist should contribute significantly in planning the programs.
   d. Extensive assessments of individual and collective needs should serve as bases of the programs.
   e. Current concerns and issues in mathematics education should be reflected in the content of the programs.
   f. The programs should be ongoing and cumulative.

3. Professional development programs for teachers of mathematics should recognize individual differences.
   a. Various formats, including workshops, conferences, institutes, courses and in-school discussion sessions, should be used.
   b. Programs should be tailored to meet the needs of teachers with diverse knowledge, skills and experiences.

4. Professional development programs for teachers of mathematics should be effectively conducted and should include the following features:
   a. A blending of mathematical content and effective pedagogy
   b. Active participation of teachers
   c. Attention to the concrete, day-to-day problems of teachers
   d. An integration of theory and practical applications
   e. Communication of objectives to participants
   f. Opportunities for teachers to practise new skills and techniques in the classroom
   g. Incorporation of support and follow-up activities

5. Professional development programs for teachers of mathematics should be systematically evaluated, with attention to these issues:
   a. Determining if the needs they are designed to meet have been satisfied
   b. Using the results from the evaluation to improve and develop future programs

—Art Jorgensen

From the President's Pen

We have just completed another successful annual conference, held this year in Medicine Hat. A huge thank-you goes to conference cochairs Diane Congdon and Gary Hill and to all conference organizers. The 450 participants discussed new and different classroom ideas and viewed a variety of teaching aids.

The conference opened with eight sessions, followed in the afternoon by the Math Fare, consisting of 105 half-hour presentations. Participants moved from session to session and mingled in the large ballroom. Tremendous interaction occurred among participants and presenters. It was a rewarding experience for all. Saturday's 40 sessions were of a more traditional nature. The conference ended with University of Toronto's Brendan Kelly's closing address. Dr. Kelly challenged us to use the technology available and to build with these resources. He reminded us that we must inform the public about the changes that are occurring and the importance of mathematics to society. A revolution in mathematics is occurring, and we need to lead the way.

Congratulations to Louise Frame, Mathematics of the Year Award recipient. Louise teaches at Dr. E.W. Coffin School in Calgary. She is a past president of MCATA and has served 12 years on the executive.

At the annual general meeting, the constitutional changes were approved as printed in the June 1992 *Newsletter*. The executive will now revise its responsibilities and duties. Much work must be done to prepare our Mathematics Council to meet the changes ahead and to make NCTM's standards our standards. We encourage you to become actively involved in your council. Volunteer to host a miniconference in your area; we can help with the speakers. Prepare to run for the executive in the upcoming spring elections, and more important, continue to be a council member. Encourage your colleagues to join our council or any of the 22 specialist councils.

—Bob Hart

Thought for the Day

A child who has really learned something can use it, and does use it. It is connected with reality in his mind, therefore he can make other connections between it and reality when the chance comes. A piece of unreal learning has no hooks on it; it can't be attached to anything, it is of no use to the learner.

—John Holt, How Children Fail, *1964*

The Right Angle

Wanted: Examples of elementary, junior high or senior high school real-life mathematics problems that you use in your classroom. Please send these examples to a Regional Office of Education (see addresses below).

What is this request all about? Alberta Education has six mathematics consultants who work in Calgary, Edmonton, Grande Prairie, Lethbridge and Red Deer. During their school visits, they would like to share real-life mathematics classroom examples and are asking for your help.

What will happen with these examples? They will be collected and put together in a document, which will be shared with the teachers who submitted them, as well as with the mathematics teachers the consultants visit.

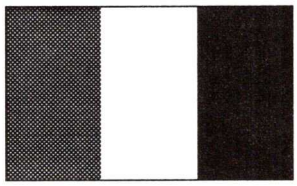
Please submit your examples of problems to **Pat McLaughlin**, Calgary Regional Office, Room 1200, Rocky Mountain Plaza, 615 Macleod Trail SE, Calgary T2G 4T8; **Dick Daly** or **Art Peddicord**, Edmonton Regional Office, Box 21, Edmonton T5K 0L2; **Cindy Meagher**, Grande Prairie Regional Office, 12th Floor, 214 Place, 9909 102 Street, Grande Prairie T8V 2V4; **Gary Hill**, Lethbridge Regional Office, Provincial Building, 200 5 Avenue S, Lethbridge T1J 4C7; **Ron Babiuk**, Red Deer Regional Office, 3rd Floor W, Provincial Building, 4920 51 Street, Red Deer T4N 6K8.

Achievement Testing Program

Nola Aitken, who was responsible for developing the mathematics achievement test, has moved to the University of Lethbridge. Kay Melville, from St. Albert, is now working in this position. If you wish to contact Kay, phone 427-0010.

—Florence Glanfield

Elementary Clues Corner



Bill's class wanted to make a school flag consisting of three stripes, each representing one of the three school colors: shocking pink, grape and neon blue. How many different ways could they arrange the colors on the flag? Answer: six

Because their work was over for another year, the Burned-Out Elf Club wanted to get together for a celebration. Elf A was only awake every sixth day, Elf B was only awake every fourth day and Elf C was only awake every fifth day. On what day could they get together for their party? If planning began on January 1, 1992, what would that date be? Answer: February 29, 1992

President's Annual Report 1991

Serving as president this past year has been a pleasure. The annual conference, the miniconferences and our publications were the Council's main activities. Our membership currently stands at 775.

The executive met four times during the year, three times in Calgary and once in Edmonton. A goal-setting task was undertaken at our first meeting. We established priorities and formed committees at our Thinkers' Conference in Calgary. The topics focused on the annual conference and miniconference schedules, executive reorganization, membership promotion, publications, awards and the budget.

Six hundred members attended "Mathematics: A Meaningful Mosaic," the 1991 annual conference in Edmonton. Thanks to cochairs Marie Hauk and Bryan Quinn and committee members on a job well done. Future conference themes—"Reflections: Congruent Beliefs and Practices," "Connections: The Whole Is Greater Than the Sum of Its Parts" and "Mathematics: A Meaningful Journey"—will reflect the NCTM standards.

Thanks to Myra Hood and Florence Glanfield for planning the miniconferences. A resource fair was held in Calgary with 240 participants. Three miniconferences were held in Calgary and one was held in Grande Prairie with over 300 people attending. Themes for miniconferences will centre on communication.

Thanks to editors John Percevault, Craig Loewen and Art Jorgensen. Two issues of *delta-K* were published, focusing on "Technology in the Classroom" and "Manipulating and Activating Mathematics." As well, five newsletters were produced, which kept mathematics teachers informed about the Council's events and activities.

Diane Congdon represented our council at the NCTM Annual Conference and Delegate Assembly at Nashville in April. Other MCATA members serving on NCTM committees are Richard Kopan (Regional Service Committee) and George Ditto (Convention and Conference Committee).

As president, I represented MCATA at the invitational symposium on student evaluation in Edmonton in June. Four executive officers attended the Specialist Council Conference in Banff during August as part of the ATA Summer Conference.

I wish to thank the executive members for their assistance during this past year, especially Louise Frame, John Percevault and Daiyo Sawada as they leave the executive.

—Bob Hart

Dates to Remember

1993 NCTM Annual Conference
Seattle, March 31 to April 3

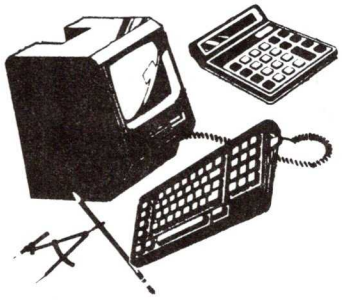
This is shaping up to be an excellent conference. Attending an NCTM annual conference is an event to be remembered. Now is the time to plan to attend.

1993 MCATA Conference
Calgary, October 28 to 30

If you have ideas for topics you would like covered, presenters you would like to hear, or if you would like to make a presentation, contact Bob Michie, the 1993 conference chair. Your help would really be appreciated.

Technology

Add Two Cs to Three Rs: Calculators and Computers



Preparing students to succeed in the world means helping them master not only the traditional three Rs but also the two Cs—calculators and computers—before they graduate from high school. That's why the *Professional Standards for Teaching Mathematics,* developed by NCTM, encourages use of modern technology in the classroom. Used effectively, calculators and computers enhance discourse and do not replace children's thinking. Possessing technology, of course, is not enough; the key is how teachers use it.

Consider the words of one mathematics teacher: "I wanted my students to learn that the sum of the angle measures in a triangle is 180 degrees, so I had them construct a lot of triangles on the computer and record the angle measures. The software made it possible to collect a lot of data quickly and make a generalization. I thought my students would remember the relationship better if they discovered it themselves."

The *Professional Standards* urge the widespread classroom use of computers and calculators as a way to free time for more important work. Previously, students spent 80 percent of their time doing simple computation, learning to multiply and divide progressively larger numbers. In the process, they often lost sight of mathematical insights and discoveries because they became mired in the process of producing the results. Calculators and computers not only save time but also give students access to new ways of exploring concepts. The evidence is unmistakable, NCTM says. Students have an unprecedented need to master calculators and computers if they expect to succeed in all walks of life in the 21st century.

1994 Conference News

Does October 20 to 22, 1994, sound a long way away? Well, it did to me, too, until we started planning the 1994 Math Conference, which will be held in conjunction with the 1994 Canadian Regional NCTM Conference in Edmonton. I, as conference chair; Yvette d'Entremont, program chair; and George Ditto, Canadian representative for NCTM's Conference and Conventions Committee, attended a meeting in Reston, Virginia, to collect and share ideas and meet fellow mathematics educators from across North America.

We will keep you posted so that you can plan to attend the Edmonton NCTM Conference! If you have any questions, phone me at 427-2948 or 489-0084.

—Florence Glanfield

Try Your Hand at These!

The following problems are taken from the 1990/91 Alberta High School Mathematics Competition, Part 1.

Problem 1

The number N is the sum of all prime numbers which divide 1991. The product of all prime numbers which divide N is

(a) 5 (b) 6 (c) 15 (d) 192 (e) 1991

Problem 2

If $x-(x-(x-(x-1)))=1$, then x is

(a) -2 (b) -1 (c) 0 (d) 1 (e) 2

Answers

1. (b) The prime numbers which divide 1991 are 11 and 181. Hence, N=192. The prime numbers which divide 192 are 2 and 3.

2. (e) the equation simplifies to $x-1=1$.

Picture Patterns

Mathematics can be visual as well as numerical. Interesting things happen when these two facets of mathematics are combined. For example, Carlos and Nancy were building a sequence based on a pattern of figures with white and shaded tiles like the ones shown.

The first three figures in their sequence are pictured.

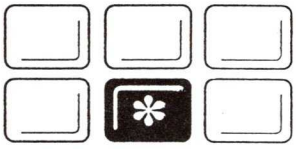


Figure 1

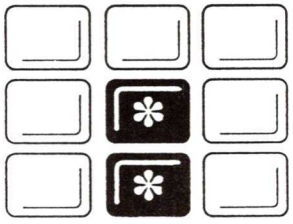


Figure 2

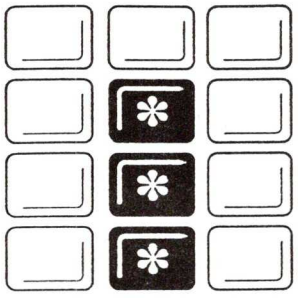


Figure 3

1. Draw Figures 4 and 5 following Carlos's and Nancy's "rule."

Figure 4

Figure 5

2. Carlos is building Figure 4. How many shaded tiles will he need? _____
3. How many white tiles will Carlos need for Figure 4? _____
4. How many white tiles will Nancy need to build a figure that would use 10 shaded tiles? _____
5. If a figure uses 100 shaded tiles, how many white tiles will it need? _____
6. How many shaded tiles will be needed for a figure that uses 21 white tiles? _____
7. How many shaded tiles will be needed for a figure that uses 22 white tiles? _____
8. How many shaded tiles will be needed for a figure that uses 15 tiles altogether? _____
9. How many shaded tiles will be needed for a figure that uses 20 tiles altogether? _____
10. Nancy built a figure she called "figure *n*." She asked Carlos, "How many shaded tiles did I use?" Could Carlos answer? _____ Explain. _____
11. Nancy then asked Carlos, "How many white tiles did I use to build figure *n*?" Could Carlos answer?_____ Explain. _____
12. How many tiles did Nancy use altogether to build figure *n*? _____

(From *National Council of Teachers of Mathematics*, September 1992)

The editors wish to thank Melfried Olson, Western Illinois University, Macomb, Illinois, and Douglas Edge, University of Western Ontario, London, Ontario.

Parents Can Give Children Math Power

Every child loves puzzles and games. That's why it's helpful to connect the puzzles and games played at home with the math taught in school. According to NCTM, by developing everyday activities into mathematical games, parents can help make the "math connection" that will build youngsters' interest in the subject.

One NCTM idea is to discuss with your children which grocery store is best for shopping at. You can base decisions solely on price, or introduce other factors, such as quality, availability of brands and service, to complicate the problem. If you start by just asking the question, your kids may look at newspaper ads to compare prices or check the prices of a few items in the stores.

Energy use is another possibility. Ask your children to make a bar graph plotting your monthly electric bills for the past year. Encourage them to ask why those bills fluctuate from month to month. The same can be done with heating bills.

Have your child make a scale drawing of one of the rooms in your house and make scale templates of the furniture in that room to show proper perspective. Together, rearrange the furniture in as many patterns as possible. Discuss whether additional pieces of furniture could fit in the room.

Standard board and card games are also good for developing math skills and interests, but you can also use simple pencil-and-paper games.

For the free brochure *Family Math Awareness Activities*, send a preaddressed, stamped, business-size envelope to NCTM, 1906 Association Drive, Department NU, Reston, VA 22091.

(From *News USA*)

A New Look at a Classic Fairy Tale

Though the classic fairy tale, *Melisande*, was written by Edith Nesbit nearly 100 years ago, its elements are still fresh today. Make no mistake; *Melisande* is a genuine fairy tale, complete with magic spells and marvels and the requisite marriage between a princess and a prince. But it doesn't stop there! Ms. Nesbit weaves mathematics into her tale of Melisande, the young princess who is cursed by an evil fairy to grow up to be bald. On being granted one wish, Melisande says, "I wish I had golden hair a yard long, and that it would grow an inch every day, and grow twice as fast every time it was cut, and. . . ." Luckily, her father, a skilled mathematician, interrupts her wish before she finishes because he sees its consequences.

This wish can be used as a springboard into a variety of investigations by students across grade levels. Students in K–5 can work on quantifying through a unit on measurement. For example, primary students can cut string into a piece that they estimate to be one yard long—the original length of hair Melisande wished for. Then they can compare that to a piece of string that is one yard long. Next, using a one-yard long piece of string, they can compare it to their hair length and objects in the classroom. They could also use nonstandard units (unifix cubes, toothpicks, hand spans and so on) to measure the one-yard length of string. Upper elementary students can use the standard length of Melisande's hair to apply meaning to a yard as they measure the classroom and outdoor areas. In middle school, students can go further to explore how long Melisande's hair would be in a week, two weeks, a month and so on if she did not cut it. Now use the variable of having it grow twice as fast every time it was cut. This exploration involves students in the idea of proportional relationships that integrates algebra, functions, discrete math, measurement and number.

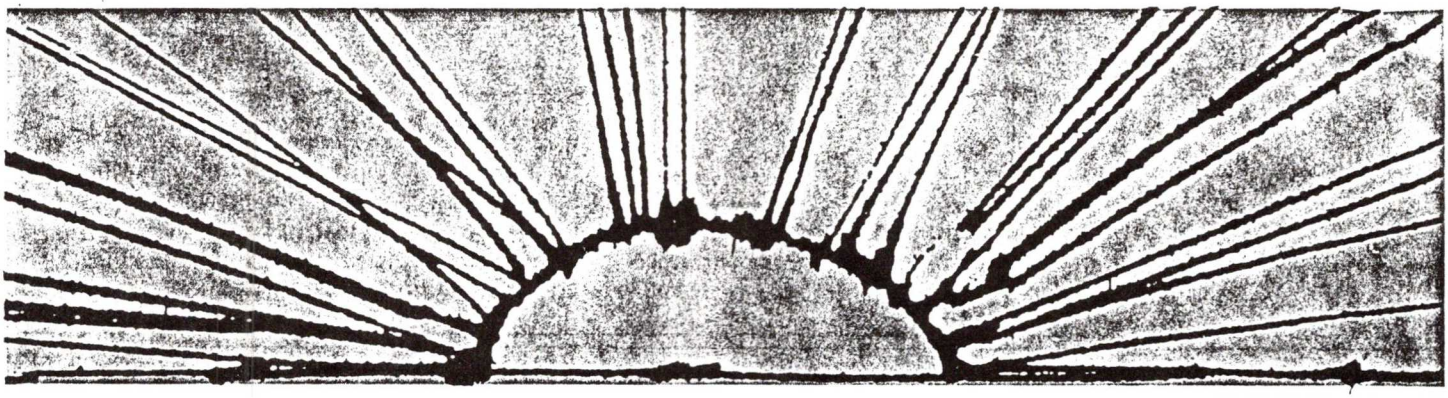
However, the tale does not end here. Enter Prince Florizel. In his attempt to solve Melisande's dilemma by cleverly cutting off her hair, he creates yet another problem. Now, instead of her hair growing in length, Melisande grows in height! She is soon too large to fit indoors and is sad because she is separated from her loved ones. Nonetheless, Melisande uses her size to save the kingdom from an attack by an invading army. Eventually, with Florizel's help, she returns to her proper height and her hair begins to grow again.

Luckily, through the suggestion of the King's godmother, a unique solution—using a scale and Florizel's sound judgment—returns Melisande to her proper size with a head of hair five feet, one and a quarter inches long. The Princess bestows 100 kisses on Florizel, and they are married the next day!

Melisande's growth in height and the ultimate solution to the evil spell are also worth investigating. In addition, the logic used to solve problems throughout the story illustrates divergent thinking and encourages students to make predictions. In fact, you may stop the story at various points and have your students suggest possible solutions. Though I wouldn't advocate fairy tales for social and political lessons, I appreciate their ability to transport us into the world of fantasy and fairy lore as well as to provide a magic carpet to fly into mathematical investigations.

—Jaine Kopp,
University of California, Berkeley

(From *California Math Council Communicator*, September 1992)



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The Mathematics Council of The Alberta Teachers' Association offers you these benefits:

Publications

- MCATA Newsletter—news, articles and special features published several times a year.
- MCATA Journal, *delta-K*—published three times a year. Features articles and ideas useful to classroom teachers and provides an outlet for Alberta mathematics educators to exchange ideas.

Professional Activities

- Publishes professional journals and newsletters.
- Sponsors an annual conference.
- Encourages and assists in the establishment of regional councils.
- Promotes inservice education for improving mathematics throughout the province.
- Provides resource personnel and helps with program planning in cooperation with convention committees, regionals and other interested groups.

Membership

- **REGULAR**: Members of the ATA as specified in ATA bylaws. All such members are entitled to full privileges of council membership including the rights to vote and to hold office.
- **STUDENT**: Student members of the ATA may join this council and are entitled to all benefits and services of council membership except the right to hold office.
- **AFFILIATE**: Persons who are not ATA members as specified in ATA bylaws. Such members receive all benefits and services of council membership except the rights to vote and to hold office.
- **SUBSCRIPTION**: Institution and businesses are eligible for subscription membership. Such members may receive all the benefits and services of council membership except the rights to vote and to hold office.

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The Mathematics Council of The Alberta Teachers' Association

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Address ______________________

______________ Postal Code ______________

Phone (Home) ______________________

School or Employer ______________________

Grade Level, Specialty ______________________

Local Name & Number ______________________

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☐ Active ☐ Associate ☐ Student

☐ Life ☐ Honorary

C. Category of membership in MCATA

☐ New ☐ Renewal

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Make cheque payable to **The Alberta Teachers' Association** (check one)

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Student $ 5 ☐ Subscription $35 ☐

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