



Mathematics Council NEWSLETTER

The Alberta Teachers' Association

Providing leadership to encourage the continuing enhancement of teaching, learning and understanding mathematics.

Volume 20

Number 3

April 2002

President's Message

The Mathematics Council has embarked on a special project to communicate information about and facilitate understanding and thinking on the topic of mathematical literacy. In January, we were approved for a specialist council grant from the ATA. We have formed a committee consisting of K-12 teachers, a postsecondary and Alberta Learning representative and an MCATA executive. Our goal is to produce a background paper on mathematical literacy and a pamphlet to distribute to MCATA members and school districts. We will tell you more at the conference in Canmore.

—Sandra Unrau



From the Editor's Pencil

After reading last issue's "Dialogue" section, I began to look at the way I teach number sentences in my Grade 2/3 class and to focus more diligently on what the manipulation of the numerals means to the children. I have tried substituting letters for the numerals to see if they are able to make the connections, and, believe it or not, most of them are! Hopefully, by the time they get to Indy's classes at Mount Royal, manipulation of variables won't be an issue for them!

Be sure to visit the ATA Educational Trust Website at www.teachers.ab.ca/services/awards/trust.html for complete information about the trust and its awards programs, including a list of the 150 project reports available from the ATA library. Bursary application forms can be downloaded from the site.



—Anne MacQuarrie

Websites

The websites highlighted in this section are intended to be a source of information and resources. From the vast number of sites on the Web, these ones might be a good place to start your surfing.

Sites for Students

Powers of Ten

✦ www.powersof10.com

The Powers of Ten website is suitable for junior high and high school students. It is a valuable tool for teaching and understanding the world through the concept of scale. Although math is the most obvious field of study, it can be applied to every subject matter. Each of the six strands (space, time, tools, people, games and patterns) holds the 44 powers of 10, from 10^{-18} to 10^{+25} . At each of these stations, the particular level of scale is explored. The subjects include physics, medicine, cosmology, literature, photography, painting and more.

The Ultimate Puzzle Site

✦ www.dse.nl/puzzle/index_us.html

The Ultimate Puzzle Site is an initiative of three students. All the interesting puzzles and riddles on the site have been subdivided into the following categories:

- Basic Puzzles—for example, the Climbing Snail: A snail is at the bottom of a 20-meter-deep pit. Every day the snail climbs 5 meters up, but at night it slides 4 meters back down. How many days does it take before the snail reaches the top of the pit?
- Harder Riddles
- Logical and Mathematical Puzzles
- Brain Teasers
- Complex Problems
- Brain Tests and Experiments
- Puzzle Jokes

The puzzles are marked with stars that denote the degree of difficulty of the given puzzle. Solutions are provided to all the puzzles.

Sites for Teachers

PopNet

✦ www.popnet.org/PopTemplate.cfm

PopNet is a resource for population information. You can browse the most comprehensive directory of population related websites available by organization, region and country, or topic within countries.

Consortiamath.com

✦ www.consortiamath.com

Consortiamath.com is a cooperative project of the six Alberta Regional Professional Development Consortia. Its purpose is to facilitate communication and collaboration among teachers, parents, administrators and those interested in mathematics education in the province. The goal is to create a virtual community that works collectively to solve common problems.

—Elizabeth Donovan

Dr. Art Jorgensen Chair Award

This award is presented by MCATA to encourage students enrolled in education programs in post secondary institutions throughout Alberta to pursue and commit to mathematics education. The award consists of a one year term on the MCATA executive, with all expenses paid to attend executive meetings (meals, travel and accommodation when necessary) and the annual mathematics conference, as well as a one year membership to MCATA and the National Council of Teachers of Mathematics (NCTM).

For further details, as well as an application form, see our website at www.mathteachers.ab.ca.

Leadership in Mathematics Education: Getting to Know The National Council of Supervisors of Mathematics

If you are a leader in your school, school district or province, you will be interested in the organization for leaders in mathematics education, the National Council of Supervisors of Mathematics (NCSM). The NCSM is an international organization of about 3,000 members and is affiliated with the National Council of Teachers of Mathematics (NCTM). The purpose of the NCSM is to support mathematics education leadership at the school, district, college/university, state/province and national levels.

The NCSM envisions a cadre of well trained, broadly informed and perceptive leaders of mathematics education at all levels. These leaders must be empowered and held accountable for facilitating the implementation of quality mathematics education programs for all students.

More specifically, the NCSM offers up to date information about research, issues, trends, programs, policy and practice in mathematics education; provides opportunities for the enrichment of mathematical knowledge and the development of leadership skills; promotes the importance of designated mathematics education leaders at all levels; promotes networking among members; collaborates with other stakeholders in the education community, business and government to strengthen leadership in mathematics education; and recognizes outstanding mathematics education leaders.

Canadians have always been active members in the NCSM. For example, there is a Canadian director on the NCSM board of directors. Many Canadians participate by developing documents, speaking at the NCSM annual conference and contributing to working committees. If you'd like to learn more about the organization, please check the website www.ncsmonline.org.

This year, the NCSM will be working with Nelson Thomson Learning to sponsor two events specially designed for leaders in mathematics education in Canada:

- ✦ August 14, 2002: "Leadership in a New Century: Challenges and Celebrations"
The first event will be held at the Delta Montreal Hotel on the day prior to the NCTM Canadian Regional Conference in Montreal (August 15–17).
- ✦ October 16, 2002: "Mathematics Education Leadership: Focus on Quality"
The second event will be held on the day prior to the NCTM Canadian Regional Conference in Regina (October 17–19). The final meeting arrangements for this date are not yet finalized.

At these two meetings, we will be discussing issues of importance to mathematics education leaders in Canada. The issues include recruiting and retaining new teachers, implementing new provincial curricula and assessment programs, and identifying and supporting new leaders. Nelson Thomson Learning will share some of their new materials with us. If you are interested in attending, please contact NCSM Canadian director Florence Glanfield at florence.glanfield@usask.ca or 306-966-7564. There is limited enrolment.

MCATA Grants

Grants worth \$500 each are available for mathematics education initiatives that support current learning and teaching practices and/or current priorities, as outlined by or through Alberta Learning, school districts, MCATA, NCTM, the ATA or other reputable educational associations. The annual deadlines are May 1 and December 1.

For full details, as well as the application form, see our website at www.mathteachers.ab.ca. Grant applications can be sent to lorraine.taylor@lethsd.ab.ca.

Dialogue

Christine Lee is a first-year student at the University of Calgary in the Master of Teaching program.

Integer Addition and Subtraction Using Number Lines

In my first year of the Master of Teaching program at the University of Calgary, I have been placed at a Calgary Board of Education junior high school and have been planning and teaching the integers unit under the supervision of my partner teacher, Ann McLennan. Although the idea of integers seems simple enough to someone who considers herself a math geek, I needed an approach to help Grade 7 students understand integer addition and subtraction. After researching various lesson planning and educational websites, I encountered “Integer Addition and Subtraction: A Participation Model” by Jeff LeMieux at the Encarta Schoolhouse lesson plans website, <http://encarta.msn.com/alexandria/templates/lessonFull.asp?page=1088&pr=1>. The human number line idea provided by LeMieux helped demonstrate to the young students how operations with integers worked and was less confusing than the standard abstract, algebraic or algorithmic methods used by students in high school or university.

Although it was important that the students be able to use the number line, I wondered if there were ways of expanding Jeff LeMieux’s human number line for use at home or for tests. To investigate this, I drew little generic people facing two opposite directions on small pieces of paper and glued them back-to-back on a paper clip. Using the paper clip, students can slide or walk their miniature human along the number line, which is made of adding machine tape. Instead of using a plain number line by drawing in lines between numbers to demonstrate different operations, the students can now imitate the life-sized number line at their desks. I try to encourage my students to use manipulatives like integer tiles and the mini human number lines with each lesson, quiz and assignment, because it helps promote their mental math skills.

Instructions for Using the Number Line

A number line is marked out using masking tape on the classroom floor, with numbers going from 20 to 20. When solving an addition statement, have a student stand at the first number in the problem, facing the positive integer direction, and then take the required number of forward steps (positive integers) or backward steps (negative integers) to solve the problem. For solving $4 + (-3) = 1$, for example, place a student at 4 and have him/her face the positive direction and take three steps backwards to arrive at 1.

When you want to solve a subtraction statement, position the student at the first number in the problem, facing the negative direction. To solve the problem, have the students take forward steps for subtracting positive numbers and backward steps for subtracting negative numbers. For solving $(4) - (-3) = -1$, for example, place a student at 4, facing the negative direction, and have him or her take three steps backwards to arrive at 1.

—Christine Lee

Math Requirements Update

The Northern Institute of Technology (NAIT) has released the following document regarding the acceptance of Applied Mathematics 30 toward their programs:

Only five programs insist on Pure Mathematics 30 as a prerequisite:

1. Combined Laboratory and X Ray
2. Cytotechnology
3. Diagnostic Medical Sonography
4. Medical Laboratory Technology
5. Respiratory Technology

Applied Mathematics 30 or Pure Mathematics 30 are both acceptable as prerequisites for programs as varied as Aviation Training, Geological Technology, Electronics Engineering Technology, Petroleum Engineering Technology and Telecommunications Engineering Technology.

For more detailed information, check the NAIT website at www.nait.ab.ca.

2002 MCATA Annual Conference

Canmore, October 31–November 2, 2002

The 2002 annual math conference will be held in Canmore, from October 31 to November 2, 2002. Most of the sessions will be held at the Canmore Radisson Hotel. Our conference planners are deep in planning for the Summit in Canmore. Helen McIntyre (mcintyrh@cadvison.com) and Sandra Unrau (sunrau@cbe.ab.ca) are the cochairs, Evelyn Sawicki (evelyn.sawicki@cssd.ab.ca) and Janice Kristjanson (jkristja@cadvision.com) are the program chairs, Lorraine Taylor (lorraine.taylor@lethsd.ab.ca) is the display's director, Patricia Chichak is the registration coordinator (mathguy@telusplanet.net) and Elaine Manzer (manzere@prsd.ab.ca) is the budget and advertising coordinator.

We invite you to present at the conference. Please download a speaker proposal form from the MCATA website at www.mathteachers.ab.ca. The website will continue to have updates on the conference as plans are confirmed. The June edition of the ATA News will also have conference information.

AISI Projects?

The Alberta government has given our school boards funds under the Alberta Initiatives for School Improvement (AISI) and the money has been meted out for many various projects. If your school (or school district) has a math project that you particularly enjoyed, please share it with us. Send the particulars to anne.macquarrie@shaw.ca, and write "Newsletter Submission" in the subject line.

Alberta Learning Update

According to the calculator policy for all mathematics and science diploma exams (www.learning.gov.ab.ca/k_12/testing/diploma/bulletins/essential/calc_policy.asp), "Students must clear **all** programmable calculators, both graphing and scientific, that are brought into diploma examinations of all information that is stored in the programmable or parametric memory." The policy also states that "during examinations, supervising teachers must ensure that

- calculators operate in silent mode
- students do not share calculators or information contained within them
- calculator cases are not available to students
- programmable calculator memories, including parametric memories, have been cleared
- only graphing calculators on the current list approved by Alberta Learning are used"

During the January diploma exam administration, some teachers raised concerns about calculator programs that can mask memory. Calculators that contain these programs and do not have a password can be cleared using the instructions found on Alberta Learning's website (www.learning.gov.ab.ca/k_12/testing/diploma/bulletins/essential/clearing_calc.asp). Students who use passwords to protect their calculators should be informed that if they do not clear their calculator, they will not be allowed to use their calculator on the exam.

Students who plan on writing a mathematics or science diploma exam should be made aware of the calculator policy as soon as possible in their high school career. Students should also be encouraged not to borrow a calculator for the diploma exam unless they know precisely how to clear and operate it.

Symposium On Mathematical Understanding

On June 1, the University of Saskatchewan College of Education hosted a symposium on mathematical understanding. The symposium was held one day prior to the Canadian Mathematical Society's (CMS) summer meeting. Each speaker at the symposium also shared his or her paper at the CMS summer meeting, in the mathematics education sessions.

About 60 people, including teachers of all grade levels, curriculum consultants, school trustees, school administrators and university researchers, joined in on the conversation on mathematical understanding.

The symposium investigated different ways of thinking about the phenomenon of mathematical understanding. This is a very exciting time for all aspects of mathematics education, and the symposium was a wonderful opportunity for researchers from the fields of developmental and cognitive psychology, mathematics education and mathematics to share their thinking about mathematical understanding. The symposium also provided time for each participant to reflect on the thoughts of the speakers and consider the implications for provincial curricula and for instructional practices.

Anna Sierpinska, a much-published mathematics education researcher from Concordia University, led the first session. Her talk, "Understanding in Mathematics: Memories of Research Gone By, and Some Eternal Questions," opened the discussion.

Jamie Campbell, a cognitive psychologist from the University of Saskatchewan, shared his thinking and research with his talk, "An Encoding Complex Approach to Numerical Cognition in Chinese-English Bilinguals." Jamie's talk investigated the mental processes that people might perform when doing computation. Morris Orzech and Grace Orzech, two mathematicians from Queen's University, shared what they've learned about their students' understandings of mathematics. They shared examples of students thinking at the university level through their talk, "A Definition of Mathematical Understanding, and Some Related Principles." Sherry May, a mathematician at Memorial University, Michael Rabinowitz, a developmental psychologist at Memorial University, and Don Mantanyka, a retired teacher from Saskatoon, shared examples and thinking about automaticity in understanding mathematics. In "Teaching the Rules of Exponents: A Resource-Based Approach," they described the skills that students must master before learning a new concept and their work at Memorial University.

The proceedings of the symposium on mathematical understanding, "Mathematical Understanding: Four Perspectives," was recently published. You can purchase copies of the proceedings for a cost of \$10. Cheques should be made payable to the University of Saskatchewan, and orders for copies of the proceedings should be sent to Florence Glanfield at florence.glanfield@usask.ca, or by mail:

Florence Glanfield
Department of Curriculum Studies
University of Saskatchewan
28 Campus Drive
Saskatoon S7N 0X1

Mathematics Council of the Alberta Teachers' Association

Providing leadership to encourage the continuing enhancement of teaching, learning and understanding mathematics.

March 19, 2002

Dear mathematics education leader,

The Mathematics Council of the Alberta Teachers' Association (MCATA) is holding a mathematics leaders' symposium on May 3, 2002, at the Red Deer Lodge in Red Deer. We are inviting key mathematics leaders from school districts to join us at this symposium. MCATA usually hosts two symposia each school year. One is the day before our fall Annual Conference and the other is in the spring.

We feel the topic, mathematical literacy, is a timely issue to focus on. Mathematical literacy K–12 is beginning to catch the attention of teachers, administrators, district curriculum leaders and Alberta Learning. MCATA is currently working on a reference paper and brochure to help math leaders, math teachers, schools, districts and parents understand this topic and its relationship to the current program of studies.

- What does mathematical literacy mean?
- What does being mathematically literate mean?
- What implications does the meaning of mathematical literacy have for an early math literacy initiative in our schools?

These same questions have been addressed in reading and writing literacy over the last few years. As jurisdictions are becoming more comfortable in addressing the reading and writing literacy issues they are beginning to ask about math literacy and how we can ensure that our students are literate in mathematics as well.

The symposium is designed to

- address the issues around mathematical literacy,
- hear what the literature is saying about mathematical literacy and numeracy,
- provide feedback for the work on the reference paper and brochure, and
- give math leaders ideas for getting mathematical literacy questions and issues openly discussed in their districts, fostering a common understanding and a sense of direction.

We encourage you to send your key mathematics district leaders to this symposium so that they will have the opportunity to discuss this topic with other leaders of mathematics from across the province. Please pass on this information and registration form. Information is also available on our website at www.mathteachers.ab.ca.

Sincerely,
Sandra Unrau, MCATA President

Copyright © 2002 by The Alberta Teachers' Association (ATA), 11010 142 Street NW, Edmonton, Alberta T5N 2R1. Unless otherwise indicated in the text, reproduction of material in *Mathematics Council Newsletter* is authorized for classroom and professional development use, provided that each copy contain full acknowledgement of the source and that no charge be made beyond the cost of reprinting. Any other reproduction in whole or in part without prior written consent of the ATA is prohibited. *Mathematics Council Newsletter* is published several times yearly by the ATA for the Mathematics Council. Editorial and production services: Central Word Services staff, ATA. Address all correspondence to the editor. Authors' opinions are not necessarily those of MCATA or the ATA. ISSN 0823-1117

Mathematics Council of the Alberta Teachers' Association

Providing leadership to encourage the continuing enhancement of teaching, learning and understanding mathematics.

We invite you to the

Mathematics Leaders' Spring Symposium

Focus: Mathematical Literacy
Red Deer Lodge, Red Deer
May 3, 2002

Literacy is an important topic of interest to educators, and literacy in mathematics is just beginning to be discussed. At the fall 2001 Math Leaders' Symposium, we presented the following quote and asked delegates to begin asking others what it meant to be mathematically literate:

In order to be read, a poem, an equation, a painting, a dance, a novel, or a contract each requires a distinctive form of literacy, when literacy means, as I intend it to mean, a way of conveying meaning through and recovering meaning from the form of representation in which it appears.

—Elliot Eisner

Come and join us for a great day exploring the idea of mathematical literacy—what it means, what the research says about it and what other math leaders from around the province have to say about it.

- What does it mean to be mathematically literate in today's society?
- What knowledge, skills and attitudes are needed to be mathematically literate?
- How does the Alberta program of studies address mathematical literacy?
- How has the meaning of mathematical literacy changed in the last 20 years?
- Will the meaning of mathematical literacy change for future graduates?
- How would you determine if a child were mathematically literate in Grade 1, 5 or 8?

If we consider the definition for mathematical literacy from the Program for International Student Assessment (PISA), then students require more than skills, fluency and procedures to be mathematically literate. PISA states that mathematics literacy is "an individual's capacity to identify and understand the role that mathematics plays in the world, to make well-founded mathematical judgements and to engage in mathematics, in ways that meet the needs of that individual's current and future life as a constructive, concerned and reflective citizen."

We hope to see you on May 3.

Where: Red Deer Lodge, 4311 49 Avenue, Red Deer

When: May 3, 2002

Timeline for the day:

9:00—muffins, coffee and registration

9:30 to 11:30—Morning session

11:30 to 1:00—Lunch on your own

1:00 to 3:30—Afternoon session

Please fax or e-mail this registration information to Sandra Unrau at (403) 777-6026 or sunrau@cadvision.com.

Name: _____

Address: _____

District: _____ Position: _____

Division: 1 2 3 Postsecondary

E-mail address: _____

Summit in Canmore 2002

A Focus on Mathematical Thinking and Mathematical Literacy

Mathematics Council of the ATA—Speaker Proposal Form

October 31–November 2, 2002

Radisson Hotel and Conference Centre, Canmore

Name(s): _____ Name(s): _____
Address: _____ Address: _____
City: _____ City: _____
Province: _____ Postal Code: _____ Province: _____ Postal Code: _____
Phone(W): _____ Phone(H): _____ Phone(W): _____ Phone(H): _____
Fax: _____ Fax: _____
E-mail: _____ E-mail: _____

Grade level focus : K–3 4–6 7–9 10–12

Available Friday Yes No Available Saturday Yes No

MCATA Member: Yes No

Length of Session: (please circle one) 90 minutes 180 minutes

Type of Session: workshop (tables) lecture (lecture style seating)

Session Title: _____

Session Focus: Pattern and Relations Number
 Shape and Space Statistics and Probability

Short Description of Session:

(please keep to under 200 characters: for the program booklet)

Janis Kristjansson
11 Harlow Avenue NW
Calgary, Alberta T2K 2G2

Phone: (403) 777-8410
Fax: (403) 777-8412
E-mail: jkristja@cadvision.com

For further information, see cover letter. Handout reimbursement will be available on site at the conference.

I am willing to have my name on a list of potential speakers for other conferences/PD. This information will be made available on request, to schools, districts or other requests for professional development in mathematics. The list will be held with MCATA executive for this purpose only. Yes No