

Mathematics Council NEWSLETTER

The Alberta Teachers' Association

Volume 12

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From the Editor

Once again, I am back to a familiar theme: the need for mathematics leaders in the early grades. To expect all teachers in the early grades to be able to teach children mathematics effectively is as ridiculous as asking them to teach children music or physical education effectively.

One reason noted for superior mathematics achievement by children in such countries as Japan and Germany is the availability of teachers with an extensive background in mathematics education. The

"Blue Ribbon Panel" recommended that at least one teacher in each primary/elementary school have enough background in mathematics education to serve as the mathematics leader or coordinator.

The NCTM supports this concept, as the following position paper (March 1984) indicates.

I urge you, as mathematics leaders, to encourage your school system to ensure that each school has at least one person able to serve as mathematics coordinator.

Mathematics Leaders in Elementary/Middle Schools

A key component in the improvement of mathematics instruction for all students is greater attention to the elementary/middle school mathematics program through provision of stronger mathematics leadership at individual schools.

School mathematics leaders are essential for raising the level of mathematical knowledge and pedagogical competence of the staff, for coordinating

mathematics instructional effort within and between buildings and for helping to assure implementation of a comprehensive, high-quality program. In addition, school mathematics leaders will support the roles and efforts of teachers, supervisors and administrators who are increasingly concerned about promoting excellence for their students.

For these reasons, the National Council of Teachers of Mathematics advocates that every elementary/middle school identify a school mathematics leader to provide ongoing leadership and assistance in planning, implementing and evaluating a comprehensive school mathematics program. School mathematics leaders should be available as a resource to all staff in the areas of curriculum design, professional development, teaching methodology, classroom management, selection of materials and student assessment.

More specifically, school mathematics leaders may perform or assist in any, or all, of the following tasks connected with

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the essential instructional functions listed below:

1. Curriculum design

- Provide leadership in the development of mathematics instructional programs to meet diverse student needs
- Coordinate the implementation of a sound instructional scope and sequence for mathematics
- Facilitate the review and revision of the curriculum
- Integrate mathematics with other content areas

2. Curricular content

- Relate the content of state/provincial and local curriculum guidelines to the individual school's program
- Present and interpret mathematics content to meet teachers' needs
- Promote the importance of mathematics
- Keep abreast of national, state/provincial and local recommendations for updating and revising curricular content by participating in the activities of professional associations

3. Methodology and materials

- Acquaint teachers with successful and innovative strategies for classroom instruction through demonstration lessons and conferences
- Consult with teachers in selecting and implementing activities that improve motivation and attitude toward mathematics

- Review, and recommend for acquisition when appropriate, teaching materials, calculators, computer software and so on and assist teachers in integrating them into the program

4. Assessment

- Participate in the review and selection of means of assessment
- Assist staff in designing and using classroom tests
- Assist staff in interpreting and using test data and placing students in appropriate activities

5. Other functions

- Work with staff in determining needs and priorities for professional development
- Assist teachers, on request, in self-evaluation activities
- Plan and budget for the purchase of instructional materials
- Maintain and promote effective communication among grades and schools and with parents, the community and support personnel
- Coordinate instruction between regular and special programs to meet individual student needs
- Manage, schedule and equip a mathematics laboratory or teacher resource room
- Provide direct instruction, as appropriate, for individual students, mathematics teams or special projects

As defined, school mathematics leaders serve as an immediate resource to teachers by demonstrating knowledge, competence and leadership in mathematics education. Thus, they should know and understand mathematics substantially beyond that which they may be expected to teach, and they should have knowledge and competence in the methods and techniques appropriate for effectively teaching mathematics to elementary/middle school students. ▲

NCTM Annual Conference

The 1994 NCTM annual conference will be held April 13–16 in beautiful Indianapolis, the car-racing capital of the world.

An excellent program, covering all areas of mathematics from Kindergarten to university, is planned. There should be many sessions to interest all who teach students mathematics. As well as the sessions, numerous tours of Indianapolis and surrounding areas are planned.

You are encouraged to attend this exciting conference—you will not be disappointed. ▲

From the President's Pen

We have completed another successful annual conference, held this year in Calgary. Congratulations and thanks to conference chair Bob Michie and program chairs Bob Midyette and Barb Morrison, as well as all the other chairs and their committees for the superb job they did in organizing the conference.

The conference theme, "Reflection: Congruent Beliefs and Practices," highlighted the need for teachers to examine their work with students in light of increasing information and



"You Can't See Your Reflection in the Ocean"

We all know that teaching students mathematics is a challenge. The following quotations taken from Cathy Seeley's opening session at the 1993 MCATA conference put the challenge in its proper perspective:

So, basically, I am supposed to . . .

create a rich and safe environment where all students develop mathematical power by working actively together in heterogeneous groups doing

knowledge about learning and teaching in mathematics. Keynote speaker Cathy Seeley was outstanding. Her address provided much food for thought regarding beliefs about what we teach and our practice of teaching.

The Math Fare, a sharing session begun at the previous conference in Medicine Hat, proved just as successful this year. Thanks to the many classroom teachers from across the province who participated as presenters.

Congratulations to Mary Anne Nissen who received the 1993 Outstanding Mathematics Educator of the Year Award. A profile of Mary Anne's career is included in this issue.

meaningful and worthwhile mathematical tasks using state-of-the-art technology as an appropriate problem solving tool at the appropriate time, to reach deeper levels of understanding than ever before, largely because of my carefully timed and well-phrased probing questions, while I convince my fellow teachers that this is how they, too, should teach, and while I sell the idea that this is how it really should be to parents, taxpayers, administrators and school board members, most of whom think I should really be spending my time raising my test scores by just doing a better job of what we used to do 20 years ago, in an environment that most of them would not dare set foot into?

Yes!

The day before the conference, 94 math leaders from across Alberta met with the idea of forming a sharing symposium to develop a better provincial network to promote and enhance mathematics instruction and learning. We will look to the future for more opportunities for this type of sharing of ideas and concerns.

Your council will next meet on January 22 in Red Deer. If you have questions or concerns, contact me or any other executive member. And in the meantime—remember, Christmas is right around the corner, so best wishes for a happy holiday season. ▲

—Wendy Richards

Here's what I want you to do:

- Don't teach something.
- Learn one new way to use calculators to teach something you could not do otherwise.
- Learn how to use one good computer package that does something better and differently than you could do otherwise.
- Learn how to use cooperative learning in your mathematics teaching.
- Largely ignore your standardized tests and test scores for a year or two. ▲

—Cathy Seeley

The 1992 Outstanding Mathematics Educator: Louise Frame

This award recognizes and honors those people in mathematics education who have positively affected students, teachers and programs. Louise Frame, recipient of the 1992 Outstanding Mathematics Educator of the Year Award, has made and continues to make numerous contributions to mathematics education in Alberta.

Louise is an assistant principal in the Calgary Board of Education (CBE) at the elementary school level. She has been with the CBE for the past 18 years and has taught in many schools; been vice-principal, assistant principal and practicum advisor; and had a seconded position with the University of Calgary. Louise joined the CBE from a teaching position at Babine Lake in northern British Columbia.

She completed her undergraduate work at the University of British Columbia and her master's degree at the University of Oregon. She is a past president of MCATA.

Louise feels strongly that her experiences on MCATA have provided her with a broader scope and sequence of education. Becoming aware of and realizing how things are put together from a provincial perspective have increased her insight on teaching



Louise Frame

perspectives. As well, Louise obtained incredible insights from the results of a survey of mathematics teachers in Alberta with which she was involved. Working with student teachers at the University of Calgary as university associate also provided positive support for her philosophy and commitment toward effective mathematics learning and education.

In addition to positively affecting students' learning of mathematics and mathematics curriculum in the classroom, Louise has dedicated much of her time to working with teachers in learning and teaching. The effects of this can be seen in the enhancement and upgrading of those teachers with whom she has come into contact and assisted. Through modeling and direct assistance, Louise has provided opportunities for colleagues and parents to identify and become aware of appropriate materials and their effective use in the mathematics classroom. Parental involvement in

children's learning is important to Louise.

In school, Louise strives to assist in increasing students' and teachers' love of mathematics throughout elementary school and long through their junior and senior high school experiences. She would like to allow students to do mathematics all day long, have them enjoy their experiences and be able to incorporate their learning into the "real" world.

For Louise, the joy of teaching mathematics is seeing how things fit together and seeing "the lights go on" in children's eyes. Children start to see the connections between mathematics and other learnings. Louise uses a variety of teaching methods and cooperative learning to accommodate students' various learning ranges and abilities. Through creating the language of learning, Louise encourages children to understand mathematics concepts, to speak and dialogue in mathematical terms and to apply problem solving approaches to real-life situations. Louise thrives in the day-to-day nitty-gritty of school life, working with all people (children and adults) in the school. She enjoys leading and coaching and being an important part in the lifelong learning and appreciation of mathematics and mathematics education for all with whom she comes into contact. ▲

—George Ditto

The 1993 Outstanding Mathematics Educator: Mary Anne Nissen

Mary Anne Nissen received the 1993 MCATA Outstanding Mathematics Educator of the Year Award.

Mary Anne has been active in mathematics education for many years. She has taught in many centres, including Castor, Coronation, St. Albert and the County of Strathcona. Her classroom experience includes teaching elementary, junior high and senior high school. In



Mary Anne Nissen

addition, she continues to tutor mathematics to students in all divisions. She has expertise and is comfortable discussing mathematics education at any level.

Mary Anne has an undergraduate degree from the University of Alberta and a master's degree from the University of Oregon. As a perpetual learner, her professional development activities have included workshops in Math Their Way and a course at the University of Calgary focusing on the work of the renowned mathematics educator, Richard Skemp. While on leave from the County of Strathcona, she is spending a year studying at the University of Alberta. She is taking a course in early childhood education to expand her knowledge of young children's learning and a course in assessment to keep abreast of current assessment techniques. After Christmas, she will be teaching an elementary education curriculum and instruction course.

In 1987, she was seconded by the Student Evaluation Branch of Alberta Education as a test development specialist for the elementary mathematics diagnostic program. Following the successful completion of this project in 1990, she moved to the Curriculum Branch as program manager for the



Marie Hauk presents the award to Mary Anne Nissen

revision of the elementary mathematics curriculum, scheduled to be implemented in September 1994. Continuing with this task by working on contract during her leave, she expects that the revisions will be completed by June 1994. Her ability to organize structure and details and to work professionally with teachers on committees is second to none.

Mary Anne credits her work with teacher committees and inservice sessions for Alberta Education across the province as an important component of her professional growth. The success of the elementary mathematics diagnostic program has taken her across Canada, where there is growing interest. She is a long-time member of MCATA, the National Council of Teachers of Mathematics (NCTM) and the National Council of Supervisors of Mathematics (NCSM). ▲

—Bryan Quinn

MCATA Executive Profile: Wendy Richards

Our new president, Wendy Richards, has been on the executive for the past six years, and she has worn several hats: director-at-large, NCTM representative, secretary and vice-president.

As a teacher with Edmonton public schools since 1966, Wendy has taught at the elementary and junior high levels.

Although she was originally an English major, her memories of some excellent math teachers who



Wendy Richards

showed her patience and understanding led her into mathematics. She is now a mathematics specialist at Rosslyn School, where she has taught for 15 years. Her involvement with MCATA began when she assisted with registration at an annual conference. She enjoyed the collegiality and welcomed the opportunity when she was nominated to serve on the executive.

Over the years that I have known Wendy, her outgoing personality and willingness to "give of herself" have impressed me. As a world traveler and

raconteur, she is able to offer a wealth of rich experiences to her students, colleagues and the teaching profession. I found it remarkable that she attended a 1991 math conference in Hawaii (at her own expense) to verify firsthand that the number of spirals formed by the hexagonal-shaped scales on a pineapple illustrate numbers in the Fibonacci Sequence.

Wendy states that one of her personal goals as president is to encourage more active involvement of our members. I would like to help her generate involvement by offering to share with the membership my "favorite Fibonacci magic trick," which can easily be tailored to any secondary math class. In the letter you fax to Wendy (at Rosslyn School, 455-7605) congratulating her on her recent appointment as president, express your interest in having me submit my Fibonacci trick to an upcoming newsletter. Let's get her fax machine smoking! ▲

—Bryan Quinn



"Changing Directions,"

NCTM Canadian Regional Conference Edmonton, Alberta October 20-22, 1994

MCATA's next annual conference will be the NCTM Canadian Regional Conference. The program is nearly complete, and plans for all activities are well under way. Planning committee members include

- | | |
|--------------------|---------------------------|
| Ron Blond | <i>Signs</i> |
| Daryl Chichak | <i>Membership</i> |
| Yvette d'Entremont | <i>Program</i> |
| Edna Dach | <i>Take It and Use It</i> |
| Ralph Dickau | <i>Equipment</i> |
| George Ditto | |

NCTM CCC Representative

- | | |
|--------------------|----------------------|
| Dan Forest | <i>Student Hosts</i> |
| Mary Lou Forest | <i>Exhibitors</i> |
| Florence Glanfield | |

Conference Chair

- | | |
|---------------------|---------------------|
| Marge Hallonquist | <i>Social</i> |
| Marge Marika | <i>Publicity</i> |
| Kathy McCabe | <i>Social</i> |
| Kay Melville | <i>Hospitality</i> |
| Elizabeth Mowatt | <i>Registration</i> |
| Katie Pallos-Hadden | |

Workshop Support

- | | |
|-----------------|-----------------------|
| Irene Stevenson | <i>NCTM Materials</i> |
|-----------------|-----------------------|

Phone Florence Glanfield at 427-0010, ext. 410, for more information, and keep an eye on the *Newsletter* for conference registration information.

Plan on Attending! ▲

President's Annual Report

It has been a pleasure to serve as president this past year (1992–93). Our annual conference, the mini-conferences and our publications were the main activities or services to our members. Our membership currently stands at 600 members.

The executive met six times during the year and continued to work on the goals as established during 1991–92. We reorganized the executive and formed standing committees for publications, membership, conferences and issues. These now represent the structure for our "Thinkers' Conference" in Red Deer during March each year.

During the past year, we had a very successful annual conference in Medicine Hat, the "Math Fare." Four hundred and fifty delegates attended sessions for all levels of mathematics education. The highlight was the "fair," the half-hour sessions of classroom-tested ideas. Thanks to cochairs Diane Congdon and Gary Hill and to all the committee

members on a job well done. An NCTM regional conference, "Changing Directions," is scheduled for Edmonton, October 22–24, 1994, and a MCATA annual conference will be held in Lethbridge in the early fall of 1995.

Thanks to Myra Hood and Florence Glanfield for their work in planning resource fairs and mini-conferences. The resource fairs were held in Calgary and Edmonton during January and February with over 450 people attending. Two mini-conferences were held in Calgary and Edmonton during Spring with about 300 people attending. An excellent meal and two sessions were well received.

Thanks again this year to Craig Loewen for the publication of three excellent *delta-k* journals: "Activities for Active Mathematics Teaching," "The Probability of Consecutive Numbers in a Lotto Drawing" and "In-Between Hits."

Thanks to Art Jorgensen for five newsletters which kept our members informed of events and activities of the Council.

Thanks to Daiyo Sawada, editor of Monograph No. 10,

"Communication in the Mathematics Classroom," for a job well done.

Marie Hauk represented MCATA at the NCTM annual conference and delegate assembly in Seattle in April. Other council members on NCTM committees this year were Richard Kopan on the Regional Service Committee and George Ditto on the Convention and Conference Committee.

Vice-president Wendy Richards and I represented the Council at the 1993 ATA Curriculum Seminar in June. The emphasis at the meeting was the recent ATA document, *Trying to Teach*. Four executive members attended the ATA Summer Conference in Banff in August. Our 1993–94 president, Wendy Richards, represented MCATA at the NCTM Leadership Conference in Ottawa in July.

I wish to thank all executive members for their assistance this year and especially to thank Diane Congdon and Alvin Jonson as they finish their terms on the executive. ▲

—Bob Hart
October 1993

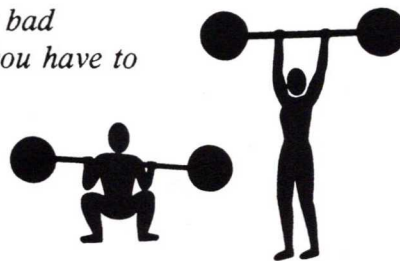
On the Lighter Side



The smallest good deed is better than the greatest good intention.

Silence is not only golden but also seldom misquoted.

Be thankful for bad luck—without it, you have to blame yourself.



Creative Marketing: A company that owns 16 doughnut shops and three weight-loss clinics. ▲

Challenging Problems from the Alberta High School Mathematics Competition Part 1 (1992-93)

Challenge your students with these sample problems from the math competition exams to spark their interest and test their skills:

Problem 8

A positive integer is called a fiver if the sum of its digits is divisible by 5. In any block of seven consecutive positive integers, the maximum number of fivers is

- (a) 1
- (b) 2
- (c) 3
- (d) 4
- (e) 5

Problem 11

An object is known to have integral weight, but this cannot be determined using a balance and three weights of values 1, 4 and 11. The minimum weight of this object is

- (a) 2
- (b) 3
- (c) 9
- (d) 13
- (e) 17

Solutions

8. (c) If there is no change in the tens digit, exactly one in every five consecutive positive integers is a fiver. In a block of seven integers, the tens digit can change at most once. Thus, we have at most 3 fivers. The block from 49999 to 50005 contains 3 fivers.
11. (e) The expression $a + 4b + 11c$, where each of a , b and c is one of -1 , 0 and 1 , can assume the values 1, 3, 4, 5, 6, 7, 8, 10, 11, 12, 14, 15 and 16. Clearly, the weight n of the object is not equal to any of these. Now, $n \neq 2$ because otherwise it can be determined from $1 < n < 3$. Similarly, $n \neq 9$ or 13.

All high schools are encouraged to have their top students compete in these competitions.

For information about how your school can get involved, contact Alvin Barager, chair, AMSMC Board, Department of Mathematics, University of Alberta, Edmonton T6G 2G1; phone 492-3998. ▲



The "What Does Professionalism Mean?" article is taken from Colorado Mathematics Teacher, volume 27, number 1, p. 4.

What Does Professionalism Mean?

Colorado math teachers attended the Rural Math Conference on Assessment in Leadville last July, which sparked numerous discussions about teachers as professionals.

How Do You Recognize a Professional Teacher?

1. Value each other as professionals by celebrating other teachers' ideas, successes and milestones
2. Set up content meetings among grade levels to share current strategies and concerns
3. Meet with administrators to discuss current trends and demonstrate a willingness to facilitate professional growth
4. Attend professional meetings and encourage colleagues' attendance too
5. Assist other teachers to obtain materials, funds and professional resources
6. Contribute articles for publications and present at professional meetings

Professionalism means that one must become independent in taking a leadership role to improve the quality of education at all levels. ▲

—Sue Buckley

The Right Angle

1993-94 Mathematics 30 Information Bulletin Changes

You should have your 1993-94 Mathematics 30 Information Bulletin for the Diploma Examinations Program; it was mailed to all senior high schools in September. If you have not received one, check with your principal or phone Florence at 427-0010, ext. 410. Requests for clarification of standard statements were made throughout 1992-93 and these clarifications have been incorporated. This bulletin also included important information about the Mathematics 30 Formula Sheet for the 1994 diploma exam, the use of scientific calculators on the exam, suggestions for students preparing for and writing the exam and a set of definitions of directing words that will be used on the open-ended portion of the exam. The bulletin can be photocopied for your students; I especially encourage you to share the statements of standards with your students so they will know what is expected of them on the diploma examination.



Achievement Testing Program

The Grade 3 mathematics achievement test will be written across the province this school year. The *Information Bulletin for Grade 3 Mathematics* was mailed out in November (by the time you read this, you may already have a copy). Check with your principal so that you get a copy. If you have specific questions or comments regarding the Grade 3 mathematics achievement test, phone Kay Melville at 427-0010.

Secondary Mathematics Curriculum

There is a lot "abuzz" in the curriculum area. Groups of teachers from around the province are working to write a curriculum for Mathematics 31, review new resources for this course and prepare statements of standards. Alberta Education hopes to have a new resource authorized for Mathematics 31 by the beginning of January 1994 so that it can be ordered for second-semester classes. For more information, call Hugh Sanders or Jack Edwards at 427-2984.

The Secondary Mathematics Advisory Committee on Curriculum Standards first met November 1-2 in Edmonton and will provide curriculum developers with input into standards and expectations for secondary school mathematics. One of its first tasks will be reviewing recommendations made in the ATA Blue Ribbon Panel's report on Mathematics 30. ▲

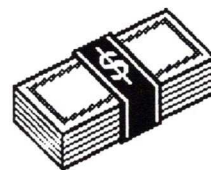
—Florence Glanfield

How Do Children Use Math? Let Them Count the Ways

Think for a minute about how important math is in your everyday life. More important, ask your children how often they use the math skills they learn in school.

Granted, math class may take just 35-60 minutes each school day. But once kids leave the classroom, they use what they have learned constantly.

How do kids use math in their daily lives? Let them count the ways: finding the right change for the soda



machine, keeping score in a soccer game, figuring out how late they can stay at the mall and still be home in time for dinner. These are just a few.

As the world becomes more complex, children need math in other ways too.

"The most important goal in mathematics instruction is developing problem solving skills," says Mary Lindquist, NCTM president. "No matter how well children can perform arithmetic calculations or accurately measure a line, unless they know when and how to apply these skills, they will not be fully prepared for the society in which we live."

NCTM suggests that the earlier children begin to solve problems the better.

(cont. →)

"How Do Children Use Math?"
cont.

High-Tech Fun

For young children, a calculator or computer is just another toy. But, the NCTM says, there is nothing wrong with making learning fun. An analysis of 79 studies revealed that kids who use calculators along with traditional instruction improve their skills with paper and pencil—both in basic operations and problem solving. In fact, the NCTM believes so strongly in the value of calculators, it recommends that all students use them to

- concentrate on the problem solving process rather than on the calculations associated with the problems;
- gain access to math beyond students' level of computational skills;
- explore, develop and reinforce such concepts as estimation, computation, approximation and properties; and
- experiment with mathematical ideas and discover patterns.

The NCTM has prepared two brochures: "Using Calculators to Improve Your Child's Math Skills" and "Help Your Child Learn Math." For free copies, send a self-addressed, stamped, business-size envelope to NCTM, 1906 Association Drive, Dept. M-NU, Reston, VA 22091-1593. ▲

Developing Number Sense Workshop for Grades 3–5 Math

Kathy Richardson developed a workshop for intermediate mathematics by teaming with colleagues Linda Gregg and Mary Ann Ward to produce the Developing Number Sense (DNS) workshop for Grades 3–5. Richardson's Developing Math Concepts (DMC) workshop for K–2 mathematics has been so well received by primary teachers that school administrators, colleagues and teachers wanted Kathy to expand her program to intermediate grades.

The new three-day DNS workshop is based on the belief that all students can become mathematically powerful when emphasis is placed on developing understanding and when students are given experiences and activities that help them construct and internalize their own understanding of math concepts. The workshop focus is on development of number sense, which is important because it allows students to reason quantitatively and to use numbers confidently when confronted by problem situations.

The *Developing Number Sense Course Book* (by Richardson, Gregg and Ward) is practical, well organized and clearly written. The book includes teacher-directed and independent

learning experiences for students to become familiar with quantity, pattern, place value, operations, fractions and decimals, and assessment. Each experience lists materials to be used, instructions, comments and sample questions to stimulate the experience.

Kathy Richardson, a classroom teacher for 20+ years and author of the popular teacher resource book *Developing Number Concepts Using Unifix Cubes*, is a nationally recognized leader in mathematics education. She writes and lectures and is involved in a variety of educational leadership programs and product development. Linda Gregg and Mary Ann Ward are accomplished educators and national presenters with varied backgrounds. Gregg is the K–6 math curriculum specialist for a large southwestern school district. Ward is an elementary school principal.

The Developing Number Sense workshop is offered by Educational Enrichment, Inc. of Norman, Oklahoma. Educational Enrichment offers quality educational programs and provides many developmentally appropriate resources for schools, teachers and caregivers of children.






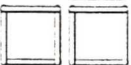

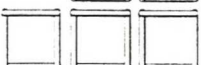
Teachers and school districts interested in sponsoring the DMC and/or DNS workshop should contact Sheryl Russell, Educational Enrichment, Inc., 770 West Rock Creek Road, P.O. Box 1524, Norman, OK 73070; phone (405) 321-3275, fax (405) 321-3283. ▲



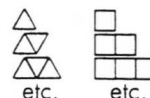
WEEKLY ACTIVITIES

4 Use five craft sticks to represent numbers in various ways. Try using five sticks to represent the number 1. Can you do it in several different ways? Try using five sticks to represent the number 3. How many different ways can you find? Is it possible to represent other numbers using only five sticks? How many ways can you find?

11 How many sticks does it take to make one triangle? Two separate triangles? Three separate triangles? Make a table and look for patterns. Try making other geometric figures with sticks. How will the numbers in your table change? Describe the changes in the patterns in your tables.

No. of separate triangles	 's	Craft sticks	No. of separate squares	 's	Craft sticks
		3			4
		6			8
		9			12
	4 triangles	?		4 squares	?
	5 triangles	?		5 squares	?

How would the patterns in your tables change if you made sequences like the ones shown here?




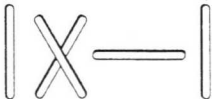

18 Many roman numerals are made using line segments. Use five craft sticks to make as many roman numerals as you can. Which roman numerals cannot be made using five craft sticks?

25 Choose a number between 1 and 50. Make a poster or exhibit showing as many different ways as you can to represent that number with sticks. Don't forget that you can use sticks to represent operations.

WEEKLY ACTIVITIES

4 Craft sticks can be used to make number puzzles. Some examples might include these:

Use five craft sticks:

- Move exactly two sticks to make eight: 
- Move exactly three sticks to make eight: 
- Move three sticks, to make zero: 
- Make up your own number puzzles using craft sticks.

11 You need five craft sticks. What is the smallest number that you can make with five sticks? What is the largest number? In your journal, write about how you solved this problem. Post your solutions on the bulletin board. How did your solutions differ from those of your classmates?

18 Building on geometry. Each person in your group needs an identical set of sticks and some "walls" made from books or file folders so that each person has a working space that no one else can see. Have one person in your group build a shape or design using some or all of the set of sticks and then describe it for others to build. The others may ask questions. When all directions have been given and all questions asked, lift your walls to see if the structures that were built are the same. Discuss the process. What mathematical words did you use? Which instructions or questions were the most helpful? The least helpful? Why?

25 Use a balance and record the number of toothpicks needed to balance one craft stick, two craft sticks, three craft sticks, and so on. Record your information as ordered pairs in a table and look for a pattern. Can you use your pattern to predict how many toothpicks will be needed to balance ten craft sticks? Fifteen craft sticks? Test your prediction. If you were to plot the ordered pairs in your table, how would your graph look? Sketch your prediction and then try it and see.

No. of craft sticks	No. of toothpicks
1	?
2	?
3	?
4	?

MCATA Executive 1993-94

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