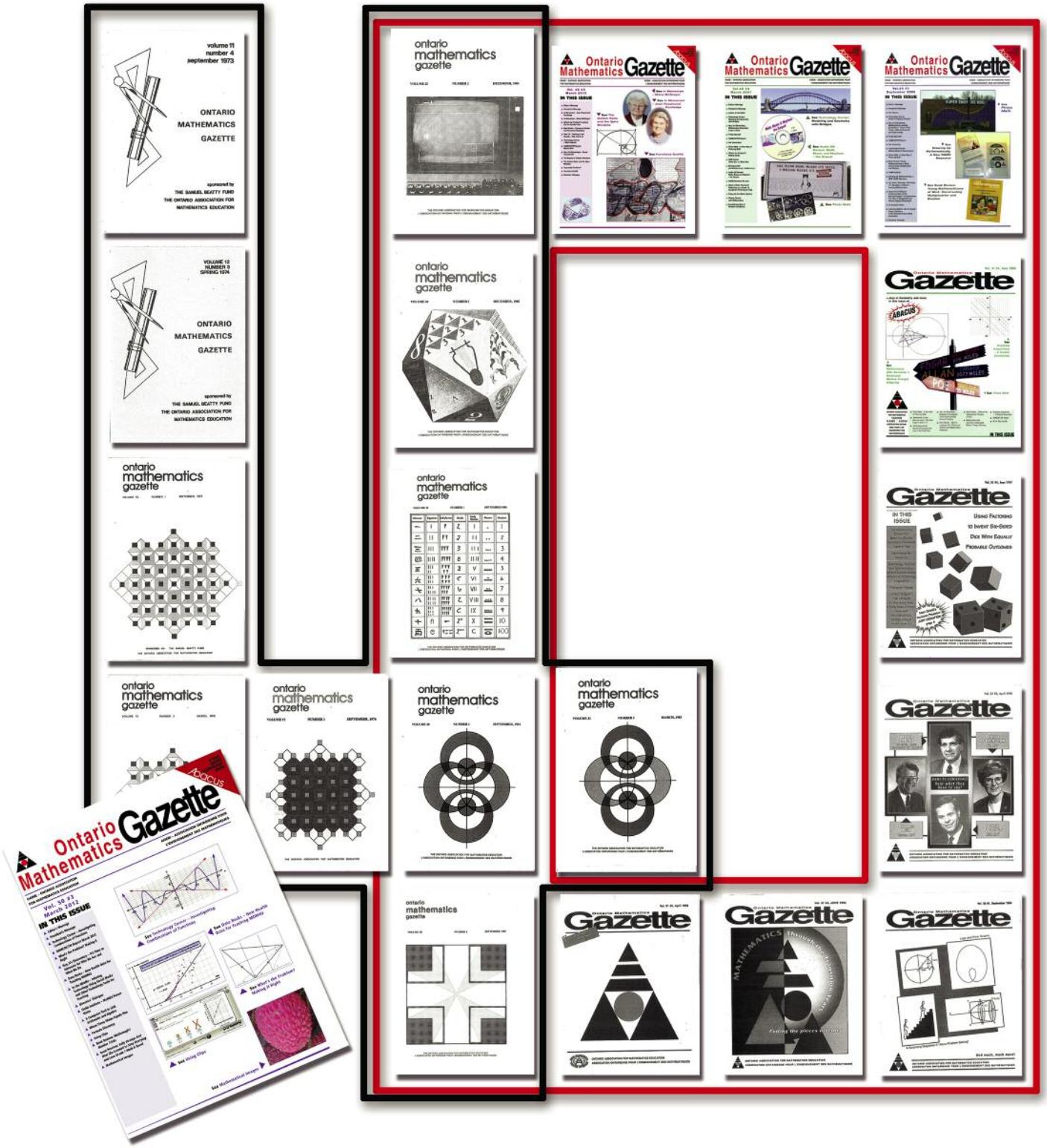
Ontario Mathematics Gazette

OAME – ONTARIO ASSOCIATION FOR MATHEMATICS EDUCATION

AOEM – ASSOCIATION ONTARIENNE POUR L'ENSEIGNEMENT DES MATHÉMATIQUES

Vol. 50 #4 June 2012 – 40th Anniversary Edition



OAME Heroes ~ Presidents



Don Attridge (OATM)



Andrew Vertesi (OMC)



1973 David Alexander



1974 John Egsgard



1975 Joan Routledge



1976 Tom Griffiths



1977 Neil Williamson



1978 David McPhail



1979 Alex Norrie



1980 Lorna Morrow



1981 George Knill



1982 Sharon McPhail



1983 David Davidson



1984 Paul Pogue



1985 Paul Lessard



1986 Dino Dottori



1987 Ralph Connelly



1988 J Symington



1989 Mary Lou Kestell



1990 Mickey Sandblom



1991 Ann Jones



1992 Jeri Lunney



1993 Ron Lancaster



1994 Todd Romiens



1995 Susan Stuart



1996 Barry Onslow



1997 Judy Crompton



1998 Ralph Connelly



1999 Peter Saarimaki



2000 Mary Howe



2001 Shirley Dalrymple



2002 Margaret Warren



2003 Stewart Craven



2004 Gordon Cooke



2005 Kathy Kubota-Zarivnij



2006 Dan Charbonneau



2007 Jacqueline Hill



2008 Anna Jupp



2009 Beverley Farahani



2010 David Zimmer

2011 Connie Quadrini

2012 Cathy Hall

Submission of Articles

The *Ontario Mathematics Gazette* (*OMG*) is looking for news items, articles, and good ideas that are useful to mathematics teachers and mathematics teacher education. We are seeking submissions, preferably from mathematics teachers K–12 and other mathematics education professionals, that describe innovative and creative approaches to mathematics teaching.

Please keep in mind the following criteria when making submissions to the *OMG*:

- The ideas/activities must be of interest to the readership.
- The ideas/activities must be fresh and innovative.
- The mathematics content must be appropriate for the readership.
- The mathematics content must be accurate.
- The article must be well written and easily understood.
- The article and its ideas must be free of sexual, ethnic, racial, or other bias.
- The article must not have been previously published, nor should it be out for review by other publications.
- The article must be original.

Articles must be word-processed in MS Word, double-spaced with wide margins, not exceeding 10 numbered pages of text, and prepared according to the *Publication Manual of the American Psychological Association, Sixth Edition*. Figures and diagrams should be drawn by computer, if possible, or drawn in black ink in camera-ready form. Embedded images must also be submitted separately in jpeg or tif format. Proof of the photographer's permission is required, and for **photos of students** under the age of 18, the written permission of a **parent or guardian is required**.

You must submit **one complete copy** of your article, embedded with any tables, figures, and captioned photographs or graphics, to the Editor, Marian Small, along with **separate files for each of the text, graphics, and/or photographs**. Please e-mail all files to Marian Small at **marian.small@gmail.com**.

Your name should not appear anywhere in your article, including websites, so that your article can be sent out for blind review. Your name, full mailing address, and e-mail address must be included on a separate sheet. Upon review, you will be notified as to whether your article has been accepted for publication (as is, or pending minor or major revisions) or rejected.

The Editor reserves the right to edit manuscripts prior to publication. Once an article is published, it becomes the property of OAME.

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Guest Editor's Message

JACK LESAGE
jacklesage@rogers.com

In April, 1991, OAME published an issue of the *Gazette* celebrating 100 years of mathematics educators associations in Ontario. It is interesting reading and is available by going to the Members Section of **www.oame.on.ca**.

In his article, *The OATMP and the OAME; Something Lost?*, Dave Alexander, then a past president and life member, and a future Executive Director expressed some concerns and issued a challenge.

While the whole article is worth reading, he said, in particular:

"As we move toward the 21st century I believe that the Ontario mathematics education community must find a way once again to involve all the players in the discussion of curriculum change. Some of the matters for concern are listed below.

- How are the interests of mathematics education to be best served in the debate around teaching generic thinking skills rather than subject discipline skills?
- How should the mathematics curriculum be structured to best respond to the needs of all learners?
- How should the mathematics curriculum respond to the availability of graphic and symbolic manipulator calculators?"

I would argue that, after you have read the articles in this issue, you will feel pretty good about how we, as an association, have responded.

If you find the *Heroes* lists and the *OAME History* interesting you will enjoy going to the Ye Olde Archives section which is under the *About OAME* button on the site and is open to non-members as well. In particular, the *Timeline of OAME* is a nice visual history. Thanks to Greg Clarke for this and for all of his help with the project. The "Heroes" are the first to say that they profited from the expertise and commitment of their forerunners in the previous 82 years of associations. And we can see that the future "Heroes" have 39 more years of role models.

You will note on the Inside Back Cover that Dave and Sharon McPhail and Barry Onslow and Mary Howe are both presidential couples. Ralph Connelly is an OAME "two-timer" president. He joins John Egsgard and Dave

Alexander who are OATM/OAME "two-timers".

When this project (Inaugurating the 40th year of OAME.) began, I had no idea as to what it should or could be. But, thanks to the Past Presidents' Committee, we have the plan that you will see unfolding in this issue.

I wish also to thank all of the authors who carried out the plan by contributing their expertise to this special issue. My thanks to Steve Brown and Carolyn Sedore, of the Descartes Foundation, for their help. And, of course, Penny Clemens, the graphic designer, who took me by the hand and patiently walked me through the process. She is remarkable!

Finally, I wish to thank Mary for her patience, her advice and her support. ▲

▲ How It All Started

It doesn't seem like four years ago that this excursion through the memories that are OAME started, because the time has passed so quickly and yet so comfortably. It was during the OAME 2008 Past Presidents' luncheon at the Parkway Sheraton in Richmond Hill that reminiscing and talk, and there was lots of it, got around to "Do you remember when?" Several of the Past Presidents made reference to a special Centennial edition (April, 1991) of the *Gazette* that honoured 100 years of mathematics education organizations in Ontario. Then we noticed that OAME would be 40 years old in the near future – so why not . . . ?

When we presented the suggestion to the OAME Board of Directors, they thought it was a great idea . . . and since we suggested it, we should take on the task! In the long run it really wasn't a task but a very enjoyable stroll down memory lane and a chance to see where mathematics education has been and where it is going.

So what **did** we do to celebrate OAME's 40 years?

Well we:

- explored how OAME has evolved over the decades,
- marveled at the strengths and involvement of the various chapters of OAME,
- looked at how the *Gazette* and the *Abacus* have developed and at the variety of exceptional editors,
- considered the changes in elementary and secondary mathematics education in the province and across North America, how they affected us and how we reacted,
- analyzed the evolution of assessment procedures and practices and the implications for teaching and learning,
- were astonished at the many documents, resources and programs that OAME has developed or co-developed, on our own or in cooperation with the Ministry of Education and the Ontario Mathematics Coordinators Association,
- recognized the many heroes, award winners and exceptional groups who have contributed so much to Ontario's mathematics education culture.

There are many people to thank for their contributions to this special *Gazette*. We start where the idea started, with a core group of Past Presidents that included Dave Alexander, John Egsgard, Tom Griffiths, Ralph Connelly, Mary Lou Kestell, Ron Lancaster, Todd Romiens, Susan Stuart, and Judy Crompton, and a then future president Connie Quadrini.

Others offered additional assistance and ideas electronically and our thanks go to Mickey Sandblom, Jeri Lunney, Barry Onslow, Margaret Warren, Gordon Cooke and Jacqueline Hill. We also wish to thank Myrna Ingalls and Chris Suurtamm for their special input, and Greg Clarke for his technical expertise and creative suggestions for the chapter presentations. Also, working with the Publications committee, we have appreciated the support of the OAME Executive, Directors, and past and present Executive Directors: Dave and Sue Hessey, Fred and Lynda Ferneyhough.

And who can ignore Jack LeSage? We must salute Jack for his yeoman service. Not only did he serve as editor of the Centennial issue, but he also continued on to this 40th anniversary edition of the *Gazette*. We could not have found a more experienced and willing editor.

We hope that you will enjoy this special 40th anniversary edition as much as we enjoyed pulling it together. Please share it with those who have yet to join OAME and join the dialogue on mathematics education for Ontario and the future.

Sincerely

Don Attridge, Shirley Dalrymple and Peter Saarimaki
40th Anniversary Gazette Committee Co-Chairs ▲

▲ President's Message

CONNIE QUADRINI
connie.quadrini@ycdsb.ca

Connie is the outgoing President, an Outstanding Leadership in Mathematics Education Awardee and is the Grades 7–12 Mathematics Program Consultant for YCDSB.

It was in the early 1990's that I attended my first York 4 Mathematics Association (Y4MA) Fall Conference as a teacher candidate. I can recall attending workshop sessions that focused on the use of concrete materials, rich problems, and assessment strategies to support student learning. I left each session energized and inspired. I was in awe of the network of individuals who were dedicated to improving mathematics education. How exciting for me to participate in such a professional learning experience! Little did I realize at the time that this would spark the desire for me to continue my learning as a mathematics educator.

Early in my teaching career, I was invited to run for the position of Y4MA councilor. Who could say no to the opportunity to network with other educators who were interested in making a difference in mathematics teaching and learning? Over my 13-year term as a councilor and treasurer, I worked collaboratively with committee members to support educators within our chapter. We organized fall and spring mini-conferences, each year brainstorming new themes that would support the needs of teachers in our local school boards and faculties of education. Whether a focus on the effective uses of manipulatives and technology, supporting the implementation of a new mathematics curriculum, or exploring the continuum of learning, K-12, our chapter offered professional learning opportunities that would draw groups of educators together to explore, learn and grow.

Such work is mirrored in 14 other chapters in the province of Ontario. From WOMA to COMA, NWOAME to SWOAME, the commitment to supporting educators is not only evident but unwavering. It is within these local contexts that we attend the OAME Annual Conference, each year sponsored by a different chapter. This exciting event offers educators a rich professional learning experience and opportunities to expand networks and to renew their passion for mathematics education.

Almost a decade ago, I was elected to serve as an OAME director. It was at that time that OAME's GUM (*Growing Up Mathematically*) project had come to fruition. A vision had been born, one that would guide not only those who created it, but those who would continue the work of the organization well into the future.

The Ontario Association for Mathematics Education envisions a learning environment where all students do, see, hear, and touch mathematics in a profound and meaningful way. Our association sees the classroom as a community where teachers and students work collaboratively to learn and value mathematics.

I continue to be amazed by the high quality resources that are made available to OAME members as well as the broader mathematics community. The OAME *Gazette*, which includes the *Abacus*, and our website, **www.oame.on.ca** offer mathematics educators: rich mathematics problems, interesting teaching and assessment ideas, as well as authentic stories from the classroom. It is these resources, along with professional learning offered at chapter mini-conferences, OAME Annual Conferences and Leadership Conferences, which support our collective learning and move us closer to realizing OAME's vision.

It is hard to believe that almost 20 years have passed. As I reflect upon my experiences, I realize just how much OAME has supported me in my growth as an educator. This is echoed by many other educators whom I've had the privilege to meet and learn from.

Congratulations OAME on our 40th Anniversary!

I wish to thank all those who have contributed to the work of local chapters and OAME Board of Directors over the past 40 years. Thank you for paving the way for our movement forward and I look forward to meeting those who will help us carve new directions for continued improvement in mathematics education in Ontario.

And finally, I wish to congratulate and thank the chairs (Don Attridge, Shirley Dalrymple and Peter Saarimaki) and the Past Presidents' committee members for their leadership in producing this special edition of the *Gazette*. ▲

▲ Problem

COURTESY OF RALPH CONNELLY AND RON LANCASTER

Find a number that, when written in English, has its letters in alphabetical order.

How many other such numbers are there?

Ministry of Education

Minister

Mowat Block
Queen's Park
Toronto ON M7A 1L2
Telephone 416 325-2600
Facsimile 416 325-2608

Ministère de l'Éducation

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Ontario

April 2012

I am pleased to bring greetings on behalf of the Ministry of Education to mark this 40th anniversary edition of the Ontario Mathematics Gazette.

It is encouraging to know that mathematics educator associations have a long and distinguished history in the province, and the beginning of the fortieth year of their present version is an excellent time to acknowledge the contribution they have made across Ontario.

In particular, I welcome this opportunity to congratulate the Ontario Association for Mathematics Education (OAME) on its successes over the past four decades. The association has been an important partner in its work with the Ministry of Education on various mathematics initiatives, and has served as an important link between the ministry and mathematics educators in Ontario.

The membership of the OAME and its various chapters deserve recognition at this time for their dedication to improving mathematics, and their support of classroom teachers and stakeholders in the mathematics community.

In closing, I extend my best wishes to the delegates attending this year's annual OAME conference. I trust it will be a good opportunity to discuss your accomplishments to date and prepare for the future.

Congratulations again on this anniversary celebration.

Yours truly,

Laurel Broten

Laurel Broten
Minister

▲ My Years ('87-'88 and '98-'99) as President Ralph Connelly

There were many significant events and initiatives during both of my terms (curriculum revisions, etc.), but the one that I think probably still stands as OAME's greatest initiative are the *Linking Assessment and Instruction in Mathematics* documents! At the time we produced these documents, there was a lot of talk in the field about the importance of "rich" problems, of tasks that would cross mathematical strands and address several expectations, but precious little in the way of actual examples. We were, quite simply, years ahead of anyone else in North America in showing how this could be done. I recall that for at least 2 or 3 years after we produced these documents, attending NCSM/NCTM meetings in the States, showing the documents, and having people begging for copies! Although there are now many such resources on the market, we were the first, and, I feel, still the best!

I'd also have to add, although it's not a single event or initiative, that one major accomplishment of OAME is one that we too often take for granted, and that's the incredible working relationship we have with the Ministry of Education! I had no idea how rare this was, until I dealt extensively with colleagues in the USA whose initiatives were constantly being blocked/sidetracked/ resisted by their own Departments of Education, because "back to basics" forces had managed to persuade these Departments that mathematics reform was a bad idea. In most states of the U.S. (and in some provinces here in Canada), the mathematics/ mathematics education organizations are not consulted when mathematics curriculum is changed. Here, the first source the Ministry looks to when it is doing something with mathematics is OAME. That speaks to the respect that our organization has gained through the years, and that respect has come from the fact that, when asked, we've always delivered! That's certainly something for the organization to be proud of!

WE ARE WINNERS!

Union Gas Awards
2006 Award for Outstanding Leadership in Mathematics Education – Judy Dussiaume
2004 Teaching Excellence Secondary – Heather Boychuk

Life Member of OAME
2004 Susan Stuart
1990 Dino Dottori

Don Attridge Award
1998 John Savage

K.D. Fryer Award
1985 Lasalle Secondary School

NOMA
Northern Ontario Mathematics Association

WE ARE INNOVATIVE!
- trading posts
- *famous* socials
- on-line meetings
- video-conferencing at fall conferences

25TH ANNUAL O.A.M.E. CONFERENCE — NORTH BAY — O.A.M.E. '98 — MAY 20 - 23, 1998

A Chapter for FIRSTS!

FIRST OAME Chapter,1973

FIRST Annual Conference held in Northern Ontario, 1985

FIRST Past-Presidents' breakfast

FIRST Conference with 1000 registrants

WE ARE STARS!

Our Founders: Doug Henderson, John Milliken, Art Dayman
OAME Presidents: Dino Dottori, Mickey Sandblom, Susan Stuart, Dan Charboneau
OAME Rep to NCTM: Mickey Sandblom

Merivale HS - 1987



West Carleton SS - 1994



2006 Lisgar CI - 2006



Mother Teresa CHS - 2009



Rideau District HS - 2011

Kenneth D. Fryer Award Winners

Carleton Ottawa Mathematics Association

The Carleton-Ottawa Math Association joins OAME in celebrating 40 years as a community of Mathematics Educators. COMA's annual Socials, Forums and Mini-Conference showcase the broad spectrum of expertise amongst our members and the Carleton-Ottawa Math Olympics is eagerly anticipated every year. All COMA members raise their glasses in celebration of their partnership with OAME!

OAME Presidents



Ann Jones 1991-1992



Jeri Lunney 1992-93



David Zimmer 2010-2011



Cathy Hall 2012-2013



Gazette Editor Marian Small 2010-2012





Our Award-Winning Members

Union Gas Awards

Susan Guzzo 2003



Blanche Thomas 2003



Beata Myhill 2004



Ron Gaudreau 2005



Anne Fitton 2006



Don Attridge Award



Jeri Lunney 1996



Chris Suurtamm 2001



Kelly Blair 2006



Rob McLeish 2007



Mary Bourassa 2009

Morley MacGregor Award

Joan Ellis 1993





Shelagh McCarthy 2007

Brant, Bruce, Dufferin, Grey, Haldimand, Halton, Huron, Norfolk, Oxford, Perth, Waterloo, Wellington, Wentworth

The Grand Valley Mathematics Association

Founded January 1972

Host of four eminently successful OAME (or OATM) conferences:
Waterloo in '72 at the University of Waterloo
OAME '83 at the University of Waterloo
OAME '95 at the University of Guelph
OAME 2004 at the University of Waterloo
These conferences were successful educationally, organizationally, socially, and financially.

A chapter that has...
- produced many publications for classroom use
- created math posters, Math Reference T-shirts, Pi and e pins for teachers and students

GVMA is dedicated to...
- assisting teachers of mathematics by providing meeting opportunities through hosting mini conferences and seminars
- assisting students by providing scholarships

Founder and sponsor of the OAME Kenneth D. Fryer Award (an award given annually to recognize a secondary school mathematics department which fosters collegiality, team work, and excellent classroom teaching; contributes to the overall development of students; and demonstrates leadership in the mathematics community).

Check us out: www.GVMA.ca

The Evolution of OAME

JUDY CROMPTON, SHIRLEY DALRYMPLE, DAVID ALEXANDER, DON ATTRIDGE, MYRNA INGALLS

Judy is a past president (PP), a Life Member, retired from OME and was actively involved with this issue. Shirley is a PP, retired from YRDSB and is on the 40th Gazette committee. Dave is a PP, a past Executive Director, a Life Member, retired from OME. Myrna is a Life Member, a Don Attridge awardee, retired from OME.

Prior to 1973, two mathematics education organizations were at work in Ontario, the Ontario Mathematics Commission (OMC) and the Ontario Association of Teachers of Mathematics (OATM). OMC provided for discussion of curriculum by a wide range of stakeholders, including elementary and secondary school teachers, representatives of faculties of education, Colleges of Applied Arts and Technology, university mathematics departments, and the Ontario Ministry of Education (OME). OATM, on the other hand, provided an excellent in-service opportunity for elementary and secondary teachers through its annual conference.

In 1973, the two organizations joined to form the Ontario Association for Mathematics Education (OAME). The new organization was comprised of a provincial council along with four charter chapters located in: Northern Ontario; Carleton-Ottawa; Prescott, Russell, Stormont, Dundas, and Glengarry; and Renfrew County. OAME's mandate included both those of OATM and OMC: to provide in-service support to classroom teachers and a voice in future planning to stakeholders in the mathematics education community. In 1974, the Grand Valley Mathematics Association, an independent organization founded in 1972 to serve the needs of teachers in the Kitchener-Waterloo area, joined with OAME as a chapter.

OAME continued the good in-service work of its predecessor organizations, including the running of two yearly conferences – the Annual Conference for all teachers and the Leadership Conference for elementary teachers. The Leadership Conference was originally designed as a two-year experience, with exposure to ideas occurring in the first year, and reflection upon delegate experiences in the second. This format continued for about four years and then converted to a one-year experience. The Leadership Conference focused on the teaching of elementary school mathematics until 1998, when a secondary school strand was added to recognize the immense changes occurring at that level. Under OAME, the Annual Conference, which initially focused mainly on secondary school mathematics, has expanded to include an equivalent experience for elementary school teachers. As well, the Annual has been able to reach increasing numbers of teachers in their home areas through the practice of hosting by local chapters.

From the start, OAME established a strong structure with a constitution, an expectation of leadership in support of teachers, and a flexible committee structure that evolved according to the needs of the time. Frequently, those needs have resulted from initiatives and policy changes originating with the Ministry of Education. At the beginning, OAME struggled to be recognized as a voice for Ontario elementary and secondary teachers of mathematics. Gradually, through constant effort at communication with the Ministry and through increasing service to teachers, OAME's profile rose, along with its opportunities to participate in Ministry initiatives. Over its lifetime, OAME has striven to be both reactive and proactive in relation to curriculum and assessment policy. OAME representatives have been a part of every major Ministry project involving mathematics education since the 1970's.

OAME has been linked with the National Council of Teachers of Mathematics (NCTM) since the beginning. It gradually developed other important partnerships, including: the Ontario Mathematics Coordinators Association (OMCA), the Fields Institute for Research in Mathematical Sciences, the Ontario Teachers Federation (OTF), the Ontario Association of Junior Educators (OAJE), the Consultants/Coordinator's Association of Primary Educators (CAPE), and the Ontario Middle Level Educators Association (OMLEA). OAME has partnered with these various organizations on publications and responses to Ministry initiatives. A major partnership occurred in 1998, when OAME, OMCA, and the Fields Institute won the Ministry contract for the rewriting of the secondary school mathematics curriculum. Subsequent to the release of the curriculum, OAME and OMCA partnered with the Ministry in the creation and delivery of an unparalleled implementation support to the curriculum that continues to this day. In the past ten years, OAME's relationship with the Ministry of Education has evolved into one of mutual alignment, respect, and trust.

OAME has a long history of providing resources to support teachers. The *Ontario Mathematics Gazette* was first published in 1962 by OAME's predecessors, OMC and OATM. Upon its creation, OAME continued publishing the *Gazette*. As well, the Abacus newsletter was first published in 1973. In 1986, the *Abacus* became an insert in the *Gazette* and in 1993 the focus of the *Abacus* became elementary school mathematics only. Together, the *Gazette* and the *Abacus* provide an effective way of sharing resources created by the various curriculum-based committees of the OAME provincial Board. Some resources are also funnelled through the Chapter Representatives and most are now posted on the OAME website. The website has become an excellent resource for members and other teachers. Introduced in the late 1990's, it has grown to include items such as grade-specific resources, information about professional development opportunities, on-line registrations, and links to other organizations. In addition, there is a members-only section that provides a wide range of additional information, including an archive of *Gazette* issues, the proceedings of previous Leadership and Annual conferences, and OAME Board materials. The website continues to broaden the scope of its offerings.

In the 1990's, OAME began to produce and publish resources for sale in partnership with OMCA. Beginning with the *Focus on Renewal of Mathematics Education*, there followed a series of *Linking Assessment and Instruction* documents, one at each of the primary, junior, and intermediate divisions. For each of these, OAME/OMCA partnered with the relevant divisional organization – CAPE, OAJE, and eventually OMLEA. In the early 2000's, OAME, with financial support from Union Gas, produced *Growing Up Mathematically*, an interactive professional development program designed for elementary and secondary schools. These projects had a four-fold benefit: they provided timely assistance to classroom teachers; they brought money into OAME's coffers; they increased OAME's profile in the province and elsewhere; and they gave valuable experience to OAME members who went on to be leaders in the writing of the 1999 - 2000 curricula and the extensive implementation that followed.

At the core of OAME's existence is the desire to be of service to teachers and students. This has inspired a number of notable and worthwhile projects, one of the most exciting being the Ontario Mathematics Olympics (OMO). Following a round of chapter-based

▲ OAME HEROES

▲ OAME Life Members

OEA Life Members (recognized as OAME Life Members in 1986) John Egsgard, Ross Leigh, Jack LeSage, Morley MacGregor, Eric Magee, Joan Routledge.

1986	David Alexander, Lloyd Auckland
1987	Don Attridge
1988	Robert Smith
1989	Norman Sharp
1990	Dino Dottori
1991	Alex Norrie
1992	John Del Grande, Lorna Morrow
1993	Bob Robinson
1994	Tom Griffiths, Bill Nimigon
1995	David Davidson
1997	M. Elaine Harvey
1998	Mary Lou Kestell
1999	Judy Crompton
2000	Kaye Appleby
2001	Peter Saarimaki
2002	Ralph Connelly
2003	Ron Sauer
2004	Susan Stuart
2005	Eric Muller
2006	Todd Romiens
2007	Bill Morrison
2008	John Rodger
2009	Myrna Ingalls
2010	Kathy Kubota-Zarivnij,
2011	Greg Clarke

competitions, Grade 7-8 students from across the province gather in a host chapter to participate in a day of mathematical activity. Initiated in 1995 by the COMA chapter, OMO has become a very popular event among teachers and students alike. OMO is an expensive event to run because the students and their teacher/coaches must be housed, fed, and transported to one location from all across the province. OAME has and continues to actively seek corporate sponsorship for the Ontario Mathematics Olympics.

The period from 1970 to the present has been a remarkably busy and changeable one for education in Ontario. The 1990's were particularly volatile. Elementary school curriculum saw a significant shift early in the decade via the Common Curriculum, whose premise was the integration of curriculum. Coupled with a stunning shift in assessment via the Ontario Provincial Standards and Education Quality and Accountability Office (EQAO), teachers, students, and parents were faced with significant challenges. Grade 9 faced the same challenges, along with the move to an unstreamed Grade 9 program. This affected not only Grade 9, but also Grade 10, as adjustments had to be made for different incoming student preparation. By the end of the decade, however, these curricula had all been revised, along with the entire secondary school curriculum. There followed an intensive period of Ministry-supported implementation through the first decade of the new millennium. It was a truly challenging and sometimes frustrating and bewildering time for teachers ... but OAME was there for them, every step of the way.

In 1973, the vision of the committee that created OAME from OATM and OMC was of a single organization that would continue the mandates of both predecessors:

- to provide in-service support to teachers at all levels and throughout the province;
- to involve all sectors of the Ontario mathematics education community in the discussion of curriculum change.

The organization of local chapters based on the model of the Grand Valley Mathematics Association was envisioned as a way of reaching and including classroom teachers through locally provided activities.

How well has OAME fulfilled this vision? The four founding chapters of OAME have grown in number to fourteen regional chapters that reach into all parts of the province, along with one umbrella chapter for independent schools. Each chapter holds regular professional development sessions, providing every teacher in the province access to opportunities to learn and to remain current. As well, the OAME Annual Conference continues to be hosted by a different chapter every year. Throughout the various curriculum evolutions over forty years, OAME chapters have encouraged members and all teachers to provide valuable input that has enabled OAME to respond effectively to Ministry of Education initiatives. During the past twenty years, OAME has worked in both a supportive role and as a partner in important Ministry writing and implementation initiatives. Through a broadly based provincial board and strong partnerships with organizations at all levels of education, OAME has expanded significantly its ability to provide a voice to a wide range of mathematics educators. An examination of the table of OAME activities provided at the end of this article will give a sense of the growth in sophistication, profile, and contribution of the organization.

OAME has met many challenges in its forty-year life and the future will, undoubtedly, present many more. OAME is steadfastly committed to the betterment of mathematics education and to the support of teachers and students, as evidenced by its objectives:

- To aid the professional growth of mathematics educators.
- To encourage and to engage in research, development and evaluation of curriculum design and curriculum teaching materials related to mathematics education.
- To promote co-ordination in mathematics education at all levels and effective communication within the mathematics community of Ontario.
- To provide liaison with other educational organizations in Ontario and with mathematics education organizations in other provinces and countries.
- To maintain affiliation with the National Council of Teachers of Mathematics [NCTM], and to promote projects of mutual concern.
- To maintain an active and representative mathematics educator's voice with the ministry that is responsible for education in the Province of Ontario, the various other educational bodies in Ontario, and the public.
- To encourage the development of local, regional and special interest mathematics organizations in Ontario, to grant such organizations chapter

affiliate status as defined in Article VIII, and to maintain a mutually supportive relationship with them.

These objectives clearly encompass the original vision of the founding committee of OAME. They are also the outgrowth of forty years of experience and effort in support of mathematics education. The goals provide an excellent foundation to guide the Ontario Association for Mathematics Education as it engages an interesting and exciting future. ▲

▲ My Year ('73-'74) as President David Alexander

This was the initial year.

1. The development of the Chapter concept and the encouragement of the creation of Chapters was a key to increasing the provision of inservice opportunities across the province.
2. After initially considering ceasing the publication of the *Gazette*, the decision to continue its publication has proved to be a key means for mathematics education leaders of Ontario to share insights.
3. The converting of the OAME Secretary-Treasurer position from a one-year to an extended term and thenaming of Morley MacGregor to that office was an initiative that had a significant impact on the growth of OAME and ultimately on the teaching of mathematics.

▲ My Year ('74–'75) as President John Egsgard

As president of OAME in its second year my job was made easy by the work of our first president, Dave Alexander, and our secretary, Morley MacGregor.

One concern that I had was with the naming of the conferences (first, second, etc.). I felt that the implication of this naming was that there had not been meaningful conferences before when, in fact, there had been provincial meetings of mathematics educators associations as early as 1892. However, I was in the minority on this issue.

▲ Kenneth D. Fryer Award

1985	O'Neill CVS	Oshawa
	LaSalle SS	Sudbury
1986	Overlea SS / Marc Garneau CI	East York
1987	Merivale HS	Nepean
1988	Lorne Park SS	Mississauga
1989	Northern CIVS	Sarnia
1990	Albert Campbell CI	Scarborough
1991	Thousand Islands SS	Brockville
1992	Unionville SS	Unionville
1993	Medway HS	Arva
1994	West Carleton SS	Dunrobin
1995	Markville SS	Markham
1996	St. Thomas Aquinas SS	London
1997	Bluevale CI	Waterloo
1998	Barrie North CI	Barrie
1999	Dr. John R. Denison SS	Newmarket
2000	Frontenac SS	Kingston
2001	Parkside CI	St. Thomas
2002	Eastern High School of Commerce	Toronto
2003	Centre Dufferin DHS	Shelburne
2004	Gordon Graydon Memorial SS	Mississauga
2005	Central Peel SS	Brampton
2006	Lisgar CI	Ottawa
2007	Fletcher's Meadow SS	Brampton
2008	Middlefield CI	Markham
2009	Mother Teresa CHS	Ottawa
2010	Saint Joan of Arc CHS	Maple

OAME ACTIVITES 1973 - 2011

Decade	OME or EQAO Initiatives that Involved or Evoked Response from OAME	OAME Initiatives
1970's	• Intermediate Cyclical Review • Writing of and responding to new Intermediate Curriculum • Senior Cyclical Review	• OAME formed in 1973, with a provincial council and four charter chapters • writes a constitution and guidelines encouraging the development of new chapters throughout the province • continues the running of a yearly Leadership Conference for elementary school teachers and an Annual Conference
1980's	• Ontario Assessment Instrument Pool • Secondary Education Review Project • Drafts of new 9 - 12 curriculum (final curriculum released 1985) • OAC Calculus Teacher Inservice Program • Transition Years document	• establishes a subcommittee to study the creation of a permanent body to work with OME on matters pertaining to mathematics education in Ontario • establishes a computer committee to begin gathering resources involving use of computers in math • creates and adopts a position paper on Bill 82 (Special Education) • creates a Women in Mathematics Committee • publishes in the *Gazette* a list of strategies for supporting non-mathematics teachers who are teaching math

1990's	• Technological Studies Consultation Paper (1991)
	• Formative Years Discussion Paper (1991)
	• Early Years Discussion Paper (1992)
	• Specialization Years Consultation Paper (1992)
	• The Common Curriculum, Grades 1-9 (1995)
	• The Ontario Provincial Standards for Mathematics, Grades 3, 6, and 9 (1995)
	• Secondary School Reform Proposals (1996)
	• New Grade 1-8 curriculum for mathematics (1997)
	• Background paper on mathematics education for Expert Panel
	• Expert Panel on Secondary Education, Mathematics (1997)
	• Requests for Proposals (RFP) for writing of new secondary curriculum (1998)
	• Draft versions of new curriculum (1998 - 2000)
	• Course Profiles
	• Exemplars
		• the Women in Mathematics committee is renamed the Mathematics Equity Committee, with a broadened mandate to include concerns relating to gender, ESL, and special needs in the learning of mathematics (1991)
		• begins an in-depth examination of the NCTM document, *Curriculum and Evaluation Standards* (1989) and its supporting publications
		• partners with the OMCA in the writing of *Focus on Renewal of Mathematics Education*, an interpretation of the NCTM *Standards* in the Ontario context and a guideline for the revision of Ontario math curriculum
		• first Ontario Mathematics Olympics (by COMA) (1995)
		• charter member of the Education Forum of the Fields Institute for Research in Mathematical Sciences (called the Fields Forum)
		• begins publishing support materials for teachers (some for sale and some distributed through chapter representatives), including:
		  • a pamphlet for parents based on the *Focus on Renewal*;
		  • *Linking Assessment and Instruction, Intermediate Division* (in partnership with OMCA), J*unior Division* (in partnership with OAJE), and *Primary Division* (in partnership with CAPE);
		  • a scope and sequence for the 1997 Grade 6-8 curriculum with additions suggested to help the flow;
		  • *Teaching Math Through Technology*;
		  • *Mathematics Survival Kit for Grade 9 Teachers*;
		  • regular submission of articles to the OAME *Gazette* and *Abacus*
		• in partnership with the Fields Institute and OMCA, makes a submission to the Ministry RFP for the writing of the new secondary curriculum; wins the contract
		• establishes an OAME website
		• works with Ministry of Education and Texas Instruments on a series of workshops for the new secondary curriculum (1999 - 2000)
		• joint OAME/OMCA/OME project to produce a package on Concerning Assessment and Reflective Evaluation (CARE)

Decade	OME or EQAO Initiatives that Involved or Evoked Response from OAME	OAME Initiatives
2000+	• course profiles • exemplars • summer institutes • Prior Learning Assessment and Recognition • preparation of resource materials for Grade 11 courses • Grade 3, 6, 9 EQAO mathematics testing • School Achievement Indicators Program • Leading Math Success • Expert Panels: Early Math (2003); • Mathematics in Grades 4-6 (2004); • Student Success (2004) • Sustaining Quality Curriculum Project (secondary math curriculum review, 2004-2005) • secondary curriculum implementation initiatives: PRISM, CIIM, OERB, OSAPAC • College Math Project (2009)	• revises *Linking Assessment and Instruction*, Intermediate, in partnership with OMCA and the OMLEA • produces materials to assist teachers in implementing curriculum, JK - 12; distribution through chapter representatives or submission of articles to the *Gazette*, the *Abacus*, and the website • produces materials for mathematics teachers and guidance counselors explaining the pathways through the various course types in mathematics and the likely destinations of the pathways • creates a sample examination for Grade 9 and publishes it in the *Gazette* and on the website • *Growing Up Mathematically* (GUM), an interactive professional development program designed for elementary and secondary schools (2005) • continues expansion of website capability and contents, including a public site and a members only site • active pursuit of corporate sponsorship for OMO • regular updates at board meetings from OME, EQAO, OTF, NCTM, OMCA, and the Fields Forum

PROJECTS COMPLETED THROUGH PARTNERSHIP AMONG MOE, OAME, AND OMCA

Concerning **Assessment** and **R**eflective **E**valuation
Targeted **I**mplementation and **P**lanning **S**upports
Critical **L**earning **I**nstructional **P**aths **S**upports
Professional **L**earning for **M**athematics **L**eaders and **C**oaches
MathGAINS

▲ My Year ('02-'03) as President Margaret Warren

During my years on Council and while serving as president, I remember the:

- *Linking Instruction and Assessment* documents,
- creation of expert panel reports and course profiles,
- development of Ministry Exemplars.

As president, the key initiatives were developing OAME's vision statement and the creation of the Growing Up Mathematically (GUM) Professional Learning resources.

▲ My Year ('04-'05) as President Gordon Cooke

Working between Stewart Craven and Kathy Kubota Zarivnij was a great pleasure. The first of two Leadership conferences developing Complexity as an organizing principal for classroom dynamics was a great success. The GUM Project (Growing Up Mathematically) was in the final stages of review, refinement and production and we worked on marketing this very successful project. We established protocols dealing with Chapters charging separate delegate fees to the annual conference. Many thanks to Dave and Sue Hessey.

QSLMA

1965-67
Gazette Editor
Dr. J. E. Hogarth (Queen's U)

1967-69
Gazette Editor
Dr. D. H. Crawford (Queen's U)

1974
Host of First OAME Annual
Life member Elaine Harvey

1984
OAME Conference

1987-89
Abacus Editor
Ronald Ripley (Queen's U)

Doug Evans, First Webmaster for the OAME website

1991
Kenneth D Fryer Award
Thousand Islands SS

1999-2003
Gazette Editor
Louis Lim (Quinte SS, Belleville)

2000
OMO by QSLMA

Kenneth D Fryer Award
Frontenac SS

2002
Don Attridge Award
Gordon Cooke - 1000 Islands S.S.

2004 - 2005
Past President Gordon Cooke

2006
Don Attridge Award
Kelly Blair - Upper Canada DSB

2007
Mona MacGregor Award / Award for Outstanding Contribution
Dr. Lynda Colgan

2009 - 2010
Past President Beverly Farahani

2011
Kenneth D Fryer Award
Rideau District HS

2012
OAME Conference

2013
OMO

ALGONQUIN LAKESHORE CDSB

CATHOLIC DISTRICT SCHOOL BOARD OF EASTERN ONTARIO
Learning and Growing Together in Christ

HASTINGS AND PRINCE EDWARD DISTRICT SCHOOL BOARD

LIMESTONE DISTRICT SCHOOL BOARD

UPPER CANADA District School Board

S.W.O.A.M.E.

South Western Ontario Association for Mathematics Education

OMO 2012: THE POWER OF PROOF
ONTARIO MATH OLYMPICS

Ontario Association for Mathematics Education
WINDSOR 2011
OAME
PUT MATH ON THE MAP

CHAPTER ACCOMPLISHMENTS

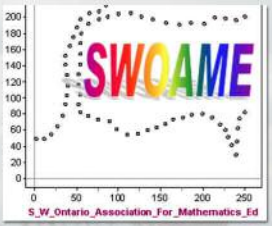
OAME 1993 – Connections
OAME 2011 – Put Math on the Map
OMO 2012 – The Power of Proof

Todd Romiens, OAME President 1994-1995
Life Member (2006)
Rene Descartes Medalist 1996
***Gazette* Editor 1999-2000**

Steve Chevalier, Don Attridge Award 2011

David Petro, Leadership Award 2011

S. W. O. A. M. E.



THE GOLDEN SECTION

Representing Niagara Region and Hamilton Founded in 1975

Home of the only person who has been President of OAME twice!

Past Presidents:

George Knill 1981-82
Paul Lessard 1985-86
Ralph Connelly 1987-88
Judy Crompton 1997-98
Ralph Connelly 1998-99

OAME Life Members:

Bob Robinson 1993
Judy Crompton 1999
Ralph Connelly 2002
Eric Muller 2005

Gazette Editors:

Ralph Connelly 1983 - 1986
Clifford Gravelle 1986 - 1987
Ralph Connelly 1987 - 1988

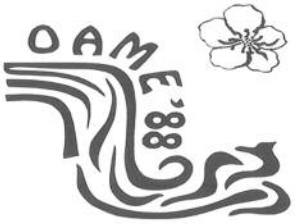
Elementary School Award Winner:

St David CES
HWCDSB, 2010

OAME 2010



OAME 1988

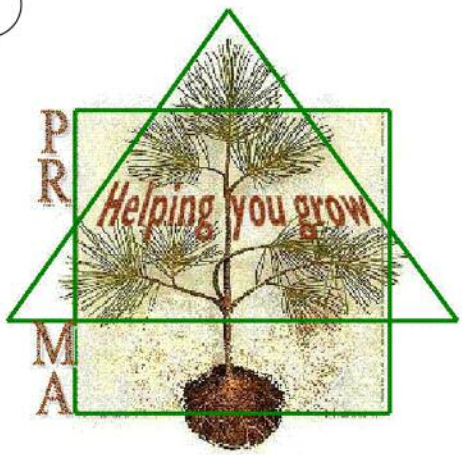


PINE RIDGE MATH ASSOCIATION

http://chapters.oame.on.ca/prma/

OAME AWARD WINNERS

KENNETH D. FRYER AWARD
O'Neill CVI Math Department, 1985
MORLEY McGREGOR AWARD FOR EXCEPTIONAL AND CREATIVE ELEMENTARY MATH TEACHING
Kevina Morrison, 2004
Sandra Jean Price, 2008
Laurie Moher, 2009
DON ATTRIDGE AWARD FOR EXCEPTIONAL AND CREATIVE SECONDARY MATH TEACHING
Jacqueline Hill, 2004
OAME LEADERSHIP AWARD
Laurie Moher, 2011
UNION GAS AWARD FOR OUTSTANDING LEADERSHIP IN MATHEMATICS EDUCATION
Dave Lamontagne, 2004
MONA MACGREGOR AWARD FOR OUTSTANDING CONTRIBUTION TO OAME
Gord and Lorraine Banks, 2005



07 OAME Past President Jacqueline Hill 08

2004/2008/2009 Exit 3.14
Eat Sleep Math
Ontario Mathematics Olympics

ANNUAL CONFERENCES

OAME 2003
"PRIMED FOR MATH"

OAME 1979

▲ The Evolution of Elementary Mathematics Teaching and Learning in Ontario

SUSAN STUART

Susan is a PP, a Life Member, retired from Nipissing U.

In the 1960s elementary school teachers made decisions about mathematics content, sequence and methodology with the guidance provided from the 'The Little Grey Book'[i], which contained 14 pages of concise lists of skills and knowledge of arithmetic, measurement and 'problems'. The preface of the document reflected a belief in the "progressive principles" then associated with the American John Dewey[ii]. Students were to work in groups according to their ability and interest and teachers were to plan their teaching so that children could advance at their own rate. "Learn to do by doing" was strongly advocated and in arithmetic this was reflected in the belief that "the best experience in arithmetic is probably that which results from solving problems arising out of real situations in the lives of the children." Teachers were encouraged to use "the enterprise procedure" (projects), to cut across subject matter lines, such as in the construction of a castle that would involve reading, writing, measurement, costing and gathering of historical information. Although accuracy in arithmetic was highly important, teachers were cautioned that "a desirable attitude towards accuracy is fostered by avoiding ... the use of computations in which, because of their immaturity, they almost inevitably make errors". In other words, even "drill" and practice, which was required, needed to be designed to meet the needs of each child. This perhaps was an early form of today's differentiated instruction. External examinations were deemed 'impractical' due to individual differences in children. Homework was not endorsed ("…no excuse for infringing upon the right of children to sufficient time for sleep and play and the right of the home to direct their activities outside of school hours.").

Did all this mean that mathematics learning took place in active classrooms through highly relevant, project-based activities? No, in fact it rarely did and most elementary teachers, who were strong language teachers, often had little knowledge and less confidence to teach mathematics. Textbooks provided practise materials and exercises that teachers could depend upon - The 'Grey Book' recommended their use. The Socratic Method, rote learning and silent seatwork was the norm in most elementary mathematics lessons of the day.

The 1968 publication of the Hall-Dennis Report, *Living and Learning*[iii], opened the door to change in elementary schools. Many teachers embraced the idea that "the modern curriculum must be flexible… by providing learning experiences to meet the needs of individual young people at every level." A common mantra teachers heard was "a guide on the side, not a sage on the stage". Discovery, group work, individual research and teacher-student planning were all appropriate. Exercises from textbooks, conventional drills, memory work and other forms of rote were to be avoided. However, many elementary teachers did not have a deep understanding of the mathematics content and were not confident enough to move away from the textbook pages. Although many teachers attended workshops that helped them create groups in their classrooms and plan integrated activities in language arts and social studies, little attention was given to professional development in mathematics. Again, in reality, the Hall-Dennis Report had little impact on the teaching of mathematics, especially in Grades 4 to 8. As well, many firmly believed that, unlike in other subjects, there was a 'only one right way to do' mathematics and that children learned mathematics skills only if they were shown each step in a process and then practised repeatedly. Even teachers who planned dynamic, student-centred language arts, social studies and science lessons often used Socratic, textbook-based lessons for mathematics. New, however, were teachers talking about educational reform and exploring new ideas about mathematics content and pedagogy.

In 1975, the new elementary mathematics curriculum was different from anything previously experienced. *P1J1 the Formative Years*[iv] listed 'opportunities' students were to experience by the end of Grade 3 and Grade 6. This was a huge change from a list of skills to be 'covered'. School boards, under the guidance of regional Ministry of Education offices, developed their own grade-by-grade mathematics programs. Accompanying these 'binders' were additional documents containing: sample problems to encourage problem solving at all grades, assessment items and instruction on how to use

calculators. After-school professional development was frequent because content, such as geometry, was new to teachers and elementary schools were leading the national move to the SI (metric) system. Generally, the focus in mathematics was on content rather than teaching strategies. The exception, however, was the introduction of manipulatives. OAME's leadership conference for elementary teachers often focused on how to help classroom teachers implement these changes. 'Make-and-take' workshops were popular at OAME conferences because teachers realized that using games and activities would help them to address individual needs.

During the 70's and 80's, elementary teachers did their best to learn and teach new mathematics content and more importantly, began to tentatively change how they taught mathematics. Using helpful publications from both the Ministry of Education[v] and the Federation of Women Teachers' Associations of Ontario (FWTAO)[vi], primary mathematics teachers made bold changes. Junior and intermediate teachers were still hesitant. However, problem solving was becoming a focus in Grades 4 to 8 and many schools were implementing a 4-step problem-solving process. For the first time, estimation and approximation were included within the arithmetic skill set. Teachers were talking about the role of the four-function calculator in their lessons. Some were experimenting with simple activities that helped students use their calculators efficiently, such as using the constant feature. Although many of these activities were seen as enrichment rather than integral to mathematics learning, it was an important first step. Schools were setting up computer labs for the first time and a few adventurous teachers were exposed to mathematics software for tutorials and learning games. The 1980's ended with the publication of ground-breaking documents such as *Agenda for Action*[vii], *Everybody Counts*[viii] and, *Curriculum and Evaluation for School Mathematics*[ix], which would soon provide the direction for professional development and influence curriculum reform across North America.

The 1990's were interesting times. The 1995 *Ontario Common Curriculum*[x] and the Mathematics Standardsxi developed for the NDP Government were quickly replaced by the *Ontario Curriculum Mathematics*[xii] in 1997, when the Conservative Government was elected. Elementary teachers were caught up in an incredible wave of change. Change was not confined to curricula. This was a time of much educational unrest … a 10-day

▲ Exceptional and Creative Teaching in Elementary Mathematics (Morley MacGregor Award Until 2003)

1991	Susan Oleniuk	Murray Street PS, Corunna
1992	Barbara Beckley	Gateway PS, North York
1993	Joan Ellis	Knoxdale PS, Ottawa
1994	Lorraine Duffin	Masonville PS, London
1995	Judy Finch	Hill Street PS, Corunna
1996	Carol Danbrook	William Grenville Davis SPS, Brampton
1997	Mary Storey	Board Office York Region
1998	Anne Muller	Lisgar PS Mississauga
1999	Barbara Nicholson	Peckham Centre North York
2000	Margaret Kemp	Orchard Park PS London
2001	Helen Hart	Coledale PS, Unionville
2002	Pat Barltrop	Alexmuir JPS Scarborough
2003	Merilyn Fox	Henry Kelsey SPS Toronto
2004	Kevina Morrison	Highbush PS, Pickering
2007	Shelagh McCarthy	Morison PS, Deep River
2008	Sandra Jean Price	Math Coach Durham DSB
2009	Laurie Moher	Education Centre Kawartha Pine Ridge DSB
	Jennifer Brown	Education Centre Simcoe County DSB
2010	Maria Casasola	Claude E. Garton PS Thunder Bay

teacher strike, changes to collective bargaining, the creation of the College of Teachers, mandatory teacher testing, introduction of provincial testing, standardized report cards and so on. Emotions were high. Nothing was the same.

The newest editions of elementary mathematics textbooks helped teachers make some methodological changes by embedding communication and reasoning. School Board support documents, e.g. *Mathematics Resources* from The Toronto Board of Education,[xiii] helped teachers move from arithmetic-centred programs to planning a balance of number sense, measurement, geometry, data and algebra. Primary teachers began to use story books to enhance mathematics learning. Problem solving was no longer seen as a set of skills to be acquired in dedicated lessons. School Boards provided professional development to help teachers learn about problem solving stages, strategies and skills. Everyone was talking about teaching and learning mathematics through problem solving.

In 1991 and 1994, the National Council of Teachers of Mathematics released two position papers on the use of calculators[xiv] and computers[xv] that lead to much discussion around our province. The following excerpts show the importance NCTM placed on technology:

(1991)The NCTM recommends that all students use calculators to –

- Explore and experiment with mathematical ideas…
- Develop and reinforce skills…
- Focus on problem solving rather than computations…
- Perform the tedious computations …when working with real data
- …go beyond those levels limited by traditional paper-and-pencil computations

(1994) "Teachers should plan for students' use of technology in both learning and doing mathematics…"

(1994) "Every student is to have access to a calculator appropriate to his or her level. Every classroom where mathematics is taught should have at least one computer for demonstrations, data acquisition, and other student use at all time. Every school should provide additional computers and other types of technology for individual, small-group, and whole class use."

Did this soon become reality? Of course not. Schools purchased many computers, but they quickly were dated and could not handle the latest software. Purchasing new computers and calculators for all classrooms and for labs was too expensive for schools. The expectations were also beyond the abilities of most elementary teachers…but not for long. Slow progress began.

But the focus of these years was assessment and accountability. The emphasis on integration across subject areas disappeared and mathematics stood on its own. EQAO was created and a standard report card became mandatory. Pedagogical change that had been slow in coming suddenly was evident, first in Grade 3 and Grade 6 classrooms and then all grades, perhaps because of provincial testing and the report card. Teachers struggled with ways to link mathematics instruction and meaningful assessment. OAME led the way by creating assessment material embedded in rich problems, including exemplars[xvi].

During the last 10 years, elementary teachers have continued to struggle up a steep learning curve. Although the content of the curriculum has basically remained unchanged since 1997, elementary teachers have been faced with expanding demands to have deeper understanding of this content, and more importantly, keeping up-to-date with educational technology for both teaching and learning, research in mathematics methodology, knowledge and skills of effective questioning, differentiated instruction, …and much, much more. The focus is always on professional learning.

For the first time, the Ministry of Education adopted a student achievement strategy that was founded on the importance of subject-focused work with teachers. Expert Panels were formed to provide guidance on best practices of teaching and learning mathematics, based on current research that would become the foundation of this subject-focused work. In 2003, the *Early Math Strategy: Report of the Expert Panel on Early Mathematics in Ontario*[xvii] was released, followed in 2004 by *Teaching and Learning Mathematics: The Report of the Expert Panel on Mathematics in Grades 4 to 6 in Ontario*[xviii]. Both documents presented important information about characteristics of learners, components of effective teaching frameworks and an effective mathematics program, the importance of concrete, print and technological resources, the role of mathematics assessment and developing teachers' mathematical expertise.

With the establishment of the Literacy and Numeracy Secretariat (LNS) in 2004, professional learning was front and centre. Secretariat-sponsored literacy and

numeracy training for elementary teachers has occurred each summer since 2004. Regional Math Forums were held across the province. Not only were teachers encouraged to learn from experts, but from each other. School boards have appointed Lead Teachers. The Schools on the Move: Lighthouse Program was established for schools to share effective strategies and learn from one another. Professional Learning Communities have been formed in schools. Since 2004, elementary mathematics teachers have been provided with professional learning tools on-line, including Webcasts for Educators, and the Ministry of Education *e*Workshop, as well as print resources from publishers, OAME and the Ministry.

In 2009, a review of the work of the LNS[xix] was released. The overall conclusion was that positive change in literacy and numeracy teaching and learning was evident. However, among the many recommendations for the future, the reviewers stressed that the LNS needed to "Intensify the focus on numeracy." Teachers and principals felt that there continued to be a serious discrepancy between their knowledge and confidence in literacy teaching and that of mathematics teaching. (p118) And so, the journey continues.

Mathematics education and teachers have come a long way in 40 years. A young teacher in 1972, who was handed a class set of textbooks, along with the 5" x 8" Program of Studies containing two pages of content to teach her Grade 5 class mathematics for the year had no idea what the future held. Little could she imagine that weeks and weeks of long division practice would be replaced with student-focused, problem solving-based experiences; that students would spend less time holding a pencil and more time using a calculator or computer; that the chalkboard would be replaced in the mathematics classroom by an interactive whiteboard on which magical mathematics happens; and that the students in the classroom would talk about mathematics as much as the teacher.

And what about the young elementary teachers of today? What do they imagine the mathematics classroom of 2052 will hold for our learners?

[i] *Programme of Studies for Grades 1 to 6 of the Public and Separate Schools 1960 (a reprint of the 1955 edition with minor revisions)*, Toronto: Ontario Department of Education, 1960, pages 98-111.

[ii] Fleming, W.G., *Education: Ontario's Preoccupation*. Toronto: University of Toronto Press 1972. 184

[iii] Ontario. Living and Learning. *The Report of the Provincial Committee on Aims and Objectives of Education in the Schools of Ontario.* Toronto: The Newton Publishing Company, 1968.

[iv] Ontario Ministry of Education (1975). *The formative years: Circular P1J1*. Toronto: Queen's Printer for Ontario.

[v] Ontario Ministry of Education (1985). *Shared Discovery: teaching and learning in the Primary years*. Toronto: Queen's Printer for Ontario.

[vi] Federation of Women Teachers' Associations of Ontario (1986). *PLAY: Active Learning in the early school years.* Toronto, ON

[vii] National Council of Teachers of Mathematics (1985). *Agenda for action: Recommendations for school mathematics of the 1980s.* Reston, VA: Author

[viii] Mathematics Science Education Board (1989). *Everybody counts: a report to the nation on the future of mathematics education.* National Academy Press. Washington, DC

[ix] National Council of Teachers of Mathematics (1989), *Curriculum and evaluation for school mathematics.* Reston, VA: Author

[x] Ontario Ministry of Education (1995). *The Common Curriculum: Policies and Outcomes, Grades 1-9*. Toronto: Queen's Printer

[xi] Ontario Ministry of Education (1995). *The Common Curriculum: Provincial Standards Mathematics, Grades 1-9.* Toronto: Queen's Printer

[xii] Ontario Ministry of Education and Training. (1997). *The Ontario Curriculum: Grades 1-8: Mathematics.* Toronto: Queen's Printer for Ontario.

[xiii] *Math resources: Kindergarten to grade nine, School Edition.* Toronto: Mathematics Department, Toronto Board of Education (1996).

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▲ Elementary Mathematics Education Timeline

SUSAN STUART

Curriculum Document	1960: *Programme of Study for Grades 1 to 6 of the Public and Separate Schools* (better known as "the Grey Book") 1967: *Curriculum P1, J1*, - key policy document for education in Gr. 1 – 6 Subject Guidelines for Gr. 7 – 9	1975 The Formative Years (Circular P1J1) Summary of goals and curriculum expectations to achieve by the end of each division (P, J) 1985 Shared Discovery: Teaching and Learning in the Primary Years OME Support document – introduction of 'growth strands'
External Influences	1968: *The Hall-Dennis Report* Calls for a curriculum more closely related to students' experiences, a decrease in rote learning, and an increase in parental and community involvement in schools 1969: Biggs, E. E. & MacLean J. R. *Freedom to Learn: An active learning approach to mathematics*, Addison Wesley	1980 *Agenda for Action*, NCTM 1986 *PLAY: Active Learning in the Early Years,* FWTAO
	1960's	**1975 – 1990**
Content	The syllabus simply listed the mathematical topics – mainly arithmetic, including measurement and problems Textbooks introduced the "new math", set theory and properties of number systems Daily planning based on 10% of timetable or 30 minutes/day ('Grey Book' p14)	A move from a list of skills and knowledge to a list of "learning experiences leading to competence". Programs developed at board level and then refined by individual schools and teachers Arithmetic - Some new topics, such as classification, decimals, equivalent fractions (P) and algebraic notation (J), mapping sets, mean and sample Measurement - implementation of the metric system Geometry – more emphasis and new topics such as transformational geometry
Methodology	Facts and mechanical processes presented in problem situations arising out of real situations Drill and practice required Large portion of arithmetic practice was to be "mental" ('Grey Book' p95) Exactness, neatness, and orderliness training was seen as "inimical to real progress in arithmetic" ('Grey Book' p95)	Teachers "work out the application of the curriculum", plan by division. They had "responsibility of selecting strategies, resources, and activities appropriate to the needs of individual children." (CircularP1J1p 3) Learning through enquiry encouraged but most common was 'chalk and talk' followed by seatwork Group work followed by written seatwork was becoming more common Integrated units, emphasis on meaning and basic skills were espoused, but in mathematics, teaching from the textbook remained most common, especially from Gr. 3 – 8 Most changes in methodology occurred in the primary grades
Technology	Geometry set	Protractors, clinometers, magnetic compasses, overhead projector Computer use was rare, calculators used occasionally to check work or estimations in arithmetic
Assessment	"The elementary school has no business with uniform standards of attainment…children grow in body and mind at their natural rate…there will be as much variety of attainment as there is of intellectual ability." ('Grey Book' p11) Therefore, "uniform external examinations (are) impractical…this is as it should be." Students tested at frequent intervals Promotion based on combination of teacher observation, student work and test results	Assessment on a continuous basis to ensure learning at a level and rate in keeping with individual abilities In-depth observation based on **growth strands** for specific skills and knowledge homework/notebook assessment, unit tests, participation/effort and observation of student activity
Classroom Resources	Dependence on textbooks for detailed content. "The provision of textbooks for each grade makes it possible for the teacher to plan her teaching so that children may advance at their own rate of speed." ('Grey Book' p97)	In-service focus on manipulatives – pattern blocks, geoboards, attribute blocks, geometry materials, Cuisenaire rods, etc. Print material for these manipulatives was abundant and many were written by Canadian teachers. Manipulatives were used frequently in Primary, occasionally in Junior and rarely in Intermediate. Textbooks were common in Gr. 3 – 8 and used daily

	1993 *The Common Curriculum* Essential and specific outcomes achieved by the end of Gr. 3, 6 and 9 Focus on outcomes-based learning. 1995 *Provincial Standards, Mathematics, Grades 1-9*	1997 *The Ontario Curriculum, Grades 1-8, Mathematics* 1998 *The Kindergarten Program*
	NDP Government 1989 Everybody Counts, National Research Council, Washington, DC 1989 Curriculum and Evaluation Standards in School Mathematics, NCTM 1993 Principles for Fair Student Assessment Practices for Education in Canada , Joint Advisory Committee, University of Alberta 1995 Royal Commission on Learning 1995 Linking Assessment & Instruction in Mathematics: Connecting to the Ontario Provincial Standards Transition Years, OAME	**Conservative Government** 1998 *Guide to the Provincial Report Card*, OME 2000 *Principles and Standards for School Mathematics*, NCTM 2002 *The Ontario Curriculum – Exemplars: Mathematics, Grades 1 – 8*, OME 1997 *Linking Assessment & Instruction in Mathematics: Junior Years*. OAME 1998 *Teaching Mathematics Through Technology document and discs*. OAME 1998 *Scope & Sequence Posters, Grades 6 – 8*. OAME 1999 *Linking Assessment & Instruction in Mathematics: Primary Years*. OAME
	1990 – 1995	**1995 – 2003** ***(see page 23 for 2003-2012)***
	1993 Mathematics, Science and Technology were combined under five broad topics: Models, Theories and Fundamentals; Systems, Structures and their Functions; Interrelationships and Change; Inquiring, Reasoning and Reporting; Perspectives 1995 Mathematics strands introduced: problem solving and inquiry; number sense and numeration, geometry and spatial sense, measurement, patterning and algebra, data management and probability Key components of problem solving, communications, reasoning, connections and technology mentioned for the first time	Introduction of curriculum expectations (overall and specific expectations) Expectations replace outcomes and are far more detailed Organized into Strands: Number Sense and Numeration, Geometry and Spatial Sense, Measurement, Patterning and Algebra, Data Management and Probability. Mathematical Processes: Reasoning, Communicating, Making Connections, Problem Solving, Using Technology
	Verbs such as "describe, investigate, apply, demonstrate" became as important as the mathematics content Focus on strategies that encouraged questioning and connections, especially to everyday life Focus on problem solving, although it was viewed as a topic to be taught separately from other strands 'Chalk and talk' followed by seatwork was still a predominant strategy, especially in Gr. 4 – 8, although student work did reflect a move away from computations out of context	Emphasis on integration disappeared. All reference to equity and gender removed. Learning through inquiry Focus on problem solving and understanding, explaining their thinking, justifying solutions
	Technology included for the first time as "a must" Four-function calculators become part of many classrooms. Computer labs are set up in schools	Instruction in the use of calculators and computers from the time students enter school Use them to investigate number, search for patterns, and do calculations with numbers during problem-solving activities In Gr. 4 – 8, use calculators and computers in assignments, homework, and evaluation activities In reality, few classrooms consistently used calculators for problem solving and rarely used computers
	Workshops for teachers focus on 7 standards of student assessment: Mathematical Power, Problem Solving, Communication, Reasoning, Mathematical Concepts, Mathematical Procedures, and Mathematical Disposition. Assessment and presented as separate ideas. Teachers encouraged to view evaluation as a means to improving instruction and the whole mathematics program.	1996 EQAO established. 1997 Testing at Gr. 3 1999 Testing at Gr. 6 Focus on performance indicators using achievement charts- used for grading. Standard Provincial Report Card – letter grades in Gr. 1 – 6, % in Gr. 7, 8. 1998 all strands had to be reported on each term 2000 each reporting period must assess at least two strands. EQAO testing became a focus in Gr. 3 and 6 classrooms.
	Primary grades using a wide variety of manipulatives with teacher direction to children on how to use them. More emphasis placed on using manipulatives purposefully rather than for play. Geometry manipulatives become common in Junior grades.	Manipulatives become integral part of textbook lessons at all grades.

▲ OAME History

COMPILED BY SUSAN STUART

1860 Formation of the Ontario Teachers Association which later became the Ontario Educational Association (OEA)

1892 First meeting of the Mathematical and Physical Association of Ontario (MPAO). This later became a section of the OEA.

1945 Canadian Mathematical Congress formed

1946 First woman president of MPAO (Hilda Rice)

1950 MPAO affiliated with the National Council of Teachers of Mathematics (NCTM)

1951 MPAO changed its name to Ontario Association of Teachers of Mathematics and Physics (OATMP)

1953 First record of the publication of a newsletter

1958 First record of regional meetings (Metro Mathematics Seminars)

1959 Rebirth of the Ontario Mathematics Commission (OMC)

1961 OATMP hosted the first NCTM Summer Meeting outside the USA

1962 (Feb) First issue of the *Ontario Mathematics Gazette* (Ralph Stanton)

1964 First elementary school teacher on council (Jim MacLean)

1965 Annual conference included seminars for elementary school teachers for the first time

Association changed its name to Ontario Association of Teachers of Mathematics (OATM)

1966 Annual conference held at a hotel for the first time

(Sept) *Gazette* issue was an Elementary School edition (There was another one in 1967.)

1968 First elementary school teacher elected president (Jim MacLean)

1970 First annual conference held outside Toronto (Ottawa)

1971 First Leadership Seminar (for elementary school teachers only)

1972 Annual conference changed to May instead of March Break (Waterloo)

1973 OAME formed by joining OATM and OMC, at North Bay

Mona & Morley MacGregor became Secretary/Treasurer

First President, David Alexander

Abacus newsletter began (Brock Rachar)

Hosted an NCTM regional conference in Toronto

1974 Only Canadian NCTM President (John Egsgard)

1976 Bilingual OAME-AOME name adopted

1981 New logo

Voting by mail began

1982 NCTM Annual conference (Toronto). Only time outside of USA.

1986 *Abacus* became an insert in the *Gazette*

Gazette now only available to OAME-AOME members

1989 Don & Carol Attridge became Secretary/Treasurer

1990 NCTM Regional meeting (Hamilton)

1991 Centennial Issue of the *Gazette*

1993 The *Abacus* began to focus exclusively on elementary

1994 OAME began Special Project Committee to create assessment documents

1995 David & Bonnie Alexander became Executive Directors

First annual Ontario Studoent Math Olympics (OMO), COMA

Linking Assessment & Instruction in Mathematics: Connecting to the Ontario Provincial Standards: Transition Years for sale

1996 Incorporation and Charitable status – Directors renamed Vice-Presidents, Councilors renamed Directors

Elected directors decreased from 20 to 19 to maintain 40 voting members

1997 Leadership Seminar opened to secondary school teachers for the first time

Linking Assessment & Instruction in Mathematics: Junior Years for sale

First OAME website, through the University of Guelph

1998 *Teaching Mathematics Through Technology* document and discs for sale

Scope & Sequence Posters, Grades 6 – 8 for sale

1999 **www.oame.on.ca** established (Doug Evans)

Linking Assessment & Instruction in Mathematics: Primary Years (binder & video) for sale

2001 Sue & Dave Hessey became Executive Directors

2002 First on-line annual conference registration (MAC^2—Greg Clarke)

2004 OAME Vision Statement

Release of *Growing Up Mathematically* (OAME /Union Gas)

2005 OAME website fully active with links to Chapters

First use of MCIS

2007 On-line voting first available

2009 Downloadable version of the *Gazette* and *Abacus*

Website redesign of Members Only section

2010 On-line voting only

First on-line registration for OMO

Fred & Lynda Ferneyhough became Executive Directors

▲ My Year ('99-'00) as President Peter Saarimaki

I was coerced (asked) into running for a Council position in 1990, which was the year that Judy Crompton and Margaret Warren were also new Councillors. I did my stint on various committees. Then in 1992 I was instrumental in starting TEAMS, which became a recognized chapter at the Annual in 1996, a year after we had agreed to run and started the planning for OAME 1997!

Later, when Bob Robinson was moving on, he needed a volunteer to take over the Council Comments Column. I happened to be sitting with him that day and, voila, it became my job. When OAME incorporated in 1996 and the councillors became directors, I renamed the column to Directors Dialogue.

Then in 1999 my "friends" Judy Crompton and Ralph Connelly convinced me I should run for President. At that time I passed on the Directors Dialogue job. Also that summer Ralph and I hosted NCTM's Canadian Region Affiliate Leadership Conference. We had executives representing AB, BC, MN, NS, NF, ON, PQ & SK and NCTM representatives.

During my presidency years (i.e. Pres. Elect, Pres. and Past Pres.) I chaired or was on various response committees on the Early Years, Junior Division, Transition Years, Secondary programs as the OME explored them. And I was on each of the *Linking* documents teams.

When Bonnie and Dave Alexander submitted their intention to retire as Executive Directors, I became the chair of a selection committee which led to the appointment of Sue and Dave Hessey.

As Past President I organized the Leadership Conference. The keynote speaker was David Onley (then the science/weather expert on CITY TV and now the Lieutenant Governor).

For the first time in the history of Ontario Mathematics educators associations, the next three presidents were women.

Elementary Mathematics Education Timeline *(continued)*

Curriculum document	2005 *The Ontario Curriculum, Mathematics (Revised)*
External Influences	2003 *Early Math Strategy, The Report of the Expert Panel on Early Math in Ontario*, OME 2004 *Leading Math Success. Mathematical Literacy Grades 7 – 12: The Report of the Expert Panel on Students Success in Ontario* OME 2004 *Teaching and Learning Mathematics: The Report of the Expert Panel on Mathematics in Grades 4 – 6 in Ontario* OME 2005 *Education for* OME 2005 *Growing Up Mathematically*, OAME

2003-2012

Content	Seven mathematics processes: problem solving, reasoning and proving, reflecting, selecting tools and computational strategies, connecting, representing, communicating Sample problems provided for the teacher. Many expectations revised/ combined, moved, or deleted. New headings used relating to mathematics sense and understanding relationships
Methodology	Instruction using challenging problems, construction of multiple solution methods, and mathematical communication and reasoning Solve problems but also understand what they are doing, explain their methods and follow the explanation of others Balance and variety of teaching strategies, student groups - use guided instruction, shared mathematics and independent mathematics Focus on 4-part lessons and using a variety of lesson styles
Technology	4-function calculators commonly used by students in Gr. 4 – 8 Increased support for Gr. 7 and 8 teachers to encourage use of technology (TIPS, Sketchpad, GAINS) Computers move to the classroom Emergence of laptop classrooms. Interactive white board technology in some classrooms
Assessment	A variety of assessment strategies and tools, including observation, interviews, journals, daily work, performance tasks, self-assessment, etc. Continued use of the achievement chart EQAO Testing continued – School improvement plans and possible mathematics focus based on test results at Gr. 3 and 6
Resources	MathGains, CLIPS,

+SCARBOROUGH, the original outliers.

Founded in 1973

Current President: Freda Liu
Past Presidents: John MacLennan
Merilyn Fox



Fall – Annual mini-conference for teachers

Spring – Annual SMO competition for students

{SCAME}

Scarborough Association of Mathematics Educators

TEAMS

Toronto Educators Association for MathematicS

Toronto Educators Association for MathematicS

T E A M S

OAME Conferences

OAME 1997: The Name of the Game



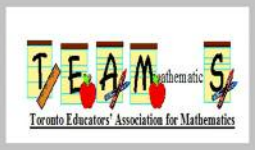
OAME 2005: NEXUS: Building Mathematical Connections



OAME 2013: Think BIG



History of the Chapter Acronym



TEY^{2}MS (1992 – 1998)
Toronto, East York, York, Metro Separate

TE^{2}Y^{2}MS (1998 – 2002)
Toronto, Etobicoke, East York, York, Metro Separate

TEAMS (2002 – present)
Toronto Educators Association for MathematicS

Ontario Mathematics Olympics

1999, 2002, 2011



OMO 2011

Past Presidents of OAME

Peter Saarimaki (1999 – 2000)

Stewart Craven (2003 – 2004)

Kathy Kubota-Zarivnij (2005 – 2006)

Anna Jupp (2008 – 2009)

Awards

Kenneth D Fryer Award

Marc Garneau C.I. (1986)

Eastern Commerce C.I. (2002)

Elementary Staff Award

William Burgess P.S. (2011)

Union Gas Awards

Anna Jupp (2005)

Felicity Endicott (2005)

Life Members of OAME

Peter Saarimaki
Kathy Kubota-Zarivnij



Credit Humber Association for Mathematics Promotion

peel District School Board

Dufferin-Peel Catholic District School Board

CHAMP started off as the Peel Association for Mathematics Education (PAME) in 1985 through the efforts of Alex Norrie, Bob Jones and Claire Zeller. Among the ten people who were at that first executive meeting at Gordon Graydon Memorial Secondary School were MaryLou Kestell, Carol Martin, John Rodger, Donna Del Re, Liz Henry, Marlene Dewey and Richard Dewey. However, the group had to wait until the provincial conference in 1986 to be officially recognized as a chapter.

The first co-directors of the executive were Bob Jones from the secondary panel and Helen Baker from the elementary panel. After a mini-conference in February of 1986 at Brampton Centennial Secondary School, Janet Mitchell and Jeff Irvine took over as co-directors. The chapter signed up 42 members at the conference and had a new logo. The first official event was held in May and featured a keynote presentation from Brendan Kelly on "Promoting Excellence in Mathematics K-13". By the end of the school year, the chapter had grown to 97 members.

A change in name became necessary as in the fall of 1988 Chris Dearling of Halton, Jeff Martin of Etobicoke and Walter Curran of Dufferin-Peel joined the chapter. After a contest in the spring of 1989, the chapter became officially known as the Credit Humber Association for Mathematics Promotion. Within a couple of years, this growing chapter took on the task of hosting OAME/AOEM 1991. The conference was co-chaired by Bob Jones and Jeff Martin and was held at the Regal Constellation hotel in Etobicoke.

CHAMP has continued to grow and support the vision of OAME. Its annual fall conference continues to be a primary source of professional development for teachers in the area. The contests and awards assemblies provide students in the region opportunities to compete and be recognized for their love of math. CHAMP looks forward to another forty years (and many more) with the Gazette as we reach out and look to support a progressive vision of mathematics education within our schools, our region and our province.

CHAMP News

CHAMP Fall Event

NWOAME

Northwestern Ontario Association for Mathematics Education

A Northern Voice for Mathematics Education Since 1988



Regional and Provincial Math Olympics, Pi Day Celebrations, Math Conferences,

Affiliation with All Northern Boards and Lakehead University

▲ The Evolution of Methodology in Secondary School Mathematics Instruction

JUDY CROMPTON, MYRNA INGALLS, DAVID ALEXANDER

Judy is a past president (PP), a Life Member, retired from OME and was actively involved with this issue. Myrna is a Life Member, a Don Attridge awardee, retired from OME. Dave is a PP, a past Executive Director, a Life Member, retired from OME.

The use of carefully constructed Socratic lessons has been a core instructional strategy in the teaching of secondary school mathematics in Ontario for over a century. For many years, it was the primary (or only) instructional strategy, but as the 1970's dawned, some new directions began to emerge. Teachers were experimenting with "discovery learning", an early constructivist technique in which students independently worked through a series of instructions that led them to reach a conclusion. Simple experiments might be carried out, with the class discussing their results in order to reach a conclusion. These were early steps toward a day when the mathematics teacher's toolkit would contain more than one strategy.

Pointing in a New Direction

There were four turning points in the evolution of methodology in secondary school mathematics.

By the 1980's, the topic of alternative strategies for teaching mathematics was appearing more frequently at conferences and on professional development days. The 1985 Ontario secondary mathematics curriculum contained a section called Process *Components in the Mathematics Program*. Here are some excerpts from the document:

- Language and Mathematics: "Opportunities should be provided for students to engage in writing activities in which they explore their own perceptions of mathematical concepts and report on their attempts to apply mathematics to problem solving."
- Experiential Approaches: "Throughout the Intermediate Division and for many students in the Senior Division, both the review of previously encountered concepts and the development of new ones should take place through approaches that relate abstractions to manipulative materials or to real-life situations that may be experienced or simulated in the classroom."
- Mathematical Models: "The process of problem solving using mathematics inevitably involves the choice or creation of a mathematical model. ... Throughout all of the courses, work on applications and problem solving should emphasize the aspect of choice in mathematical modelling."
- Computers in Mathematics: "The use of computers should change the quantity and type of interactions in the classroom and encourage co-operative learning. As well, the relative emphasis placed on the various objectives within mathematics courses should be adjusted in the light of the changed perception that computer technology brings." (OME, 1985, p. 17-20)

Remember now, these statements were published in 1985. They described a mathematics classroom very different from the typical, traditional classroom that existed in the province. What they did, however, was establish a very clear signpost for a new direction in mathematics education. Very few people were teaching that way in 1985, but from then on, slow but gradual progress was made. Evidence of this can be found by examining the OAME Annual Conference programs from the late 1980's and the 1990's. This was a **turning point** in Ontario mathematics education.

The comments quoted above from the Ontario 1985 mathematics guidelines foreshadowed the release, in 1989, of the *National Council of Teachers of Mathematics Curriculum and Evaluation Standards*. This landmark document thoroughly outlined a blueprint for the development of a constructivist approach to the teaching and learning of mathematics. In Ontario, it inspired the development of a number of OAME publications in the 1990's, all aimed at giving secondary and elementary teachers an image of how they might manage their teaching and student learning in a variety of ways.

Now, with all of this writing and publishing and professional development going on, did teachers all start teaching differently? No, of course not. For one thing, the wonderful ideas in the Ontario 1985 guidelines were not supported by the Ministry of Education through implementation. For another, the ideas were quite foreign to most teachers. The whole concept of mathematical modelling, for instance, was summed up in 1985 as drawing a diagram or writing an equation to

model a word problem. So what's new? The same could be said of the references to applications. In most instances, we described a context and provided an equation that modelled the situation. The student then did fairly straightforward calculations, manipulations, or graphing with it. Most of us went to the workshops, listened to the ideas about students constructing their own learning, and began to think about what it might look like in our classrooms. Meanwhile, we continued to use carefully constructed Socratic lessons.

Was this wrong? No, it was a very normal process of adaptation. To ignore the new ideas would have been wrong. But, to remain aware and constantly question one's own practice is healthy and is the first step to change.

Realizing the Vision

In all the efforts being made in the late 1980's and early 1990's, there was an essential element missing — technology. By 1988, graphing software was available and could be used effectively, for example, to explore properties of graphs and to develop the relationship between a graph and its equation. The problem, however, was in access to computer labs, which was very limited. A solution arrived in the mid 1990's in the form of a hand-held graphing calculator, along with sensors that could be used to gather data. Two things were now possible — the use of technology could be inserted into a mathematics lesson sequence at the appropriate time, and, students could enter data, create a graph of the data, and estimate an equation to represent it. In other words, from a physical situation, they could *construct* three models: a set of data, a graph, and an equation.

Did people run out to buy calculators and start experimenting? No, for a variety of reasons, the first of which was the cost of the calculators. A second reason involved classroom management — the data gathering/modelling activity described necessitated a classroom organization very different from what many teachers were accustomed to. Nevertheless, all over the province, pockets of interest and experimentation developed. By the end of the century, the use of graphing technology for mathematical modelling became very common in professional development. At last, there was some real meaning to the concept of mathematical modelling. This was a **second turning point** in Ontario mathematics education.

The 1999 Ontario mathematics curriculum was a

▲ Exceptional and Creative Teaching in Secondary Mathematics (Don Attridge Award until 2003)

1996	Jeri Lunney	St. Paul's HS, Nepean
1997	Ron Lancaster	St. Mildred Lightbourne School Oakville
1998	John Savage	Lo-Ellen Park SS, Sudbury
1999	Janet Scully	Board Office York Region
2000	Myrna Ingalls	Unionville HS, Markham
2001	Chris Suurtamm	Rick Hansen SS, Mississauga
2002	Gord Cooke	Thousand Islands SS, Brockville
2003	Mike Morin	Middlefield CI, Markham
2004	Jacqueline Hill	Port Perry HS
2005	Louis Lim	Unionville HS, Markham
2006	Kelly Blair	Rideau DHS, Elgin
2007	Rob McLeish	Sir Robert Borden HS, Nepean
2008	Shawn Perry	Dr. G. W. Williams SS, Aurora
2009	Mary Bourassa	Lisgar CI, Ottawa
2010	Cheryl Costigan	St. Elizabeth CHS, Thornhill
2011	Claudio Attanasio	St. Joseph SS, Mississauga
	Steve Chevalier	Assumption College Windsor

third turning point in the move toward constructivist teaching and learning. No longer were the references to investigations, applications, and technology part of an introduction, but rather, they were embedded in the wording of the expectations of the curriculum, for example:

- "determine, through investigations ...";
- "determine the point of intersection of two linear relations, by hand for simple examples, and using graphing calculators or graphing software for more complex examples; interpret the intersection point in the context of an application";
- "collect data, using appropriate equipment and/or technology (e.g., measuring tools, graphing calculators, scientific probes, the Internet)";
- "describe trends and relationships observed in data, make inferences from data, compare the inferences with hypotheses about the data, and explain the differences between the inferences and the hypotheses" (OME, 1999, p. 12-15).

A Decade of Implementation

Upon the release of the curriculum to schools in 1999, funds were provided to school boards to place thirty graphing calculators in each school. Then, for the first time in Ontario, curriculum implementation supports were developed in the form of course profiles for each of the Grade 9, 10, 11, and 12 courses. Collaborative teams came together to explain to teachers how to implement the intended curriculum, and in so doing, learned how valuable an experience it was to share ideas and experiences, co-plan lessons, and hear how students responded in others' classes.

This was the beginning of a decade of Ministry funding, leadership, and support for a series of carefully developed implementation projects, carried out in cooperation with leaders in the mathematics education community, including OAME and OMCA (Ontario Mathematics Coordinators Association). The series of projects met the growing needs of teachers and students as implementation proceeded. A list of the projects is included in the 2000+ section of the *Timeline Describing the Evolution of Ontario Secondary School Mathematics Education* on page 32. This was, truly, a **fourth major turning point** in the evolution of methodology in Ontario secondary school mathematics education.

An early and very effective project was called Targeted Implementation and Planning Support, known as TIPS. The TIPS project was designed to help teachers to teach in ways they had not experienced in their own learning. In the project, a huge and diversified team of educators from across the province carried out the development in a way that incorporated into pre-planning what research was telling us would make a positive difference.

TIPS incorporated:

- a three-part lesson design;
- flexible groupings of students;
- effective uses of manipulatives and technologies;
- teaching and using cooperative learning strategies;
- attention to learning styles;
- attention to the affective domain;
- embedding literacy learning in mathematics instruction;
- incorporating frequent opportunities to assess student learning and to adjust instruction accordingly; and
- attention to mathematical processes.

The Grade 7-12 TIPS development process brought together mathematics education researchers, consultants, lead teachers from both elementary and secondary panels, and Ministry of Education staff. Internal diversity and redundancy, neighbouring interactions, and decentralized control were hallmarks of TIPS development. With TIPS releases, the concept of train-the-trainer professional development evolved into professional learning support over time. At last, there was recognition that significant change takes time and calls for job-embedded support.

During this time, an Expert Panel on Student Success in Ontario was deliberating. Its report, *Leading Math Success*, was released in 2004 and was followed by provincial-level conferences that involved system-level leaders as well as mathematics leaders. The Expert Panel recognized that principals and superintendents play an important role in implementation of the intended mathematics curriculum. It recommended "that school boards ensure that all teachers of mathematics and administrators working with students in Grades 7 and 8 and in Grade 9 applied courses – including special education teachers – use the TIPS resource materials." (OME, 2004, p. 54).

Did this recommendation result in all teachers using TIPS? No, not at all. TIPS asks teachers to teach differently from how they were taught. Teachers need significant professional learning support to gain the

courage needed to teach in new ways. Some boards provided this support, and others did not. However, more boards began to plan how to build instructional leadership capacity over time.

Between 2005 and 2007, the 1999 curriculum was revised. The revisions were not a change in direction from 1999, but rather, they made policy what TIPS had exposed as a need — to teach, develop, and apply the mathematical processes across all strands in all grades. The implementation process took another positive turn at this time, in the form of a coaching approach to instructional improvement. The Ministry had funded several pilot projects in trailblazer boards, during 2006-07 and 2007-08, where coaching, Lesson Study, and demonstration classroom professional learning models were used to speed up implementation of the intended curriculum. Then, in December 2008, all boards of education were allocated funds to provide mathematics coaching support for Grades 7-10 teachers until June 2009. Boards could use either an internal coaching model, or an external coaching model, or a combination of these. Board leads met monthly from January to June in six regional groups under the leadership of three mathematics consultants released from their boards and working closely with Ministry staff. Ideas were exchanged, activities were aligned and interconnected, and challenges were addressed by these collaborative teams. The impact of this one-time coaching funding was significant. Many boards have since adopted coaching models. Retired mathematics leaders and sometimes those on temporary leaves of absence are brought into provincial-level coaching roles. Boards can use some of their Student Success funding to bring these provincial-level coaches in to help with coaching activities. It is not likely coincidental that we are seeing steady and increasing gains in student achievement on Grade 9 EQAO mathematics assessments. And, there can be little argument that instructional methodology in Grades 7-9 is evolving.

The most recent project in the evolution of instructional methodology is currently underway – the development of gap-closing resources for students in Grade 9 Applied. The goal is to assist teachers to identify the specific conceptual and procedural gaps in students' mathematics learning, assist them in filling the gaps, and then help them merge back into the mainstream when they are ready. The materials were developed in 2010 - 2011, with beta-testing starting in 2011. At the time of writing of this article, early evidence is being analyzed

▲ Leadership in Mathematics Education

2008	Anne Yeager	GVMA
2009	Kathy Kubota-Zarivnij	MOE
2010	Trish Steele	SCDSB
2011	Laurie Moher	PRDSB
	David Petro	WECDSB

▲ Elementary School Staff Award for Exceptional and Collaborative Mathematics Teaching

2010	St David CES	Hamilton
2011	William Burgess PS	Toronto

▲ Union Gas Awards

Teaching Excellence in Elementary Mathematics

2003	Blanche Thomas	Renfrew County DSB
2004	Beata Myhill	Ottawa Carleton DSB
2005	Felicity Laudisa	Toronto DSB
2006	Jessica Reiter	Peel DSB
2007	Christine MacTavish	Waterloo Region DSB

Teaching Excellence in Secondary Mathematics

2003	Susan Guzzo	Ottawa Carleton DSB
2004	Heather Boychuk	Rainbow DSB
2005	Ron Gaudreau	Ottawa Carleton DSB
2006	Anne Fitton	Ottawa Carleton DSB
2007	Paul Alves	Peel DSB

Outstanding Leadership in Mathematics Education

2003	Connie Quadrini	York CDSB
2004	Dave Lamontagne	Durham CDSB
2005	Anna Jupp	Toronto DSB
2006	Judy Dussiaume	Rainbow DSB
2007	Bonnie Jaakkimainen	Peel DSB

from over 3000 grade 9 students and 150 teachers in 8 boards.

The closing of gaps is being approached from the instructional side, as well. Effective questioning, or *questioning to evoke and expose thinking*, has been identified as a means of differentiating instruction during whole class presentations, in order to provide access to students at a range of readiness stages. At the same time, this work on questioning is improving teachers' knowledge, making clearer the connections between the curriculum, underlying Big Ideas, and lesson learning goals. Educators have had chances to collaboratively focus on questioning during inservice opportunities available from 2008 through 2011.

Conclusion

This article has identified four turning points in the evolution of mathematics instructional methodology in Ontario:

- a 1985 curriculum document that described process components of mathematics education, using constructivist language;
- the availability in the mid 1990's of graphing technology that made it possible for students to *construct* mathematical models in order to explore problems;
- a 1999-2000 curriculum that embedded references to methodology within the expectations;
- a decade of implementation leadership from the Ministry of Education, with cooperation and support from OAME and OMCA.

The result has been a gradual change in methodology from primarily Socratic presentations of skill-based learning to a broader and richer experience that includes manipulative and technology-rich inquiry lessons and collaborative investigations intended to address complex processes.

This shift has had a positive effect on secondary school student results, which are improving, as compared to other jurisdictions. As well, it is a testament to the dedication, perseverance, and collegiality of Ontario mathematics educators that the province is visited weekly by delegations from around the world. They ask how Ontario manages to do so well, to make continuous improvement in student outcomes, and to simultaneously close the gap between students of high- and low-income households. The fact that Ontario's secondary school improvement is accelerating is evidence of the growing network of educators who are opening the doors on their practice and working collaboratively and collectively to make positive instructional changes. There's a real buzz in many staffrooms these days. Teachers and coaches marvel at increases in student engagement, at how much their students know, and at how much they, themselves, are learning. That kind of buzz is getting harder to ignore.

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▲ My year ('95-'96) as President Susan Stuart

Key Issues:

1. EQAO (Joan Green) attended Council meeting to explain the intent of the new provincial testing in Grades 3, 6 and 9.

   We attended Grade 3 and 6 testing consultation meetings.
2. Because of the changes to secondary school curriculum, including the cancellation of the OAC's, OAME developed a list of school exit outcomes – an outline of how course specific outcomes should be determined.
3. *Linking Assessment to Instruction in the Junior Years* completed.

   Other Issues:
4. Met with College mathematics teachers' representatives and had input into their list of 'basic skills'.
5. Met with businesses to discuss sponsorship of events such as OMO Applied for incorporation, received registered charitable organization status, and made the necessary changes to the constitution. Councillors became Directors, Directors became Vice-Presidents.

YMA

Executive Directors
Don and Carol Attridge, 1989 - 1994

OAME Life Members
Don Attridge, 1987
Bill Nimigon, 1994
Myrna Ingalls, 2009

Past Presidents
Don Attridge, 1972-1973
J Symington, 1988-1989
Shirley Dalrymple, 2001-2002

Current President
Connie Quadrini, 2011-12

OAME Annual Conference
OAME 1992 – Perspectives
OAME 1999 – Mathematics: New Visions; No Limits
OAME 2008 – The Path is Made by Walking



Morley MacGregor Award: Exceptional and Creative Elementary Mathematics Teaching
Helen Hart, 2001

Kenneth D. Fryer Award
Unionville S.S, 1992
Markville S.S, 1995
Middlefield C.I., 1998, 2008
Dr. Denison S.S., 1999
St. Joan of Arc CHS, 2008

Don Attridge Award: Exceptional and Creative Secondary Mathematics Teaching
Janet Scully, 1999
Myrna Ingalls, 2000
Mike Morin, 2003
Shawn Perry, 2008
Cheryl Costigan, 2010

Union Gas Award for Outstanding Leadership in Mathematics Education
Connie Quadrini, 2003

Mona MacGregor Award for Outstanding Contribution to OAME and Math Education in Ontario
Carol Attridge, 1995
John Kearns, 2001

OMO Champions
Cummer Middle School, 2011

WOMA

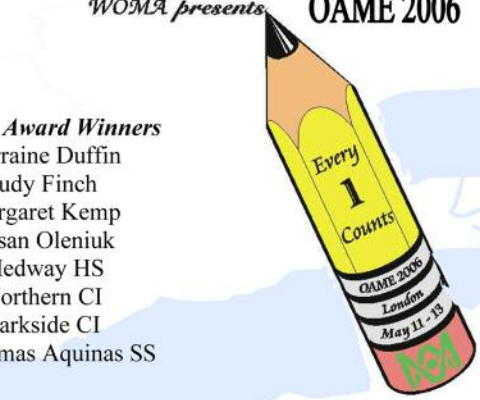
...in the heart of Southwestern Ontario

1 2 3 4 5 6 7 8 9 10 ...
WOMA presents **OAME 2006**

Home of

MCIS Co-ordinator
Cathy Lynch
OAME Exec. Directors
Dave and Sue Hessey
Morley and Mona MacGregor
OAME Life Members
Kaye Appleby
Tom Griffiths
Bob Smith
OAME Presidents
Tom Griffiths
Mary Howe
David McPhail
Sharon McPhail
Barry Onslow

OAME Award Winners
Lorraine Duffin
Judy Finch
Margaret Kemp
Susan Oleniuk
Medway HS
Northern CI
Parkside CI
St Thomas Aquinas SS





OAME 1996
The Sky's the Limit

2003 Ontario Mathematics Olympics

▲ Timeline Describing the Evolution of Ontario Secondary

External Influences	• baby boomers enter high school, bringing a broader range of students expecting to graduate • rigid streaming system, the Robarts Plan, is introduced promotion on a yearly basis • "New Math", a very structured, abstract curriculum, is introduced. • Gr. 13 courses are revised, moving from three to two Calculus enters the secondary school curriculum • Gr. 13 provincial exams are discontinued • Colleges of Applied Arts and Technology are opened, providing a new avenue of post-secondary education	• a movement to semestering, with 75-min periods • credit system is introduced rigid streams are replaced by course types, keeping doors open for students by allowing promotion by course instead of by year • course types are grouped into three streams, roughly being university preparation, college preparation, and workplace preparation • Gr. 13 courses are revised, going from two to three, expanding Calculus and introducing Relations and Functions • Gr. 9 – 10 curriculum is revised, moving away from the focus on set theory • Senior Cyclical Review begins	• course types (streams) are renamed as Advanced, General, and Basic • 1985 math guidelines are released, including an introductory section on the process components in mathematics that describes a new vision of mathematics instruction • General Level in mathematics includes two programs, Mathematics for Technology and Mathematics for Business and Consumers • the three Gr. 13 mathematics courses are replaced by three OAC's, with significant changes to Calculus, and a new course (Finite Mathematics) accessible to students from Gr. 11 Advanced

VIEW OF

Behaviourist model, in which learning is viewed
The learner's task was seen as accumulating bits of knowledge

Constructivist perspective, in which there is a focus on students' understanding
This perspective recognizes that, with the availability of facts at their fingertips, students need to have

	1960's	1970's	1980's
Technology	• slide rule • beginning use of overhead projectors • some experimental courses in computer programming using punched or mark sense cards	• slide rule • increasing use of overhead projectors • 4 function calculators gradually become less expensive • by the end of the decade, early scientific calculators are available • increasing use of computer programming using punched or mark sense cards	• routine use of overhead projectors • increasing use of inexpensive, scientific calculators • introduction of desk-top computers, with rapid growth in power by the end of the decade • beginning use of graphing software and spreadsheets by the end of the decade
Methodology	• Socratic lessons	• Socratic lessons • more use of discovery learning • teachers adapting to an effective use of 75- min periods • the place and effective use of calculators is under discussion	• Socratic lessons • increasing use of scientific calculators leads to greater use of investigations and more realistic applications • graphing software facilitates investigations involving properties of graphs
Assessment	• Gr. 9 – 12: examination at the end of each of three terms, supplemented by term tests • Gr. 13 provincial examination mark was 100% of final mark • after the elimination of Gr. 13 examinations, more weight was given to tests	• tests, mid-term and final examinations make up most of a student's mark • beginning use of assignments • the concept of "term" mark is fully established, but there is a great variation in its weighting- the term mark might include such things as quizzes and assignments • final examinations are still heavily weighted in some schools	• tests, mid-term and final examinations • increasing use of assignments • term marks include such things as quizzes and assignments, with some teachers assessing daily work habits • 1985 guidelines mandate a 40% weighting of final examinations in OAC marks; this leads to a decrease in the weighting of final examinations in other grades

	• NCTM releases its Curriculum and Evaluation Standards and supporting publications • the Common Curriculum, a revision of all curriculum in Gr. 1 – 9; streams are removed in Gr. 9 • Ontario Provincial Standards, leading to the development of EQAO testing in language and mathematics, Gr. 3, 6, and 9 • a review of Secondary School is carried out, with the goal of removing OAC's and creating a JK – 12 experience • TI81 graphing calculators become available • new mathematics curriculum for Gr. 7 – 8, (1997) • new mathematics curriculum for Gr. 9 – 10, (1999), with methodology embedded in the expectations and a focus on inquiry and the use of technology; Gr. 9 is re-streamed • OME provides funds for the purchase of 30 graphing calculators in each school	• new mathematics curriculum for Gr. 11 – 12, (2000), with methodology embedded in the expectations and a focus on inquiry and the use of technology. • "double cohort" exists in schools – some students are completing OAC's to earn a SSHGD; students under the new curriculum are working toward a Gr. 12 diploma. • OAC's and the SSHGD are phased out after June 2002 • OME provides extensive support to the implementation of the new secondary curriculum: course profiles; CARE package: support for teachers in aligning new practice with appropriate assessment strategies; TIPS: a more in-depth experience for teachers in changing their methodology; PRISM research-based resources for students having difficulty in learning math; CIIM: a research study involving more than 1000 educators from across the province, whose results informed Ministry-level resource development; development of on-line learning tools: CLIPS, OERB, OSAPAC, EduGAINS; coaching approach to instructional improvement; development of gap-closing resources and inservice; Growing Success policy document • The secondary curriculum is reviewed; a revised Gr. 9 – 10 curriculum is released in 2005 and Gr. 11 – 12 in 2007.

LEARNING
as tightly sequenced, linear, and hierarchical.
and the teacher's task to explicitly teach each objective.

of concepts rather than memorization of content, rules, and procedures.
the ability to become critical thinkers who can make meaning and connections from the information.

	1990's	2000-2010
	• routine use of scientific calculators • increasing availability and use of graphing software • access to computer labs for mathematics classes varies from school to school • a few teachers beginning to use graphing calculators and sensors • by the end of the decade, a wide range of software is becoming available, including programs involving geometry and statistics; a few teachers are experimenting	• routine use of graphing calculators and graphing software • growing use of geometry and statistics software • access to computer labs still a problem in some schools • some schools acquiring class sets of notebook computers • growing use of interactive white boards and document cameras • beginning use of on-line learning tools
	- Socratic lessons - beginning use of cooperative learning - increasing use of investigations, both individual and group, using graphing calculators or software - increasing use of graphing software - beginning use of problem solving as a means of provoking the need for new learning	- use of workbooks, rather than textbooks, in Gr. 9 and 10 - Socratic lessons where appropriate - use of inquiry methods and problem solving in an integrated fashion, to introduce, develop, and apply learning - use of whole class, individual, and cooperative learning as appropriate to the situation - wider use of a range of technologies by teacher and student - increasing focus on and support for meeting the needs of all students
	• unit tests, mid-term and final exams • focus on assessing daily work habits • term mark weightings are growing in some courses • increasing use of assignments, including investigations and problem solving • beginning use of a broader range of assessment instruments, including such things as journals and portfolios • awareness of the idea of holistic scoring (rubrics) is building	• daily work habits are no longer included in the student's mark • unit tests, mid-term and final exams • independent and group projects, including a major project as part of final assessment • challenging tasks that address complex processes as well as content • increasing use of holistic scoring (most recent, most consistent) • assessment is integrated with instruction; expectations of students are visible • assessment provides feedback for both teaching and learning • EQAO standardized testing in Gr. 9 mathematics

▲ The Ontario Mathematics Gazette

TOM GRIFFITHS

Tom is a PP, a Life Member, retired from TVDSB.

The *Ontario Mathematics Gazette* was first published in 1962 by the Ontario Mathematics Commission (OMC) and the Ontario Association of Teachers of Mathematics and Physics (OATMP). There were three issues per year. In 1963 the Samuel Beatty Fund assisted in the financial support of the journal. In 1965 the OATMP was replaced by the Ontario Association of Teachers of Mathematics (OATM).

Then, the journal included an editorial, announcements and reports of conferences and many articles on secondary mathematics.

In September 1973 the first issue was published by the OAME (the union of the OMC and the OATM) but due to financial concerns of a cost of $4 per copy, this was to be the final issue of the journal. It was numbered Vol.11, #4. At the time there were 460 members. Fortunately The Samuel Beatty Fund continued support, and the journal was continued with Vol.12, #2 in December of 1973. The Samuel Beatty Fund continued assistance until 1975, when the financial situation was such that OAME could fund the *Gazette*.

The first OAME issue included an editorial by the first president of OAME, D W Alexander. There was no editor, but an editorial board comprised of J. Clarke, W. Eames, J. S. Griffith, R. A. Kitching, J. Routledge and W. W. Sawyer. It contained a list of OAME committees and their membership, a list of executive and council members, a listing of the (outgoing) OMC executive, a report on the second International Mathematics Congress held in Exeter, England, notice of an NCTM meeting in Toronto, book reviews and an advanced announcement for the Canadian Mathematics Olympiad . There were also articles on sequences, integer drill with dice and other activities, multiplication facts for Grades 4 to 6, the effect of the use of desk calculators, a case for individual progress for students and a computer program for test mark normalization. The subscription rate at this time was $2.50 per copy.

The second issue was much thinner, as it was essentially an unexpected production due to the funding problems. It did include articles mentioning 'The New Math' and Metrication.

In March 1974 an article on the Spiral Approach to Curriculum was included. There was also a proposal to form Chapters of OAME to service the local needs of members.

In September 1974 the look of the journal changed. The cover included colour and the *Ontario Mathematics Gazette* was on top and bold, with an interesting tessellation design on the cover. (See the front cover.) The quality of the print was excellent for the time, but all diagrams were hand drawn.

Photos were included in December 1974. In this issue the new Leadership seminar was reviewed.

In Vol. 14, 1975 the editorial board was replaced by an editor, Arn Harris of Althouse College. There was the first article on pocket calculators, and the annual membership fee was $10. There was also the first advertisement for available OAME publications.

In 1977 the printing of the *Gazette* was done by Pole Publishing in Forest. It is still printed there.

In 1978, articles of interest were on transformations, mini calculators and problem solving. The editorship passed to Bob Smith, also from London.

In 1980 there was a contest for a new logo for OAME and in 1981 the cover was again changed, with changes taking place every year or two.

In September 1986, the size of the journal increased to its present format and the cost increased to $4 per issue. This was when the *Abacus* (begun in 1973) was merged with the *Gazette*.

In September 1992, the cover changed to different pictures for each issue, and pictures of the authors of articles were added to the articles. There were now four issues per school year.

In 1993 the publication included sold advertising for the first time.

From these issues to the present the changes have been gradual and presumably dependent on improved technology. There have been more pictures included as well as more colour on the cover, with larger, more easily read print.

In 2009 the *Gazette* became available electronically. (All of the issues are electronically available in the Members Only section of the website. And the Tables of Contents, complete with search by Author, Article or Issue are available to any visitor to the site: **www.oame.on.ca**)

The number of departments has increased, including

many more regular reports on the activities of the organisation, including: conferences, chapters, awards, finances, lists of councillors and executive and NCTM. There are fewer articles in more recent issues on senior secondary school mathematics.

The Gazette has evolved into an excellent journal informing the membership of the organisation and business of OAME, and includes many articles of interest to mathematics educators.

The editors of the *Gazette* for OAME have been: A. Harris, R. Smith, H. Heinig, R. Connelly, S. Pravica, C. Gravelle, B. Onslow, Jack Weiner, J. Egsgard, L. Lim, T. Romiens, M. Hurrell, and S. Craven. The current editor is M. Small.

The *Abacus* editors have been: B. Rachar, A. Czempinski, G. Jones, B. Laframboise, P. Lessard, S. McIntyre, S. McPhail, L Morrow, S. Robinson, G. Vervoort, L. Wiggan, C. Zeller, T. Brown, R. Ripley, C. & A. M. Garnham, C. Danbrook, A. Parker, R. Sauer, S. Stuart, Jennifer Weiner, F. Schatz, Mathman, L. Morrow and T. Brown. The current editors are M. L. Kestell and K. Kubota-Zarivnij. ▲

▲ My Year ('90-'91) as President Mickey Sandblom

I remember the:

- 6:30 a.m. phone calls; keeping the ship on an even keel; revisions to our Constitution and By-Laws
- the provisions to ensure financial stability;
- the Council seminar on the future of mathematics education in the '90's
- the encouragement of two-way communication between Council and the membership
- the production of the *Gazette* celebrating 100 years of mathematics educators organisations in Ontario.

All my years were happy ones with good friends.

▲ Oustanding Contribution to OAME/AOEM and Mathematics Education in Ontario (Mona MacGregor Award until 2003)

1989	Mona MacGregor	Executive Director
1991	Jack West	Spectrum
1992	John Champ	Houghton Mifflin
1993	Staff	Ramada Hotel Airport West
1994	Staff	Pole Printing
1995	Carol Attridge	Past Executive Director
1996	Len Catleugh	Texas Instruments Canada
1997	Charlie Cipolla	Rockwell Canada
1998	Peter Rose	FPR Communications Ltd.
1999	Mickey Sandblom	OAME-NCTM
2000	Penny Clemens	*Gazette* Graphic Designer
2001	John Kearns	Spectrum
2002	Vince Delisi	Texas Instruments Canada
2003	Frank Schatz	OAME-NCTM
2004	David Rosenbloom, Paul Shervill	Union Gas
2005	Gord Banks	PRMA
2006	Peter Sovran	MOE
2007	Lynda Colgan	Queen's U
2009	Joel Yan	Statistics Canada

▲ Ontario Mathematics Coordinators Association

PETER SAARIMAKI

Peter is a PP, a Life Member, a past OMCA president, retired from TDSB.

Early History

The roots of the Ontario Mathematics Coordinators Association (OMCA) were planted about 55 years ago when mathematics was being scrutinized by educators and politicians. In October 1957 the Russians startled the world by launching the first satellite, Sputnik, beating the USA by several months in achieving this scientific breakthrough. The politicians and the public believed that mathematics and science education had to be improved to overcome the Russian lead. Leadership in the proposed changes was given by the University of Illinois, the School Mathematics Study Group, and the College Entrance Examination Board. In Ontario, the Ontario Teachers Federation (OTF) and the Department of Education funded a large group of teachers to study the implications of the proposed changes for the Ontario curriculum. (paraphrased from the *Gazette*, Apr 1991)

In that period of dynamic change, experimental courses and course materials for Grades 7 to 13 were developed for Ontario schools. Many of the teachers involved in the writing went on to become curriculum leaders in some of the larger school boards. The first leaders were Wyn Bates (Dir. of Math., Toronto), John Del Grande (Coord., North York), Joe Perrell (Consultant, Hamilton), Norm Sharp (Supervisor, Etobicoke), and Jack McKnight (Coord., Scarborough). They met informally, at first, to talk shop over lunch. They were nick-named the "Super-Con-Dirs", reflecting their varying titles (Superintendent, Consultant, and Director).

After a few lunches, it became apparent that full day meetings would be very useful. The meetings were still very informal and were called whenever one of the members suggested that a meeting was warranted. John Del Grande acted as secretary for about 6 years. Any person with a K – 13 responsibility for mathematics for a Board was invited to join the group.

As the group became larger it was formally named OMCA. A constitution was written in the mid-1970s and the group was expanded to include consultants from many smaller boards. In 1989 in recognition of this, the name was changed to include "Coordinators/ Consultants". Then by 2010, with an even greater variety of job titles, the "C" went back to being the generic "Coordinators". In 1991 there were about 40 members in OMCA, including representatives from the Ministry of Education, plus others with special assignments in mathematics. By 2010 membership was over 100.

Early OMCA leaders included John Clark (Toronto), John Del Grande (North York), Lorna Morrow (North York), Joan Routledge (Aurora), Jim Fencott (Scarborough), Ron Sauer (Kitchener), Brendan Kelly (Halton), Todd Romiens (Windsor), Alex Norrie (Peel), Bob Robinson (Hamilton and Ministry of Education).

Connections

OMCA and OAME have a long history of cooperation and cross-over. The intersections have come about because of the many mathematics educators who have been members of both organizations. Even more to the point, seven people have been president of both OAME and OMCA.

OMCA members have also played critical roles (e.g., conference or committee chairs or co-chairs) for OAME provincial and chapter conferences and for the National Council of Teachers of Mathematics (NCTM) annual and regional conferences hosted in Ontario. (The 1982 NCTM Annual is the only Annual to be held outside the United States.)

Many members of OMCA are also members of other organizations, such as the National Council of Supervisors of Mathematics (NCSM), the Canadian Mathematical Education Study Group, the Association of Teachers of Mathematics (UK), the Fields Institute (U of T), the Mathematical Association (UK), and the Canadian Mathematical Society.

Of special note, the first winner (1983) of NCSM's prestigious Gilbert Medal was John Del Grande (North York), and he is still the only Canadian to receive this honour. Alex Norrie, Peel Coordinator in the 90s, was a director of NCSM and program chair for the joint NCTM/OAME/AOEM regional conference in Hamilton in May 1990.

The primary purpose of OMCA (from the beginning and reworded in the 2010 constitution) is to provide a framework for sharing of ideas, professional development, and an avenue for a collective impact on the direction of education particularly in the area of mathematics in the province of Ontario.

To further these aims, OMCA held its first "consultants

seminar" in Nov 1983, with John Clark as the organizer. Peter Hilton from State University of New York was the keynote. There were 40 attendees.

This annual event has continued to the present as the Annual Retreat, bringing leaders in mathematics education together to participate in the latest in mathematics education with the top thinkers, activists and leaders.

The Future

OMCA continues to evolve as the teaching profession evolves. We have moved with the technology. OMCA is now benefitting from members using the cutting edge Adobe Connect for audio and video communication.

We have also reconsidered our constitution and the succession plans of our Leadership team. As boards of education evolve, we have to keep in stride. In the last few years it has become evident that no longer are you hired as the Mathematics Consultant or Coordinator with the expectation that you are in that position for life. Many boards have evolved into 2- to 5-year terms for their consultants and coordinators. Because of this, a President-elect is nominated each year and only expected to serve (hang in) for three years (as PE, P and PP). The treasurer and secretary positions are now continuing positions, allowing Mike Davis for example to stay on for a number of years as treasurer, providing continuity over the long term.

OMCA and OAME have also joined together in many provincial curriculum reviews, curriculum documents and Ministry funded projects. These have included TIPS, PLMLP, CLIPS, MathGAINS, CAMPPP, and other initialled projects. OMCA will continue to work with OAME to ensure that the teachers of Ontario have reasoned, cogent, and coordinated input when the mathematics curricula come up (again) for review/revision. ▲

▲ Ontario: Evolution of Assessment Ideas and Practices

CHRISTINE SUURTAMM

Christine is an Associate Professor at U of Ottawa.

Introduction

This article discusses the evolution of assessment ideas and practices, both in terms of the broad context of assessment research and thinking, as well as in the context of Ontario. In terms of Ontario, it deals with the assessment policies of the past several decades, along with large-scale and classroom assessment practices. The article concludes with a discussion of current research on assessment in Ontario mathematics classrooms and describes some of the challenges that we still face.

Assessment Shifts in the Broad Context

While some might view current thinking in assessment as revolutionary, it is actually evolutionary, matching the gradual shifts from an early 20th century paradigm to the current 21st century view of thinking and research about how students learn.

In the first paradigm, learning was viewed as tightly sequenced, linear, and hierarchical. The learner's task was seen as accumulating atomized bits of knowledge and the teacher's task to explicitly teach each objective. Assessment consisted mainly of tests, which were used to measure mastery of individual objectives.

Emergent 21st century views rest on cognitive and constructivist learning perspectives, which value prior knowledge/experience and focus on students'

▲ My Year ('96-'97) as President Barry Onslow

Probably the most significant initiative during my term on the Board, was work on the writing and production of the three *Linking Assessment and Instruction in Mathematics* documents, together with the video for the primary document. I think that these three documents, along with the video, helped classroom teachers become more comfortable with alternative strategies for measuring success in mathematics.

During my term as president we established our links with the Fields Institute. Judy Crompton, the next president, then spent considerable time building strong links between OAME, MOE, and Fields.

We changed the format of the Leadership Conference, with participants signing up for one topic or theme over the whole conference. This format lets participants immerse themselves in a new concept, and better understand the ideas and opinions of their peers and future collaborators.

understanding of concepts, rather than memorization of content, rules, and procedures (Shepard, 2000). This perspective recognizes that, with the availability of facts at their fingertips, students must become critical thinkers who can make meaning and connections from the information. In terms of assessment, this means that tests alone are not enough, but rather, assessment should include challenging tasks that address complex processes as well as content. Further to this, assessment should be on-going and integrated with instruction; expectations of students should be visible, with students active in the assessment process; and assessment should be seen as providing feedback for both teaching and learning. These views also broaden the purposes of assessment so that it is not just at the end of learning, but also includes assessment for, and as, learning (Earl, 2003).

How These Shifts are Reflected in Ontario

Assessment in Ontario Curriculum Documents and Policies

Discussions about assessment in mathematics curriculum documents have evolved over the past half century. For instance, the 1964 Intermediate and Senior mathematics curriculum documents did not provide any direction with respect to assessment. The 1972 Senior mathematics document suggested that teachers move away from using only end of term examinations, which should "be replaced or supplemented with continuous and personal evaluation of the student's progress", and that "tests based on topics being investigated" should also be used (Ontario Ministry of Education (OME), 1972, p. 20). There was also some discussion suggesting that other methods such as projects, seminars, assignments, or discussions with students could be used along with tests.

The 1980 curriculum document for Intermediate mathematics primarily talked about the purpose of assessment as reporting to students and parents "what he or she has already mastered and what still needs to be learned" (OME, 1980, p. 12). It discussed assessment as providing information for teachers to modify program, strategies, and materials. The document suggested that assessment must take into account the complexity of learning and that more than tests and examinations are required to provide sufficient information for a valid assessment. While the term "formative assessment" was mentioned briefly in the document, immediate and continuing feedback was deemed important.

The 1985 mathematics curriculum guidelines for Intermediate and Senior divisions in both General and Advanced courses went a bit further by discussing the importance of both formative and summative assessment. With respect to formative assessment, the guidelines stated, "it should be used to inform students of their progress and to identify for the teacher those objectives that require review as well as those that require further and perhaps different instructional attention" (OME, 1985a, 1985b, p. 22). While reporting is mentioned, there were no clear guidelines other than that reports should be made at regular intervals. The documents also stated that evaluation depends on standards of achievement but that "standards cannot be established as absolute and applicable to all students without denying the wide range of differences and circumstances that affect learning" (OME, 1985a; 1985b, p. 23).

Between the 1985 document and the next round of curricula, there was a push in Ontario to establish standards or benchmarks. The Ontario Common Curriculum documents provided provincial standards of performance in mathematics for the ends of Grades 3, 6, and 9. The document also provided a diagram showing

▲ My Year ('97-'98) as President Judy Crompton

My most outstanding memory of my year as OAME President was the Leadership Conference.

It had traditionally focused on elementary school mathematics. Through the '90's, however, there were so many new secondary school developments that the OAME Executive felt the time was right to add a secondary panel to the Leadership offering. The focus was on new technologies and problem solving. I watched Shirley Dalrymple presenting with Myrna Ingalls, and Margaret Warren presenting with Mary Lou Kestell. I was both spellbound and excited as I saw the concept of modelling come within our reach, bringing with it a whole new perspective on problem solving. I found Dave Alexander, OAME Executive Director at the time and leader of the writing team of the 1985 Ministry Guidelines, and dragged him into the sessions with me, so that he too could see his vision come to life. A truly memorable experience.

connections between provincial standards, assessment of student achievement, reporting of results, and improvement of programs and student achievement. Sample assessment activities were provided and teachers were encouraged to use a variety of types of assessments. To assist teachers, several pages were included to describe a variety of assessment types, such as investigations, journals, observations, conferences and interviews, portfolios, and self-assessment.

The more recent mathematics curriculum documents explicitly state that "the primary purpose of assessment and evaluation is to improve student learning" (OME, 2005a, p. 18, 2005b, p. 17) and that assessment information helps teachers determine students' strengths and weaknesses, guides teachers in adapting their approaches to students' needs, and helps them assess the effectiveness of classroom practices. The importance of giving students feedback and clear directions for improvement and of providing opportunities for students to assess their own learning are indicated as ways of ensuring that assessment supports learning. The curriculum also strongly emphasizes using a variety of assessment methods over a period of time in order to provide more opportunities for students to demonstrate the full range of their learning. Suggested methods include assignments, day-to-day observations, demonstrations, tests, conversations or conferences, performances, and projects. The detailed listing of curriculum expectations and the inclusion of an Achievement Chart that contains descriptors of student achievement are an attempt to provide explicit criterion-referenced standards to measure student achievement.

In summary, the fairly brief statements in early documents about purposes of assessment have been expanded significantly in recent documents and more encouragement is given about the use of a variety of assessments. These reflect current views about multiple ways to assess the complexity of mathematical thinking and the various ways that students show what they know and can do. We also see a move towards more well-defined standards of performance.

Large-scale Assessment

While a provincial large-scale assessment is fairly recent in Ontario, the province has participated in international large-scale assessments since the 1980's through such examples as the Second International Mathematics Study in 1988, the Third International Math and Science Study in 1995, and the Trends in International Mathematics and Science Study in 1999. Ontario students have also taken part in the OECD Program for International Student Assessment.

In 1993 the Council of Ministers of Education administered its first national assessment, the School Achievement Indicators Program (SAIP), which sampled students in participating provinces and gave an indication of how students in various provinces were doing. Different administrations of the assessments have had different foci but mathematics is assessed on a fairly regular basis. In 2007 SAIP was re-named (and reconfigured) as the Pan-Canadian Assessment Program and assesses reading, mathematics, and science with varying foci in different administrations.

Standardized assessment at a provincial level has taken on a variety of forms. From the 1930's to the 1960's, standardized Grade 13 exit exams were used to determine entry into university. In the late 1960's the exams were abandoned and teachers' marks were used for university entrance. In the 1970's and 1980's the Ontario Assessment Instrument Pool was created. This was a bank of Ontario curriculum-based test and assessment items for various grade levels and courses, from which teachers could pick and choose in creating their own classroom assessments. The use of these items was not mandatory. In 1988-1990, a Calculus assessment project was carried out under the Ontario Academic Credit (OAC) Teacher In-service program. This project involved four phases: the development of criteria for the judging of an OAC Calculus exam and for judging the marking of student papers; a province-wide in-service program explaining the criteria and illustrating them using actual exams and student work; the requirement that every school in the province submit to the Ministry its final Calculus exam, along with three marked papers; a Ministry report to every school regarding the acceptability of its examination and marking of student work, with the requirement that a board provide additional in-service to schools whose submissions were found to be unacceptable.

A turning point in Ontario large-scale assessment came through the report of *The Royal Commission on Learning* (Bégin & Caplan, 1994) that noted that there had been "little tradition of standardized testing" in Ontario and brought to light the public desire for accountability in the educational system. This mirrored many other jurisdictions in the accountability movement. Shortly after the commission's report, the Education Quality Assessment Office (EQAO) was established. It carried out full scale assessments in mathematics and

language in Grade 3 (starting in 1997) and Grade 6 (1999), followed by Grade 9 mathematics (2001), and Grade 10 literacy (2002). In terms of mathematics, Ontario's curriculum at that point was fairly well developed, reflecting current thinking and research in mathematics education and representing an inquiry-oriented approach to mathematics learning and teaching.

EQAO has attempted to meet the challenges of an inquiry-oriented curriculum in a variety of ways. The use of teams of teachers, familiar with the Grade 9 curriculum, to develop and review short-answer and extended-response tasks was a strong attempt to ensure that the assessment items match the curriculum and to recognize the nature of activity in Grade 9 mathematics classrooms across the province. The assessments also include the use of a variety of item types (including open response), and a matching of items to the process categories. However, while EQAO has a variety of types of tasks, the assessment tends to include those mathematical ideas that are easily measured in a timed assessment and lacks the truly investigative components of the curriculum. In fact, EQAO clearly states that the assessment cannot measure all of the curriculum expectations, particularly those that require investigations.

Changing Classroom Assessment Practice

While innovative teachers have always found creative ways to get a sense of students' understanding and provide formative feedback, the main forms of assessment used by most teachers in mathematics classrooms in the last half of the 20th century were quizzes, tests, and examinations with a focus on summative assessment. However, classroom assessment practices have evolved along with assessment theory, research, and policy. Changes in classroom assessment have also aligned with changes in instructional practices. Students in mathematics classrooms are engaged in mathematical investigation, discussion, and the use of a range of mathematical thinking tools; these activities cannot be easily assessed with merely paper and pencil tests. Teachers are now much more strongly encouraged to use multiple and varied assessments to acknowledge the multiple aspects of mathematical activity and the various ways students show their understanding.

Studies with Ontario teachers provide some strong examples of current assessment practices. Case studies with intermediate teachers and work with Professional Learning Communities of teachers of Grades 4 – 8 show that a variety of assessment strategies are being used in Ontario classrooms to help give teachers a sense of students' understanding and to suggest next steps to both individual students and the teacher (Suurtamm, Koch, & Arden, 2010; Suurtamm & Koch, 2011). Below are three examples:

- Claire, a Grade 9 teacher, uses short quizzes to provide formative feedback. Rather than give students marks on the quizzes, she writes comments on the quizzes about what areas they understand and the areas they still need to work on. She also says "It helps me to see where I need to go as a teacher as well."
- Monica, a Grade 4 teacher, uses conferencing with students and asks them to discuss their work. She asks questions such as, "Tell me about your work, what were you thinking when you did this?"
- Ryan, a Grade 6 teacher, states that before a unit he puts students into groups and gives them an exploration activity "so that they can pull from all of their prior knowledge and they do it on chart paper and we put it up and we just discuss what strategies they're already using before we get into the unit. It helps me see what they already know." He also recognizes that this is an opportunity for peer assessment as "their peers are giving them feedback on what they did and could they have started in a different place or done it an easier or faster way".

While there is evidence of teachers incorporating new assessment ideas, we also see that they face many challenges and dilemmas. For instance, some challenges arise as teachers attempt to design rubrics that clearly communicate assessment criteria to students, or as they create and enact assessment opportunities that value the collaborative nature of problem solving. Teachers face dilemmas within the school culture as other teachers, students, parents, and administrators grapple with new assessment ideas. This may lead to such things as conflicts with students' and parents' expectations with respect to marks, or inconsistency in assessment practices among department members. Teachers are also faced with issues of accountability, particularly when trying to align thinking and practice with provincial, board, and school policies around assessment. For example, some teachers try to balance their progressive assessment practices with the need to prepare students to face multiple-choice questions on the EQAO assessment.

Concluding Comments

Current research and thinking encourage teachers to incorporate a range of assessment practices that are responsive to student thinking and promote student learning. At the same time, through the evolution of large-scale assessment, teachers are placed in a landscape of accountability where the teacher is seen as a technician, implementing curriculum, policies, and procedures, and where success is sometimes perceived to be measured by externally created assessments. Teachers often struggle with the conflicting messages they receive about the value of the EQAO results and the role of meaningful classroom assessment strategies.

EQAO puts many practices in place to ensure that authentic mathematical activity is represented in the assessment. However, EQAO assessments rest on a measurement model that chooses isolated bits of the mathematics curriculum that are easy to assess. These choices may not represent the important mathematical ideas and processes, nor represent mathematics as a coherent whole. This assessment model may contrast with the messages teachers receive from curriculum guidelines, including the importance of engaging students in mathematical processes, and the need to use a variety of assessments to address the diversity in both curriculum expectations and classroom contexts. Thus, the parallel traditions of accountability and meaningful, on-going classroom assessment may cause confusion for the classroom teacher. This would seem to be an important issue to address as we move forward with assessment.

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Suurtamm, C., & Koch, M. (2011). *Grappling with new assessment ideas: Dilemmas in classroom practice.* Paper presented at American Education Research Association (AERA). New Orleans. April 2011. ▲

▲ My Year ('01-'02) as President Shirley Dalrymple

The main issues that I remember from my presidency were:

1. the Ministry's proposal that teachers would earn 14 credits in 5 years under specific categories for professional development. There were many problems with the concept for example if you facilitated the PD on assessment you didn't get credit for it. The unions were working hard to oppose this proposal, even though they didn't oppose professional development. As president of OAME I, along with other subject association representatives, attended many union meetings where this issue was discussed. We were trying to come up with a solution whereby teachers would participate in PD but not use the proposed framework, which had so many rules and so much paperwork. In the end the policy died.
2. The internet was just becoming widely used and we were working on establishing our own website and as well we encouraged questions and contact from outside OAME by listing our emails in the Gazette. Since my name was listed first I received many inquiries that I had to respond to. Most were forwarded to the Executive Directors to deal with since they were requests to purchase resources or join OAME. This was very time consuming to me as a teacher since I might have as many as 30 to 50 emails to deal with before I did my own school work. It became clear that we needed to provide a protocol for contacting OAME through the ED's and through our own website. This has since been done.

ISOMA

Independent Schools of Ontario Mathematics Association

Representing Independent Schools Across Ontario

Founded in 1990



OMO Awards

2011 – 3rd Place
2005 – 2nd Place
2003 – 1st Place
2nd Place
2007 – 1st Place
2004 – 1st Place
1995 – 2nd Place

Home of ...

Ron Lancaster – OAME President (1993 – 1994)
Doug McDougall – Creator of the ISOMA Math Olympics (1993)
Vince Delisi – Mona Macgregor Award Winner (2002)

Check us out at www.chapters.oame.on.ca/isoma

Mathematics Association for Cottage Country

Youngest chapter of OAME
established 1995
Simcoe County / District of Muskoka

MAC² Innovations

First chapter to :
* use online registration (OAME2002)
* host Parents' Conference (OAME'007)
* offer chapter website as mobile app

MAC² Pioneers

John Egsgard
Past President of OAME 1974-1975
Only Canadian President of NCTM
First President of CATM
OAME Life Member - 1986
Gazette Editor 1996 - 1999

Bill Morrison
creator of Barrie & Simcoe County
Math Olympics contests
(precursor to Provincial OMO)
First MAC² President
OMO co-chair 1997, 2010
OAME Life Member - 2007

http://chapters.oame.on.ca/MAC2

Exemplary MAC² Educators

OAME Life Members
John Egsgard
Jack LeSage
Dave Davidson
Bill Morrison
Greg Clarke

OAME Past Presidents
John Egsgard - 1974/75
Dave Davidson - 1983/84
Paul Pogue - 1984/85

OAME Award Winners
Barrie North C. I. - K.D. Fryer Award winner - 1998
Jen Brown - Elementary Teaching Award - 2009
Trish Steele - Leadership Award - 2010

MAC² Lifetime Achievement Award
Peter Ryback, John Egsgard, Brad Hilliard

Event Co-Chairs
OMO 1997 : Bill Morrison, Jack LeSage, Paul Pogue
OAME 2002 : Lyn Vause, Linden Gray, Jon Rae
OAME '007 : Lyn Vause, Joyce Smith
OMO 2010 : Danielle Blair, Greg Clarke, Bill Morrison

Gazette editor (special editions) - Jack LeSage

OAME & MAC² webmaster - Greg Clarke

Outstanding MAC² Events

OMO 1997
Barrie, Ontario

OAME 2002
Year of the Palindrome
Barrie, Ontario



OMO 2010

The Venncouver Olympics

▲ Evolution of Our Logo



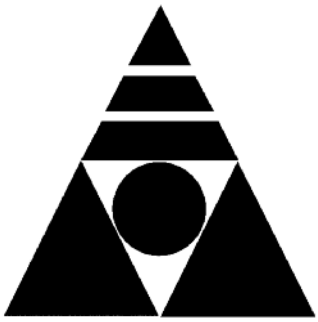
1973



1984



1991



1993



2010

3D Animated Website

▲ Father Faught Award (Junior Mathematics /Fermat Contest)

1976	Scarlett Heights CI Etobicoke
1977	Thornhill SS Thornhill
1978	Glebe CI Ottawa
1979,'86	Toronto French School Toronto
1980,'84	UTS, Toronto
1981	Loyalist CI Kingston
1982	Etobicoke CI Etobicoke
1983,'85,'87,'88	Woburn CI Scarborough
1989	Dr. J. C. Mackenzie HS Deep River

▲ My Year ('07-'08) as President Jacqueline Hill

The revision of the curriculum in 2005 was a very hot topic during my time on the board. The introduction of the seven mathematical processes was very big as well. They were embedded in the previous curricula, but were brought to the forefront in the revised curriculum because of their vast importance. Other hot topics included: differentiated Instruction, the use (or misuse) of Math Coaches, and the Ministry GAINS initiatives. As well, we worked closely with The Fields Institute and OMCA on a Curriculum Review Committee.

▲ Some of Our *Abacus* Editors



1976
Paul Lessard



1976
Gerry Vervoort



1977
Shirley McIntyre



1981
Sharon McPhail



1982
Claire Zeller



1985, '04
Trevor Brown



1989
Anna-Maria and Colin Garnham



1991
Carol Danbrook



1991
Amy Parker



1992
Ron Sauer



1992
Susan Stuart



1994
Jennifer Weiner



1996
Frances Schatz



2004
Lorna Morrow



2007
Mary Lou Kestell



1989, 2007
Kathy Kubota-Zarivnij

▲ OAME Webmasters

Doug Evans
1998 - 2004



Greg Clarke
2004 - present

▲ Some of Our *Gazette* Editors



1975
Arn Harris



1978, ’88, ‘91
Bob Smith



1981
Hans Heinig



1983, ‘87
Ralph Connelly



1983
Sam Pravica



1990
Barry Onslow



1990
Eric Wood



1991
Jack LeSage



1992, ‘99
Jack Weiner



1996
John Egsgard



1999
Todd Romiens



1999
Louis Lim



2003
Marilyn Hurrell



2008
Stewart Craven



2010
Marian Small

▲ My Year (’92-’93) as President
Jeri Lunney

As I read through my President’s messages so many thoughts and feelings came back into my mind: assessment, benchmarks, learning outcomes and destreaming Grade 9. In my year as Vice-President, I had watched Ann Jones stickhandle her way through the political minefields that OAME was dealing with in the nineties. We remained a strong voice for teachers as we worked with the OME to give our input on proposed changes such as curriculum renewal, possible destreaming of grade ten and dropping OAC’s.

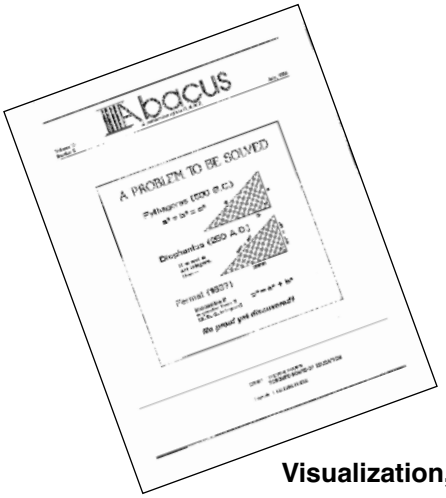
The Leadership Seminar, “Focus on Renewal”, was a fabulous success. Committees of OAME were very active preparing curriculum materials for the Transition Years and preparing activities related to benchmarks at the Early and Formative Years. We produced two publications which provided guidance and practical assistance to teachers: *Mathematics Through the Transition Years: Putting the pieces together* and a revised version of the *Focus on Renewal of Mathematics Education*. In addition, we created a new logo for OAME and a new look for the *Gazette*. As I think back on that wonderful year, I remember the privilege of working with dedicated professionals committed to excellence in mathematics in our province.



▲ My Year ('75 – '76) as President
Tom Griffiths

As president-elect I went with John Egsgard and Joan Routledge, then the past and current presidents, to the Ministry to discuss the training of teachers of mathematics. This seemed to me to be the first time that the Ministry had acknowledged us as a voice for mathematics in the province. (There were no changes as a result of this meeting.)

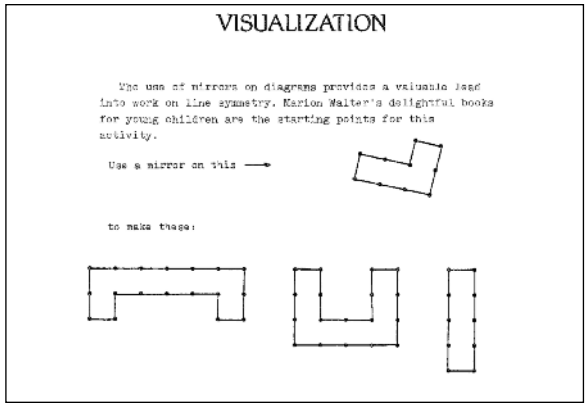
▲ Excerpts From the *Abacus*



Visualization, Sept. 1986



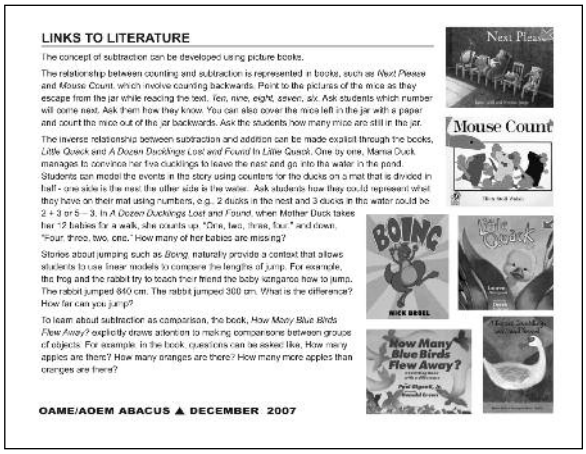
Links to Literature, Dec. 2007


VISUALIZATION

The use of mirrors on diagrams provides a valuable lead into work on line symmetry. Marion Walter's delightful books for young children are the starting points for this activity.

Use a mirror on this →

to make these:


LINKS TO LITERATURE

The concept of subtraction can be developed using picture books.

The relationship between counting and subtraction is represented in books, such as *Next Please* and *Mouse Count*, which involve counting backwards. Point to the pictures of the mice as they escape from the jar while reading the text. Ten, nine, eight, seven, six. Ask students which number will come next. Ask them how they know. You can also cover the mice left in the jar with a paper and count the mice out of the jar backwards. Ask the students how many mice are still in the jar.

The inverse relationship between subtraction and addition can be made explicit through the books, *Little Quack* and *A Dozen Ducklings Lost and Found* by Lillie Quack. One by one, Mamia Duck manages to convince her five ducklings to leave the nest and go into the water in the pond. Students can model the events in the story using counters for the ducks on a mat that is divided in half - one side is the nest, the other side is the water. Ask students how they could represent what they have on their mat using numbers, e.g., 2 ducks in the nest and 3 ducks in the water could be 2 + 3 or 5 – 3. In *A Dozen Ducklings Lost and Found*, when Mother Duck takes her 12 babies for a walk, she counts up, "One, two, three, four," and down, "Four, three, two, one." How many of her babies are missing?

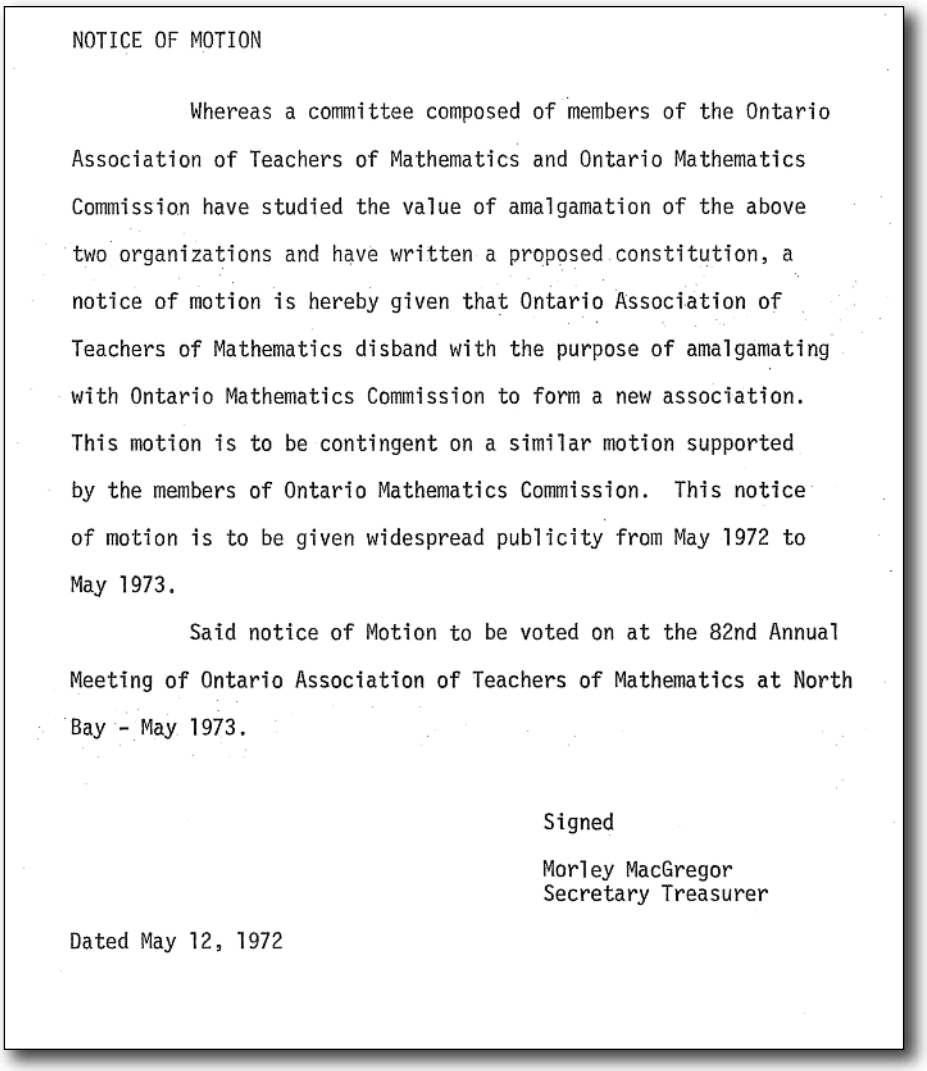
Stories about jumping such as *Boing*, naturally provide a context that allows students to use linear models to compare the lengths of jump. For example, the frog and the rabbit try to teach their friend the baby kangaroo how to jump. The rabbit jumped 840 cm. The rabbit jumped 300 cm. What is the difference? How far can you jump?

To learn about subtraction as comparison, the book, *How Many Blue Birds Flew Away?* explicitly draws attention to making comparisons between groups of objects. For example, in the book, questions can be asked like, How many apples are there? How many oranges are there? How many more apples than oranges are there?

▲ Recent OMCA Presidents

1987	Shirley McIntyre	East York
1988	Brendan Kelly	Halton
1989	Paul Zolis	Scarborough
1990	Ron Sauer	Waterloo
1991	Jeff Martin	Etobicoke
1992	Judy Crompton	Niagara
1993	Peter Saarimaki	Toronto
1994	Rad de Peiza	East York
1995	George Knill	Hamilton
1996	Mary Lou Kestell	Hamilton-Wentworth
1997	Mike Weirzba	Etobicoke
1998	Marg Warren	Peel
1999	Stewart Craven	TDSB
2000	Tom Steinke	Ottawa-Carleton Catholic
2001	Ruth Dawson	Halton
2002	Jay Speijer	Niagara
2003	Jay Speijer	Niagara
2004	Shelley Yearley	Trillium Lakelands
2005	Pat Milot	Niagara
2006	Mark Kolohon	Bluewater
2007	Joyce Tonner	Thames Valley
2008	Cheryl McQueen & Scott Armstrong	Thames Valley (first joint presidents)
2009	Jacqueline Hill	Durham
2010	Amy Lin	Halton
2011	Sandie Rowell	Hamilton-Wentworth
2012	Mary Fiore	Peel

▲ Notice of Motion (from the *Gazette*, Dec. 1972)



NOTICE OF MOTION

Whereas a committee composed of members of the Ontario Association of Teachers of Mathematics and Ontario Mathematics Commission have studied the value of amalgamation of the above two organizations and have written a proposed constitution, a notice of motion is hereby given that Ontario Association of Teachers of Mathematics disband with the purpose of amalgamating with Ontario Mathematics Commission to form a new association. This motion is to be contingent on a similar motion supported by the members of Ontario Mathematics Commission. This notice of motion is to be given widespread publicity from May 1972 to May 1973.

Said notice of Motion to be voted on at the 82nd Annual Meeting of Ontario Association of Teachers of Mathematics at North Bay - May 1973.

Signed

Morley MacGregor
Secretary Treasurer

Dated May 12, 1972

▲ My Year ('89-'90) as President MARY LOU KESTELL

When I was President, I thought that my thinking about mathematics education was on the cutting edge. I read all the resources I could find on good instruction in mathematics, articles and books on the brain and how children learn. I was the leader or as my 5-year old used to say, "I was the boss of the mathematicians." Imagine my surprise when I found my ideas articulated in the Centennial Issue of the Ontario Mathematics Gazette (celebrating the 100th year of mathematics educators' associations in Ontario). In 1877, Adam Muller, a mathematics teacher said, "to be successful in these mathematics exams, students must be trained to a complete independence of the mechanical rules and routines of the ordinary textbooks. … rules have their proper place ; but the pupil should be the master of the rule, not the rule the master of the pupil." In those days, I was writing about the importance of problem solving. And then I found out that mathematics teachers had, for a century, been concerned about the students owning the mathematics rather than memorizing teachers' mathematics. I wanted them to be thinking about their use of mathematics rather than following rules. Even to this day, my passion is focused on lessons where the student voice fills 80% or more of the time in mathematics class. I say to my Teacher Candidates, from OISE, "You talk, you learn. Students talk, they learn."

▲ Executive Directors



1972-1989
Morley and Mona McGregor



1989-1995
Don and Carol Attridge



1995-2001
David and Bonnie Alexander



2001-2009
Dave and Sue Hessey



2009-
Fred and Lynda Ferneyhough

Don Fraser, Most Frequent Featured Speaker at OAME Conferences.



COMMON CHAPTER EVENTS:

- *Periodically host the OAME/AOEM Annual Conference*
- *Periodically host the OMO competition*
- *Host local mini-conferences and workshops*
- *Host chapter competitions to choose teams for the OMO*

OAME/AOEM

ONTARIO ASSOCIATION FOR MATHEMATICS EDUCATION

ASSOCIATION ONTARIENNE POUR L'ENSEIGNEMENT DES MATHÉMATIQUES

ONTARIO

NWOAME

ISOMA

COMMON CHAPTER REPS RESPONSIBILITIES:

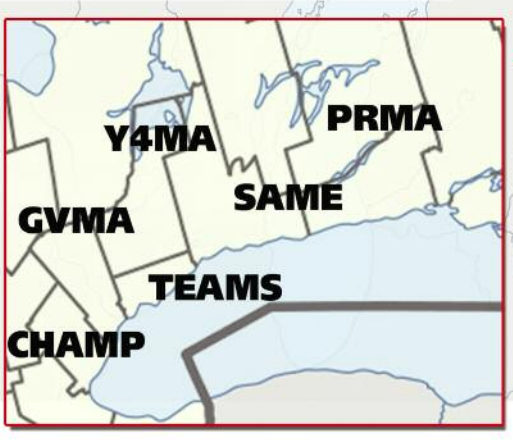
- *Represent interests of their members*
- *Attend OAME/AOEM Board meetings three times per year and provide a written report on chapter work*
- *Share information acquired at Board meetings with chapter members*
- *Serve on OAME/AOEM Board committees*
- *Promote OAME/AOEM membership and activities*

NOMA

MAC²

COMA

QSLMA



WOMA

GOLDEN

SWOAME