

MATHEMATICS KNOWLEDGE NETWORK

TERMS OF REFERENCE

1. OVERVIEW OF MATH KNOWLEDGE NETWORK

The Math Knowledge Network (MKN), hosted by the Fields Institute for Research in Mathematical Sciences (Fields) through its Centre for Mathematics Education (CME), will bring together diverse mathematics education stakeholders from across Ontario, in both official languages, to mobilize evidence from research and professional practice in mathematics education, facilitate the use of evidence-based practices for mathematics instruction to support improved educational achievement, and contribute to the *Ministry of Education's Renewed Mathematics Strategy* (RMS) in partnership with educators, researchers and organizations across Ontario.

The MKN has a four-year mandate (2016 – 2020), and the following **principles** will frame and guide its work:

1. *Addressing teacher-identified needs.* Mathematics teaching and learning needs identified by teachers will be at the core of our work by engaging teachers in reform that is personally and professionally meaningful and rewarding.
2. *Changing attitudes towards mathematics.* We will engage teachers in co-designing mathematical learning experiences for students that offer surprise and conceptual insight, and opportunities to share their learning with family, their peers, and the wider community.
3. *Fostering inclusion.* Some groups are more marginalized than others when it comes to mathematics education. We will aim to enhance learning and participation opportunities for all learners.

2. ORGANIZATIONAL STRUCTURE, PARTNERSHIPS, AND COLLABORATIONS

- The executive of MKN are all members of the CME.
- The CME has two co-directors. One of the co-directors will serve on the MKN Executive, as agreed upon by the two CME co-directors.
- The representatives of partner organizations, plus representatives from School Districts participating in the CoPs, form the MKN Advisory Panel (MKN-AP). The MKN-AP has representatives from across Ontario and individuals representing both official languages.
- The MKN-AP will include representatives from school district and community partners, including parents, once the CoPs are formed.
- MKN-AP will participate in the formation and development of CoPs, and it is expected that some of the members from MKN-AP will participate in leading or assisting the proposed CoPs, in partnership with school districts and community partners.
- Administrative oversight will be provided by a full-time Mathematics Knowledge Network Coordinator.

MKN STRUCTURE

Host: Fields Institute for Research in Mathematical Sciences (through CME)

|
Executive

George Gadanidis, Donna Kotsopoulos (MKN co-Directors)
Dragana Martinovic (CME co-Director)

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Advisory Panel

with representatives from the Partners below

School District Partners
TBA

University Partners
Brock, Lakehead, Laurentian, Laurier, Nipissing, OISE, Queen's, Trent, UOIT, Western, Windsor, York

Organizations
AECEO, AFEMO, CMS, FNMIEAO, OAME, OMCA, TVO

Community Partners
TBA

Current MKN-AP (2017):

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|--|---|
| <ul style="list-style-type: none"> • Association francophone pour l'enseignement des mathématiques en Ontario (AFEMO) • Canadian Mathematical Society (CMS) • First Nations, Métis & Inuit Education Association of Ontario (FNMIEAO) • Ontario Association for Mathematics Education (OAME) • Ontario Mathematics Coordinators Association (OMCA) • TVO • Association for Early Childhood Educators of Ontario (AECEO) | <ul style="list-style-type: none"> • Brock University • Lakehead University • Nipissing University • Queen's University • Ontario Institute for Studies in Education /University of Toronto • Wilfrid Laurier University • University of Ontario Institute of Technology (UOIT) • University of Windsor • Western University • York University • Laurentian University • Trent University |
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2.1 Identification of individuals/organizations for major tasks

- Fields, as the MKN host, will provide the infrastructure and the physical space to host the MKN and provide the financial accounting systems and oversight to manage the funding.
- The MKN co-Directors will be responsible for the administrative/leadership duties of the MKN (including coordination of MKN strategic direction, CoP formation and implementation, and interfacing with KNAER and Ministry of Education).
- The CME co-Director will oversee the interaction of the MKN with the CME and Fields (including the coordination of the capacity of the CME towards MKN goals, and the financial interactions and reporting of the MKN with Fields).
- Each CoP will also form a leadership structure.

3. COMMUNITIES OF PRACTICE (COP) will be formed in the following areas:

1. *Mathematics Leadership.* Supporting teachers/leaders to develop powerful, evidence-based models for enhancing mathematics learning and teaching.

2. *Critical Transitions in Student Mathematical Development.* Focusing on transitions proven to be challenging for students (e.g., K to Grade 1, elementary to secondary).

3. *Indigenous Knowledge and Mathematics Education.* Advancing mathematics learning for First Nations, Métis and Inuit students through the identification of effective pedagogical practices connecting existing mathematics within traditional technologies and design; exploring how and when culturally based Indigenous Knowledge and activities can be used within all classrooms.

4. *Computational Thinking in Mathematics Education.* Integrating computational thinking in mathematics instruction to facilitate conceptual development through dynamic modelling and active learning.

3.1 CoP Leadership, Membership, and Participation

Membership in the CoPs should strive to include bilingual representation from administrators and teachers from two or more partner school districts, and university partners; FNMI representation across all the CoPs ; have participation and leadership of each CoP to include school district, University and Organization partners.;

We encourage a wide range of participation: individual educators, groups of educators, schools, school districts, as well as other stakeholders, such as parents. Opportunities to engage can include: (1) sharing classroom-based knowledge mobilization related to a CoP on the mkn-rcm.ca website, (2) participation in virtual collaborations through TeachOntario, (3) access to ongoing CoP communications, and (4) other capacity building events. Funding support teachers (e.g., travel to capacity building events, teaching release, etc.) whose school districts are not immediately participating in a CoP is at the discretion of the CoP and subject to available funds.

Leadership of the CoPs is renewable annually or may follow the following time frames:

1. November 1 2016 to August 31, 2018
2. September 1, 2018 to August 31, 2019
3. September 1, 2019 to August 31, 2020

3.2 CoP Funding

Each CoP will be funded up to \$40,000 annually for four years (subject to finances and subject to annual approvals processes). Any overspending by a CoP is not the responsibility of the MKN. Additional funding may be available to each CoP, through the normal application process to the Fields Directorate for further outreach/dissemination activities. Each CoP is encouraged to

leverage funding provided through this initiative to apply for research, KM and outreach grants from research councils, foundations, and industry to support and extend the work of the CoPs. Each CoP is also encouraged to communicate with CoP partners for matching fund contributions where possible.

3.3 CoP Leadership, Annual Reports

- Each CoP will determine a leadership structure;
- Develop annual and multi-year KMb/Implementation plans, budget plans, and reports that are aligned with the MKN’s principles, the RMS, and Achieving Excellence (or other Ministry relevant initiatives); See Table 1 and Section 6;
- Establish a proposed annual budget and perform fiscal oversight of the budget (in coordination with lead organization’s financial policies for reporting).

Table 1. Annual reporting dates for CoPs.

| DUE DATE (submit to MKN Coordinator) | REPORT |
|---|--|
| March 31, 2017 | Budget and KMb/Implementation Plan (for 2016-2017) |
| July 28, 2017 | Budget and KMb/Implementation Plan (for 2017-2018) |
| September 10, 2017 | Annual Report (for 2016-2017) |
| July 28, 2018 | Budget and KMb/Implementation Plan (for 2018-2019) |
| September 10, 2018 | Annual Report (for 2017-2018) |
| July 28, 2019 | Budget and KMb/Implementation Plan (for 2019-2020) |
| September 10, 2019 | Annual Report (for 2018-2019) |

4. ACTIVITIES AND OUTPUTS OF THE MKN

The MKN will address the following priority outcomes:

1. Increased awareness, understanding, use and sharing of evidence-informed practices for mathematics by engaging teachers in co-designing mathematical learning experiences for students that offer surprise and conceptual insight, and opportunities to share their learning with family, peers, and the wider community, changing mindsets around professional learning and attitudes towards mathematics;
2. Enhanced capacity of school districts, organizations and universities in Ontario to collaborate, to access existing, as well as generate new, evidence-based knowledge that can positively impact the teaching and learning of mathematics, and efficiently meet the goals and directions of Ontario curriculum and policy;

3. Increased collaboration, partnerships, and networking between and among the Ministry, organizations, communities, networks and associated communities of practice across the education sector;
4. Improved student engagement, and equity of outcomes and well-being for marginalized students by enhancing learning and participation opportunities;
5. Advanced mathematics learning for First Nations, Métis and Inuit students, built on ways that have been identified through traditional technologies and design, as well as expanding the lens of educators to deepen their understanding of the benefits of integrating Indigenous “ways of knowing” into their practice; and
6. Sustained growth, in breadth and depth, of networks that provide evidence-based knowledge sharing to inform mathematics program, policy, and practice, based on existing and other sources of funding.

4.1 Specific Activities and Outcomes

Resource production.

1. *Actionable evidence-informed, differentiated resources.* Build on partners’ existing capacities and strengths to develop actionable resources for teachers and parents that are both creative and effective.
2. *Research Synthesis.* The goal will be to produce plain language summaries of the research that will be in an accessible form for teachers, parents, and researchers. These plain language summaries will be posted to the MKN website.

Capacity building.

3. *Networking and scaling-up.* An important role of the MKN is to network and scale-up localized knowledge and expertise that has been developed through various initiatives across Ontario.
4. *MKN-initiated institute.* The MKN will annually offer an institute for all participating members of the CoPs, including members from school district partners and members of other school districts in Ontario, with a focus on the themes of the four CoPs.
5. *MKN-AP leadership workshop.* The MKN will also offer an annual workshop for MKN-AP members immediately after the annual institute that will give MKN-AP members an opportunity to network, share and reflect on initiatives and practices, and exchange and discuss strategies and ideas for next steps.
6. *CoP led workshops.* Each CoP will annually host a day of workshops for mathematics educators and leaders, to share what has been learned along with actionable resources.
7. *Funding for expanding the work of the MKN.* The MKN will seek other sources of funding (e.g. Fields, SSHIRC, NSERC, various foundations, etc.) to expand its capacity for meeting its goals.

Web-based communication.

8. *Project website.* Our project website will serve as a hub for sharing projects and ideas among CoPs, showcasing the Network’s work, disseminating actionable resources and case stories to the wider mathematics education community in Ontario and beyond, advertising up-coming workshops and institutes, and linked to and integrating partners’ digital assets. The website will be offered in English and in French, with the latter

hosted/maintained by AFEMO (l'Association Francophone pour l'Enseignement des Mathématiques en Ontario). TVO will provide a platform for co-construction and sharing of knowledge through [TeachOntario](#).

9. *Social media*. The MKN will use social media (e.g. Twitter) to communicate with the public and all the stakeholder groups. While this approach will not necessarily reach all of our target audiences, it will allow for small and incremental updates to those that do participate.

Knowledge dissemination.

10. *Arts-informed knowledge dissemination*. Research is typically written in a style and for venues that remain largely inaccessible to the wider public and even to the practitioners who might benefit from it. Glesne (2010) suggests that to make our work accessible “to others beyond the academic community [...] means creating in forms that others will want to read, watch, or listen to, feel and learn from the representations” (p. 262).
11. *TeachOntario*. TVO’s [TeachOntario](#) will provide a platform for creating and sharing KM resources with the wider Ontario community of educators, as well as Faculty of Education teacher candidates and graduate students and their professors.
12. *Publications*. The MKN (i.e., CoP members and collaborating Advisory Panel members) will publish reports on the activities and the outcomes for a variety of target audiences including scholars, teachers and school administrators, and parents.
13. *Conferences/Presentations*. MKN (i.e., CoP members and collaborating Advisory Panel members) will collaborate to present the activities and the outcomes at a variety of venues aimed at a broad target audience to include practitioners, researchers, policy makers, parents, and community groups.
14. *Government Advocacy*. The MKN will engage with policymakers to share the work of the MKN and the evolving progress. Annually, the MKN will work with KNAER Secretariat to organize a pop-up event at Queen’s Park for MPs.

5. TIMELINES

The duration of the MKN is four years. The annual cycle for the MKN runs from September 1 to August 31. Some activities of the MKN will occur annually and others will occur semi-annually based on an academic year. The MKN Institute will occur each spring. The activities of the CoP will occur throughout the school year and sometimes in the summer as summer institutes. Annual reporting dates are outlined in Table 2 and annual reporting expectations are outlined in Section 6.

Table 2. Annual reporting dates for the MKN.

| DUE DATE (submit to MOE) | REPORT |
|---|--|
| YEAR 1 (Nov 1, 2016 - Aug 31, 2017) | |
| March 1, 2017 | Interim Network Status and Financial Update (for 2016-2017) |
| YEAR 2 (Sept 1, 2017 - Aug 31, 2018) | |
| September 1, 2017 | Network Budget and KMb/Implementation Plan (for 2017-2018) |

| DUE DATE (submit to MOE) | REPORT |
|---|--|
| October 15, 2017 | - Annual Network Report - Statement of Revenue and Expenditure Report (SRER) - Auditor's Report (for 2016-2017) |
| March 1, 2018 | Interim Network Status and Financial Update (for 2017-2018) |
| YEAR 3 (Sept 1, 2018 - Aug 31, 2019) | |
| September 1, 2018 | Network Budget and KMb/Implementation Plan (for 2018-2019) |
| October 15, 2018 | - Annual Network Report - SRER - Auditor's Report (for 2017-2018) |
| March 1, 2019 | Interim Network Status and Financial Update (for 2018-2019) |
| YEAR 4 (Sept 1, 2019 - Aug 31, 2020) | |
| September 1, 2019 | Network Budget and KMb/Implementation Plan (for 2019-2020) |
| October 15, 2019 | - Annual Network Report - SRER - Auditor's Report (for 2018-2019) |
| March 1, 2020 | Interim Network Status and Financial Update (for 2019-2020) |
| October 15, 2020 | Final Network Report |

6. EVALUATION AND REPORTING

Annually, each CoP will be required to submit a CoP KMb/Implementation Plan along with a proposed budget, which will be expected to demonstrate alignment to Ministry and MKN objectives.

Annually, each CoP will be asked to report this data in a *CoP Annual Report* that will detail the outcomes of the activities of the CoP and gauge the extent of impact. Also detailed in this report will be the budget expenditures.

The MKN will produce a MKN Implementation Plan annually. The MKN annual report will be a synthesis and compilation of the CoP annual reports and will be made available to the Ministry and for public viewing on the website.