
Connections in Mathematics Education
Connexions dans l'enseignement des mathématiques
(Org: **Roberta La Haye** (Mount Royal), **Patrick Maidorn** (Regina) and/et **Kathy Nolan** (Regina))

EGAN CHERNOFF, University of Saskatchewan
Solving equations: A make-work project for math teachers

The purpose of this session is to share, with the members of the Canadian Mathematical Society, the satirical view I have towards solving equations in the math classroom and, further, explain why I share this view with my students (prospective elementary and secondary school math teachers) each semester. Essentially, I contend (satirically) that solving equations in the math classroom is a make-work project for math teachers. For example, math teachers take a predetermined value (e.g., 2) which makes a statement ($x=2$) true and then make it harder ($x+1=2+1$) and harder ($x+1=3$) and harder ($3(x+1)=3(3)$) and harder ($3x+3=9$) for their students to determine the value that makes the statement true. However, and worthy of note, they do so with the explicit purpose of then teaching their students how to 'unmask' the solution that they themselves have 'masked'. Stated in make-work project parlance, the math teacher digs a hole with the explicit purpose of teaching students how to fill the hole they dug. Having prospective math teachers (1) recognize that no matter what type of hole they encounter (i.e., linear, quadratic, exponential, logarithmic or trigonometric equations or equations involving radicals, absolute values or fractions) the process for filling the hole is always the same (i.e., to solve an equation is to determine the value(s) that makes the statement true) and (2) dig a few holes of their own, I argue, helps them better appreciate mathematics and its numerous connections at the primary, middle and secondary school levels.

ROBERTA LA HAYE AND IRENE NAESTED, Mount Royal University
Connecting Mathematics and Art in Elementary Education

Mathematics and Visual Arts are two very different disciplines and each has its own unique goals and challenges when it comes to teaching them in the elementary education setting. The speakers are developing a course for future elementary teachers that will show them how to identify and exploit connections between Mathematics and Visual Arts to develop learning activities to enhance the understanding and appreciation of both disciplines. This talk will address why it is appropriate to link the two subjects, how it can be done and appropriate conditions for an activity to make it both an art and mathematics learning experience.

KATHLEEN NOLAN AND J. HARLEY WESTON, University of Regina
Connecting with Community: From Aboriginal Perspectives to Math on the Move

Aboriginal Perspectives and Math on the Move are two initiatives at the University of Regina that seek to connect the university mathematics community with the wider education community across Saskatchewan.

Aboriginal Perspectives in Mathematics is a two-part research project that strives to understand, and teach through, the cultures and experiences of Aboriginal students. One part of the project researches and designs several mathematics learning activities (lessons) and introduces these activities to a number of elementary mathematics teachers through one-day workshops. The second part explores teachers' perceptions of, and insights into, Aboriginal perspectives in the teaching and learning of mathematics. The project uses a narrative approach to explore teachers' successes, challenges, and insights into understanding and teaching mathematics curriculum through a distinctly Aboriginal content focus.

Math on the Move is a mobile version of the University of Regina math camp. Students from the Faculty of Education develop inquiry based mathematics activities at the grades 9 and/or 10 levels and then deliver them in schools across the province. School visits last half a day and involve working with the high school students in two 1-hour blocks of time, followed by a closing activity such as a math relay or a math Olympics.

In this session, the two Faculty members initiating these projects (one from the Faculty of Education and one from the Department of Mathematics and Statistics at the University of Regina) will describe each of the projects and provide the

audience with example activities and initial results from the research.

GALE RUSSELL, University of Saskatchewan

Mathematics Education through the Eyes of Two Worldviews – Possibility, Impacts, and Barriers

Drawing from scholarship within the fields of ethnomathematics, culturally responsive mathematics education, and Indigenous studies, this presentation explores epistemological questions and ideas related to both mathematics and the teaching and learning of mathematics. In particular, two theoretical lenses are used to ‘view’ mathematical knowledge, and the sharing and creating of that knowledge: the traditional Western worldview and an Indigenous worldview. This discussion of what knowledge is valued and how knowledge is to be obtained as seen through these two theoretical lenses reveals an approach to the teaching and learning of mathematics which has the potential to step beyond the dichotomy of the traditional and reform approaches that are at the foundation of the ongoing math wars. Within this transform approach to the teaching and learning of mathematics, there is also the potential for the removal of barriers which have marginalized so many of our Canadian students, and in particular those of First Nations, Métis and Inuit descent. Finally, in recognition of the theoretical basis of this presentation, potential barriers to the embracing of this approach will also be considered and entertained.

RICK SEAMAN, University of Regina

Talking about Connections

The goal of the Western and Northern Canadian Protocol: The Common Curriculum Framework for Mathematics K-12 is that students regularly encounter mathematical processes when learning mathematics. The seven mathematical processes considered are Connections, Communication, Mental Mathematics and Estimation, Problem Solving, Reasoning, Technology and Visualization.

Although, the mathematical processes are interrelated my starting point will be Connections where I will connect ideas to real-world phenomena in teaching mathematics. These connections are intended to help develop a view of mathematics as useful, relevant and connected to other areas of study, rather than just formulae to be memorized for the next exam.

ALYSON WORRALL, University of Lethbridge

Incorporating Children’s Literature in the Mathematics Classroom

Books written for children should not be restricted to their traditional place in a Language Arts program. In this session, I will present a number of ways in which these books— those purposefully written for use in Mathematics and others, such as folk tales—can be used to support learning outcomes in provincial programs of study for Mathematics. What makes a good book for use in Mathematics? What activities can be built around such books? What cross-curricular connections can be forged through the use of children’s books in Mathematics? These are some of the questions that will be addressed during the session.

This session has been presented to undergraduate education students at the University of Lethbridge as part of the Faculty of Education annual literature fair, and using children’s literature in the Mathematics classroom is part of an undergraduate course in curriculum methods that I teach to pre-service education students who have little to no Mathematics background. While the focus will be on K-9 classrooms, I will also make suggestions for how literature can be used in the senior high Mathematics classroom. Communication is a vital process in Mathematics and having students talk about Mathematics and appreciate that it is not an isolated subject are some of the benefits of using children’s literature in Mathematics.

CAROL YOUNCK-COUSINS AND DONNA ELL,

Puzzling it Out

Puzzling it Out by Carol Youck-Cousins (K-12 Mathematics Consultant for the Prairie Valley School Division), carol.youck-cousins@pvsd.ca, and Donna Ell (Secondary Mathematics Teacher at Miller Comprehensive High School), ell@sasktel.net.

Puzzling it Out is a unit designed to connect to curriculum outcomes from the Workplace and Apprenticeship Mathematics 10 and 20 and the Foundations of Mathematics 20 courses. In addition, the potential exists to modify and adapt this unit to be

utilized in any mathematics class where teachers are exploring metacognitive problem solving strategies.

The purpose of this unit is to provide an opportunity for teachers and their students to explore the connections between the mathematics of familiar problem solving strategies and how this mathematics can be applied in a less than traditional presentation of playing games or solving puzzles. Therefore, this unit enhances teaching and learning through inquiry and provides classroom-ready resources.

Puzzling it out connects, enhances and celebrates diversity in the classroom. This unit supports differences in ways of knowing and understanding mathematics. The mathematical learning opportunities presented in this unit are presented with a holistic focus. Constructivism, ethnomathematics, and teaching through an inquiry approach support this holistic perspective to learning. This unit allows teachers to create an engaging mathematics environment that supports and meets the needs of culturally and linguistically diverse learners.

The Puzzling it Out unit connects the classroom to the community by inviting community members with cultural gaming and puzzling expertise to come and share their mathematical reasoning and problem-solving strategies with the students.