

ED 6634. Teaching and Learning to Solve Mathematical Problems. Summer 2007

Classroom: ED 4010

Time: Tuesday and Thursday 8:30 - 11:30 am

Instructor: Dr. Margo Kondratieva

Email: mkondra@math.mun.ca

Office: ED 4025

Phone: 737-4541 or 737-8074

web page: <http://www.math.mun.ca/mkondra>

Intents.

Mathematics curriculum for grades K-12 in the Atlantic Canada and North America identifies problem solving as an integral part of all mathematics learning. This opinion is shared by many research mathematicians and pedagogs. The intent of this course is to reflect on and expand our understanding of the nature and role of problem solving in learning mathematics. Specifically we will be focusing on how as teachers we might help our students to learn mathematics through problem solving. Perhaps the most important point is that learner must be active. *To understand mathematics means to be able to solve mathematical problems.* We will focus on problem solving strategies and approaches combined with many examples as well some ideas for prompts and questions to enhance mathematical thinking.

This is a reading, working, and discussion based class. Students must be prepared to take leadership roles with questions, suggestions, and organization for discussion.

Required Resources.

G.Polya. (2004). How to solve it. A new aspect of mathematical method. With a new foreword by John H. Conway. Princeton University Press. Princeton and Oxford.

Handouts.

A selection of reading and sample problem solving materials will be distributed in class.

Course Assignments and Marking Schema.

Due Date	task	weight
on going	class participation	10%
bi-weekly (July 5, 19, Aug 2)	book of change	20%
as scheduled in class (July 19, 24, 26, 31)	group presentations	30%
Aug 2	individual paper	40%

Class Participation.

You are asked to participate in shared readings, problem solving activities, and discussions.

Book of Change.

Even if you have had a great deal of experience doing mathematics and solving mathematical problems the depth of awareness that is required for teaching others to do mathematics and to solve mathematical problems is significant. The three-leveled awareness, namely,

1. to perform yourself (awareness-in-action),
2. to articulate and formalize your performance (awareness-in-discipline), and
3. to be sensitive to what others require in order to build those skills (awareness-in-counsel),

is essential for you as mathematics teacher and it distinguishes you from others.

In this course you will be expected to engage in many mathematics tasks and work on many mathematics problems. The purpose of the Book of Change is to collect, document, and build up your awareness at all three levels.

Group Presentation.

You are asked to prepare a presentation of the readings that will be assigned and lead a class discussion on that topic. The purpose of the class presentation is to offer an opportunity for each class member to guide a class discussion. This activity is offered as one way to encourage you to develop comfort and skill in summarizing key ideas, identify key questions for discussion, and engage class participants in some activities that are relevant to the topic. You are also asked to prepare a handout (2 typed pages) including key ideas and guiding questions for each class member.

Each group (2 students) will be given up to 80 minutes for the presentation.

A presentation schedule will be negotiated in class.

Individual Paper.

As a major assignment you are asked to write a paper (approximately 10 double-spaced pages) on any topic related to problem solving in mathematics. The paper might be a review of literature on mathematics problem solving or review of a book on mathematics problem solving or any topic related to the course intent. The paper must contain a **sample problem solving activity** (preferably relevant to your teaching) placed in the context of your general review and discussion.

Please discuss with me once you have decided what you would like to do for the assignment.