

The CENTRE for EDUCATION
in MATHEMATICS and COMPUTING
Faculty of Mathematics
University of Waterloo
200 University Ave. W.
Waterloo, ON, Canada N2L 3G1



www.cemc.uwaterloo.ca

Le CENTRE d'ÉDUCATION
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Université de Waterloo
200, avenue Université Ouest
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3-DAY ANNUAL SUMMER CONFERENCE for GRADES 9 to 12 MATHEMATICS TEACHERS

The CEMC at the University of Waterloo provides professional development opportunities for mathematics teachers. Our programs respond to the need for practical and enrichment information that can be implemented immediately in the classroom. This August, we offer a three-day conference, with focus on curriculum, extensions and enrichment aimed at university preparation.

The sessions on curriculum will focus on problem solving at the academic level. This conference will increase your tools and skills and enhance your teaching of mathematics.

While the curriculum sessions are directed specifically at teachers from Ontario, teachers from any province or country will benefit. This conference attracts teachers from all over the world and offers an excellent opportunity to meet and exchange ideas. Teachers should have some previous teaching experience in an elementary or high school.

Whatever your personal, professional or mathematical goals, our conference can give you the edge you want.

Tuesday, August 21 to Thursday August 23, 2018

(Limited enrolment so it is better to register early)

Participant cost of \$180 includes accommodation, meals, conference materials, and harmonized sales tax (HST)

Participation is restricted to two teachers per school

Accommodation in a dormitory room is provided at no additional cost, if needed

Registration Now Open!

Follow the link <http://www.cemc.uwaterloo.ca/events/mathteachers.html> to register online

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Grades 9 to 12 Program

- Dates:** Starting Tuesday August 21 at 8:45 am, ending Thursday August 23, 2018 at 1:30 pm
- Location:** Mathematics and Computing Building, University of Waterloo
- Program:** The conference will help to supplement your teaching of mathematics on problem solving and provide some new resources and teaching strategies.

Monday, Aug. 20	Activity
3:00 pm – 8:00 pm	Early Registration in St. Paul's University College (SPC)
5:00 pm – 6:00 pm	Dinner in St. Paul's University College (SPC)
9:00 pm – 10:30 pm	Pizza and refreshments in Watson's Eatery at St. Paul's University College (SPC)
Tuesday, Aug. 21	
7:30 am – 8:45 am	Registration and Breakfast in St. Paul's University College (SPC)
8:45 am – 9:45 am	Meet and Greet. <i>Dean Murray</i> About the CEMC. <i>Ian VanderBurgh</i>
10:00 am – 11:30 am	Session 1: Integrating Problem Solving in Grades 9 and 10. <i>Jason Van Rooyen</i>
11:30 – 12:30 pm	Lunch in the Mathematics and Computing Building (MC)
12:30 pm – 2:00 pm	Session 2: Creating a Classroom of Thinkers. <i>Michael Jacobs</i>
2:15 pm – 3:15 pm	Session 3: Engaging Grade 9 Math Students. <i>Sunita Botha</i>
3:30 pm – 4:30 pm	Session 4: Describing Artichoke Spirals and Counting Honey Bees. <i>J.P. Pretti</i>
5:15 pm – 6:30 pm	Dinner in St. Paul's University College (SPC)
5:15 pm – 8:00 pm	Centre for Education in Mathematics and Computing (CEMC) and Grand Valley Mathematics Association (GVMA) teacher resources available for purchase.
6:30 pm – 7:30 pm	Campus Tour beginning from the front foyer of St. Paul's University College (SPC)
7:30 pm – 10:30 pm	Games, Hospitality, and Refreshments
Wednesday, Aug. 22	
7:30 am – 8:30 am	Breakfast in St. Paul's University College (SPC)
8:45 am – 10:15 am	Session 5: Making Math Stick and Increasing Perseverance. <i>Sheri Hill, Lindsay Kueh</i>
10:30 am – noon	Session 6: Complex Numbers for Secondary Students. <i>Rich Dlin</i>
Noon – 12:45 pm	Lunch in the Mathematics and Computing Building (MC)
1:00 pm – 2:00 pm	Session 7: What is Mathematics? <i>Christine Ruza</i>
2:15 pm – 3:15 pm	Session 8: Area Models for the Intermediate Learner. <i>Marcel te Bokkel</i>
3:30 pm – 4:30 pm	Session 9: Metamobius Surfaces - the greater reality of one-sidedness. <i>Ted Gibbons</i>
6:00 pm – 9:00 pm	Banquet in Federation Hall (FED)
Thursday, Aug. 23	
7:30 am – 8:30 am	Breakfast in St. Paul's University College (SPC)
8:45 am – 9:45 am	Session 10: Blended Learning in the Math Classroom. <i>Shane Restall</i>
10:00 am – 11:00 am	Session 11: Problem Solving Inside and Outside the Classroom. <i>Ian VanderBurgh</i>
11:15 pm – 12:30 pm	Session 12: Mind the Gaps. <i>Michael Jacobs</i>
12:30 pm	Session 13: Wrap-up. Resource Sharing. Final Thoughts.
12:35 pm	Hot Lunch in the Mathematics and Computing Building (MC)

Register, view program online, by visiting <http://www.cemc.uwaterloo.ca/events/mathteachers.html>

Registration Fee: \$180, per registrant. This includes three meals each day (breakfast, lunch and dinner) and accommodation in a dormitory room, if required.



Synopses of Sessions for Math Teachers' Conference – Grades 9 to 12 Teachers

Session 1:

Integrating Problem Solving in Grades 9 and 10.

Jason Van Rooyen

This session will examine the when, where and how of using problem solving in grades 9 and 10. A wide variety of problems will be examined and discussed, with varying levels of difficulty.

Session 2:

Creating a Classroom of Thinkers.

Michael Jacobs

Over the course of my teaching career I have always wanted my students to develop the same love of mathematics that I have. In doing so, I realize that there have been certain strategies that have helped my students develop their thinking and reasoning skills and as a result have got them to love Math. In this session, Michael presents a cornucopia of these strategies that he has used with high school students.

Session 3:

Engaging Grade 9 Math Students.

Sunita Botha

In this session, we will explore classroom proven strategies and activities that can be integrated into your grade 9 program to advance mathematical discussion, develop more positive attitudes and improve student understanding and engagement.

Session 4:

Describing Artichoke Spirals and Counting Honey Bees.

J.P. Pretti

The Fibonacci sequence of numbers is famous for its mathematical properties and occurrence in nature. How can we calculate the n -th Fibonacci number and why might this be important? In this session, we will explore algorithms for determining a particular Fibonacci number. We will walk in assuming no prior knowledge and walk out having learned some fascinating mathematics and computer science. Ideas for exploring this topic and its real-world applications in a high school classroom will also be presented and discussed.

Session 5

Making Math Stick and Increasing Perseverance.

Sheri Hill, Lindsay Kueh

Have you ever wondered why students forget everything after they write the test? The team of grade 10 academic math teachers at Craig Kielburger Secondary School has piloted a new way of teaching and evaluating. Unit tests were removed; weekly cumulative quizzes and thinking assignments were implemented, along with cumulative homework. Three main goals were to attack deficiencies in basic skill development, increase retention of learned skills, and increase problem solving ability. The teachers found students were more comfortable with mixing concepts from various topics, and they had more time to focus on problem solving, games, and rich activities.



Session 6:

Complex Numbers for Secondary Students.

Rich Dlin

Complex Numbers are just too cool to be left out of high school! This session covers the complex number system using secondary school level mathematics, and shows how the beauty of complex numbers is definitely attainable for secondary school students. Whether you are involved in your school's enrichment program, or just plain awesome, this session will have something for you.

Session 7:

What is Mathematics?

Christine Ruza

Explore the many sides of math and what it means to "do math". Join in the fun as we discover through a set of intriguing problems how math connects language, logic, pattern-seeking, problem-solving and more. Ways to challenge our students', and our own, preconceptions of what math is will be presented.

Session 8:

Area Models for the Intermediate Learner.

Marcel te Bokkel

Visual representations play a critical role in opening access to understanding for all students. In this session, we will explore the use of area models to build algebraic thinking for the high school student. Area models are used to help students better visualize what is happening in a problem - creating a conceptual understanding of often abstract problems. We will examine some teaching strategies, use some manipulatives and discuss some resources.

Session 9:

Metamobius Surfaces - the greater reality of one-sidedness.

Ted Gibbons

Since its discovery 170 years ago, one-sidedness has been relegated to variations on the Mobius strip and the Klein bottle. Ted has broken this barrier with his creation of the Metamobius Process, which generates an almost endless series of fascinating one-sided surfaces that are fundamental to defining the greater reality of one-sided geometry - metamobius surfaces. And because of their intrinsic beauty, these surfaces have even become a geometric art form. Ted will present a delightful, fun-filled overview of one-sidedness, including metamobius models and his creation of a one-sided grammatical structure! He will then lead an interactive workshop where participants can learn the simple basics of the Metamobius Process to create their own metamobius surfaces.



Session 10: Blended Learning in the Math Classroom.

Shane Restall

As a math teacher in 2018, you undoubtedly use technology to enhance your classroom. Is that Blended Learning? We will discuss possible definitions for Blended Learning and address advantages and challenges of using a Blended Learning environment. Popular tools and resources will be presented along with personal experiences and relevant research surrounding the efficacy of the Blended Learning model.

Session 11:

Problem Solving Inside and Outside the Classroom.

Ian VanderBurgh

In this session, we will solve some problems and talk about problem solving, both as curriculum and as enrichment.

Session 12:

Mind the Gaps.

Michael Jacobs

It is very common for students coming into Grade 9 to have gaps in their knowledge. However, sometimes these misconceptions have gone unnoticed by both teachers and students. Together we will look at some tried and tested diagnostics that will expose these misconceptions. We will look at why such misconceptions occur and what we can do to rectify them thus easing the transition from Grade 8 to Grade 9.