UNIVERSITY OF WATERLOO | The CENTRE for EDUCATION in MATHEMATICS and COMPUTING

Summer Conference for Computer Studies and Mathematics Educators
Session Information – Mathematics

Gr 7/8: Sessions designed for educators teaching Grades 7 and 8
Gr 9-12: Sessions designed for educators teaching Grades 9-12
All: Sessions designed for all educators

Date and Time	Activity	Mathematics
Tuesday, August 12		
9:00 a.m. - 10:30 a.m.	Welcome	*Think Think Think!* by Mark Modolo
10:45 a.m. - 12:15 p.m.	Session 1	**Gr 7/8** *Computational Thinking in the Math Class* by J.P. Pretti or **Gr 9-12** *Problem Solving in a Secondary Class* by Ian VanderBurgh
1:15 p.m. - 2:45 p.m.	Session 2	**Gr 7/8** *Introducing Desmos Classroom for Grade 7 and 8 Math Classes* by David Petro or **Gr 9-12** *Exploring Engagement in Math Class* by Brian McBain
3:00 p.m. - 4:30 p.m.	Session 3	**Gr 7/8** *Supporting Reasoning in Intermediate Math* by Paul Alves or **Gr 9-12** *Creating Activities with Desmos Classroom* by David Petro or **All** *UW Math Trail* by Rob Gleeson

Date and Time	Activity	Mathematics
Wednesday, August 13		
9:00 a.m. - 10:30 a.m.	Session 4	**Gr 7/8** *Reaching All Students: How Do Open Questions Work?* (double session) by Marian Small or **Gr 9-12** *Creating a Positive Math Environment* by Angela Kurmey or **Gr 9-12** *Space for All: Inspiring Learners to Practice Math Skills with 2025 Space Events using Desmos Activity Builder* by Carly Ziniuk
10:45 a.m. - 12:15 p.m.	Session 5	**Gr 7/8** *Creating Open Questions* (second part of double session) by Marian Small or **Gr 9-12** *Observations and Conversations* by Carmen Sinatra or **Gr 9-12** *Exploring the Intersection of Mathematics, Art, and Nature* by Sherri Hill and Amanda Zammit
1:15 p.m. - 2:45 p.m.	Session 6	**Gr 7/8** *Building Fraction Sense: Scaffolded Thinking Through Problem Solving* by Tali Amar or **Gr 7/8** *Making Math Come to Life with Coding* (double session) by Sherri Hill and Nathan Rowbottom or **Gr 9-12** *Reaching All Students: How Do Open Questions Work?* (double session) by Marian Small
3:00 p.m. - 4:30 p.m.	Session 7	**Gr 7/8** *Making Math Come to Life with Coding* (second part of double session) by Sherri Hill and Nathan Rowbottom or **Gr 7/8** *How to teach problem solving -BCC & Gauss - using CEMC resources* by Gerry Lewis or **Gr 9-12** *Creating Open Questions* (Second part of double session) by Marian Small

Date and Time	Activity	Mathematics
Thursday, August 14		
9:00 a.m. - 10:30 a.m.	Session 8	**Gr 7/8** *Making Math Tangible: Engaging Students with Manipulatives and Games* by Michaela Crowson or **Gr 9-12** *Financial Math Literacy Test* by Carly Ziniuk and Pauline Martin or **All** *Level Up your Thinking Classroom Routines* by Jamie Mitchell
10:45 a.m. - 12:15 p.m.	Session 9	**Gr 7/8** *Math without Worksheets* by Kelly Cullen or **Gr 9-12** *Engaging students with paradox* by Rich Dlin or **All** *Supporting Struggling Learners: Universal Design for Learning Principals (UDL) in Math* by Erika Mark

Session Details:

Welcome Address

Think, Think, Think!
At the heart of math and computer science is the joy of solving tough problems and discovering new insights. Problem-solving isn't just about the answer, but the process: understanding the problem, making connections, and rethinking approaches when needed. This requires creativity, fresh perspectives, and sometimes patience. The greater the struggle, the sweeter the breakthrough. In this session, we'll shift the focus to our teaching: How can we apply these problem-solving habits to overcome classroom challenges—both delightfully intellectual and undeniably practical? We'll explore how to approach teaching with curiosity, rethink strategies when things don't go as planned, and create joyful learning experiences, with some time for percolation, too.

Session 1

Gr 7/8: Computational Thinking in the Math Class
There is a push to incorporate computer science in math courses. This session will explore using computational thinking problems, with interactive examples successfully used with students. These examples are computer language-independent, focus on real-world applications, and include interactive apps to boost engagement and discovery.

Gr 9-12: Problem Solving in a Secondary Class
In this session, we will solve a variety of problems and engage in discussions about problem solving, examining it both as an essential component of the curriculum and as a valuable tool for enrichment and extension activities. We will explore different approaches, strategies, and techniques for solving problems, while also encouraging teachers to consider how problem solving can be integrated

effectively into their classroom instruction to enhance critical thinking, creativity, and deeper understanding among students.

Session 2

Gr 7/8: Introducing Desmos Classroom for Grade 7 and 8 Math Classes
Desmos Classroom is a powerful, free tool for running math activities that promotes communication, lets you monitor student work, and helps you explore their thinking with ease. This session introduces ready-made lessons for grades 7 and 8, shows how to use the teacher dashboard, and more. Bring a laptop, Chromebook, or tablet for the best experience.

Gr 9-12: Exploring Engagement in Math Class
Are you looking for new ways to engage your students and make math class their favorite part of the day? Imagine your students eagerly looking forward to math class, excited about what they will learn and do. In this session, you'll participate in a variety of activities designed to increase excitement and make math more engaging. You'll walk away with practical tools and ideas that you can easily implement in your classroom.

Session 3

Gr 7/8 Supporting Reasoning in Intermediate Math
A growing body of research indicates that students with a strong foundation in spatial reasoning benefit in their mathematical understanding as they progress through their education. In this session, we will explore a learning trajectory that supports numeracy and algebraic reasoning by building upon spatial understanding. Additionally, we will examine strategies such as puzzles and games that foster student confidence, engagement, and number sense.

Gr 9-12 Creating Activities with Desmos Classroom
Have you ever used a premade Desmos activity and thought it could be improved? This session shows you how to create custom Desmos activities from scratch, adding graphs, open responses, multiple choice, Polypads, and more to build interactive math slideshows. You'll also learn to edit existing activities and use basic coding with Computation Layer(Desmos' custom coding language). Bring a laptop or tablet, as this can't be done easily on a phone.

All UW Math Trail
A Math trail invites students to view the world while thinking mathematically and getting a little fresh air. Students follow a planned route and answer a set of questions, create mathematical questions related to what they encounter, or capture images of mathematical concepts that could be explored later in class. Through experiences like these, students are given a chance to connect the mathematics curriculum to many subjects including art, design, architecture, science, geography and history.

Session 4

Gr 7/8 Reaching All Students: How Do Open Questions Work? (double session)
We will explore how Grade 7/8 teachers can use more open-ended questions not only to better meet the goals of the curriculum, but to reach a broader range of students. The right open questions can, at the same time, be accessible to those who sometimes struggle, but can better challenge those who are able to do more.

Gr 9-12 Creating a Positive Math Environment
In this session, participants will look at the facets of a positive math learning environment. We will explore how to create a space where students collaborate, feel comfortable making mistakes, and see themselves as capable problem solvers. Participants will engage in thinking tasks and math conversations.

Gr 9-12 Space for All: Inspiring Learners to Practice Math Skills with 2025 Space Events using Desmos Activity Builder
2025 is a big year for space enthusiasts! As a NASA Space Apps Navigator and teacher, I use exciting 2025 astronomical events to engage students and boost math skills. Learn to create and adapt lessons using Desmos Activity Builder, with activities linked to Artemis II, the Lunar Gateway, Canadarm, and Canada's role in the OSIRIS-REx mission. Explore how cultures organize themselves astronomically and mathematically through their calendars.

Session 5

Gr 7/8 Creating Open Questions (second part of double session)
There will be opportunities for Grades 9 – 12 teachers to build their own open questions with the support of colleagues and the support of the session speaker.

Gr 9-12 Observations and Conversations
Conversations & Observations are all the rage, but how do we track them, grade them, and keep it manageable? In this session, I'll share practical strategies my department uses to effectively incorporate conversations and observations. You'll leave with tools to create your own "Conversation & Observation day" that works for you and your students.

Gr 9-12 Exploring the Intersection of Mathematics, Art, and Nature
Explore how Desmos Art Assignments blend math concepts with artistic expression to enhance creativity, exploration, and deeper learning. Through project-based learning, students strengthen their connection to math and the world around them, making it interactive, personal, and creative. This process-centered approach helps students build problem-solving skills, refine ideas, and appreciate math as both art and discovery.

Session 6

Gr 7/8 Building Fraction Sense: Scaffolded Thinking Through Problem Solving
Understanding fractions deeply is essential for mathematical flexibility, but many students struggle beyond basic procedures. This session focuses on scaffolding fractional thinking through problem-solving to build conceptual understanding. Participants will explore rich tasks, strategies to support students, and ways to connect fractions to broader concepts. Through activities and discussions, educators will gain practical approaches to help students understand fractions meaningfully.

Gr 7/8 Making Math Come to Life with Coding (double session)
Coding is now part of Ontario's Grade 9 math curriculum, but why stop there? Integrating it throughout the course helps students explore, visualize and engage with math in exciting ways. Feeling overwhelmed? Don't worry! This double session offers ready-to-use activities that connect

coding to math, even for beginners. You'll have time to experiment and build confidence, making it easy to bring coding into your classroom. Discover how coding can make math more interactive, creative, and fun—no experience required!

Gr 9-12 Reaching All Students: How Do Open Questions Work? (double session)
We will explore how Grade 9- 12 teachers can use more open-ended questions not only to better meet the goals of the curriculum, but to reach a broader range of students. The right open questions can, at the same time, be accessible to those who sometimes struggle, but can better challenge those who are able to do more.

Session 7

Gr 7/8 Making Math Come to Life with Coding (second part of double session)

Gr 7/8 How to teach problem solving - BCC & Gauss - using CEMC resources
Math problems require a variety of strategies to understand, plan, and solve them. This session will help build a teacher's toolbox of strategies to help students navigate challenging tasks. We will cover how to find problems from CEMC Problem of the Week and past Gauss contests, how to incorporate Thinking Classroom pedagogies to make these strategies visible, and how to provide meaningful feedback to students when they're approaching problems in different ways.

Gr 9-12 Creating Open Questions (second part of double session)

Session 8

Gr 7/8 Making Math Tangible: Engaging Students with Manipulatives and Games
This hands-on workshop explores the power of manipulatives and games in the middle and high school math classroom. Discover practical strategies to deepen conceptual understanding, enhance problem-solving skills, and increase student engagement. Participants will have the opportunity to play games, experiment with manipulatives, and leave with ready-to-use ideas for their own classrooms.

Gr 9-12 Financial Math Literacy Test
This workshop focuses on Ontario's K-9 Math Curriculum, incorporating Financial Literacy. Participants will review curriculum outcomes, select resources for the upcoming school year, and explore materials from CEMC Courseware, OAME, TVO, and Desmos activities. You'll also review preparation materials for the Nova Scotia 10 Provincial Math Exam: Financial Math. Learn to use Desmos Teacher Mode (with Computation Layer) for student feedback, and create practical activities for students at any level. While the focus is on Grades 7-9 Mathematics curriculum content, the content can be adapted for higher-level courses and adjusted based on student self-assessment.

All Level Up your Thinking Classroom Routines
This session will explore how thoughtfully crafted, hands-on math lessons can foster deeper student engagement and critical thinking. Using an inquiry-based approach, we'll delve into strategies for building a Thinking Classroom environment where students are empowered to collaborate, explore, and drive their own learning. We'll discuss practical ways to integrate problem-solving, student agency, and real-world relevance, creating an atmosphere where mathematical thinking flourishes.

Participants will leave with concrete strategies and ideas for using inquiry-based approaches to make math more engaging and meaningful for every student.

Session 9

Gr 7/8 Math without Worksheets

Picture walking into your classroom and the room abuzz with chatter about the lesson. Students throughout the room are using materials to make physical and meaningful connections to math concepts. During this workshop, we will explore implementing rich math tasks into the classroom without the need for a worksheet. We'll learn how to document student thinking through oral conversations and observations and discover tools to enrich mathematical understanding.

Gr 9-12 Engaging students with paradox

From Ancient Greece to Lewis Carroll, intellectuals have been testing the faults in mathematics and logic for centuries, if not millenia. The very nature of paradox promotes deeper inspection, making it a valuable tool for learning. Intriguing, yet accessible, paradoxes that are embedded in the high school curriculum will be explored. Strategies on how one can use these to engage students, promote deeper understanding, and ultimately to either resolve the paradox, or else revel in the sweet logic of its existence will be discussed.

All Supporting Struggling Learners: Universal Design for Learning Principals (UDL) in Math

In this session, participants will explore a variety of strategies, manipulative tools, and digital resources that can support student engagement, enhance understanding, and facilitate meaningful expression of their learning. Opportunity will be given to engage with hands-on activities, experiment with innovative technologies, and discuss practical applications that can be integrated into diverse learning environments. Additionally, participants will reflect on how to adapt to meet the needs of all learners, fostering a more inclusive and dynamic educational experience.