

## CEMC: Bringing Teachers Together Virtually Tuesday, August 16 – Thursday, August 18 Conference Schedule (subject to change)

Note that there are two time slots each day. Each time slot will have three parallel sessions running live. The sessions will be related to one of:

- Grade 7/8 Mathematics
- High School Mathematics, or
- Computer Science/Technology.

All sessions will run for approximately 1 hour. They will be recorded and made available online afterwards.

*Note: All times are Eastern Daylight Savings Time (Waterloo, ON)*

| Tuesday, August 16 |   |  |  |
|--------------------|---|--|--|
| Session Time       | Grade 7/8 Math  | High School Math   | Computer Science/Technology  |
| 4:30 p.m.          | <a href="#">Mathematical Modelling (Grade 4 - 9)</a><br><br><i>Presenters: Gerard Lewis, Catherine Dias</i> | <a href="#">Integrating Problem Solving in Grades 9 and 10</a><br><br><i>Presenter: Jason Van Rooyen</i> | <a href="#">Physical Computing Options with Python</a><br><br><i>Presenter: Grant Hutchison</i>                                |
| 7:30 p.m.          | <a href="#">Giving Choice in Assessment</a><br><br><i>Presenter: Carly Ziniuk</i>                           | <a href="#">The Course Everyone Should Take</a><br><br><i>Presenter: Lindsay Parchimowicz</i>            | <a href="#">Creating Self-Paced, Blended, and Mastery-Based Computer Science Courses</a><br><br><i>Presenter: Sarah Strong</i> |

**Wednesday, August 17**

| Session Time | Grade 7/8 Math   | High School Math  | Computer Science/ Technology   |
|--------------|--|---|--|
| 4:30 p.m.    | <a href="#">Selected Topics in the History of Mathematics</a><br><i>Presenters: Marcel TeBokkel, Avital Amar</i> | <a href="#">Let's Give Them Something to Talk About</a><br><i>Presenter: Ellen Thompson</i> | <a href="#">Data Representation</a><br><i>Presenter: Sandy Graham</i>  |
| 7:30 p.m.    | <a href="#">Experience First, Formalize Later</a><br><i>Presenter: Lam Nguyen</i>                                | <a href="#">Coding in MTH1W – Read, Alter, Write</a><br><i>Presenter: Marcel TeBokkel</i>   | <a href="#">Minecraft Education Edition Modding: An Introduction to Game Design</a><br><i>Presenter: Keith Smith</i> |

**Thursday, August 18**

| Session Time | Grade 7/8 Math   | High School Math  | Computer Science/Technology   |
|--------------|--|---|---|
| 4:30 p.m.    | <a href="#">Demystifying Solving Equations</a><br><i>Presenter: David Petro</i>  | <a href="#">Math Acknowledgement</a><br><i>Presenters: Amy Scales, Patsy Day</i>            | <a href="#">Bring Back Fun: Reclaiming Your Robots in a Renewed Classroom</a><br><i>Presenter: Mike Washburn</i>              |
| 7:30 p.m.    | <a href="#">Virtual Coding and Robotics in the Elementary Classroom</a><br><i>Presenters: Michael Frankfort, Michael Minchella</i> | <a href="#">Using GeoGebra to Enhance Your Presentations</a><br><i>Presenter: Rich Dlin</i> | <a href="#">A Curriculum for Meaningful &amp; Creative Learning in Computing with Comics</a><br><i>Presenters: Sangho Suh</i> |

## Session Descriptions:

### Grade 7/8 Math Sessions

#### **Mathematical Modelling**

*Presenters: Gerard Lewis, Catherine Dias*

Even though many teachers are familiar with using representations to model mathematics, few teachers have led students through the journey of mathematical modeling, even though it is a required expectation in the Grades 1-8 Curricula (C4) and MTH1W Curriculum (D2). In this session, we will spend time exploring what mathematical modeling means, co-creating examples of inquiries that could be led in the classroom, and walking through student artifacts from our experience with a Grade 4-5 class and a Grade 8 class. We will also peruse some of the lesson ideas present in Neil Casey's *Juicy Math* and the OAME Math Support website.

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#### **Giving Choice in Assessment**

*Presenter: Carly Ziniuk*

Using Padlets, playlists, and portfolios to give students choice for how to express their understanding of Mathematical concepts. The goal of this session is to find sample pieces to springboard into your own classroom(s)!

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#### **Selected Topics in the History of Mathematics**

*Presenters: Marcel TeBokkel, Avital Amar*

The aim of this session is to give consideration to the mathematics of several different cultures and civilizations over time. We will consider problems that typify the work and explore several using the procedures of that time.

**Experience First, Formalize Later**

*Presenter: Lam Nguyen*

Often, mathematics learning is viewed as a linear process where basic skills and notation (formal) are required before accessing more complex concepts and thinking processes (experience). This can create barriers to entry for learning. The pandemic and virtual learning environments has enabled us to examine accessibility and entry points to engaging with, thinking and learning about mathematics. A model where learners can jump right into mathematical thinking and experience the concepts has been effective this past year in engaging learners. This session explores strategies for this model for teaching concepts closely connected to curriculum outcomes and topics.

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**Demystifying Solving Equations**

*Presenter: David Petro*

Let's demystify solving equations. If students only know how to mechanically use the balance method to solve equations, they often lose sight of what finding the solution actually means. In this session we focus on visualizing equations and the solving equations process to introduce methods for solving simple one and two step equations. We will use virtual tools (and those with real counterparts) to first strengthen, then streamline the process of solving equations.

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**Virtual Coding and Robotics in the Elementary Classroom**

*Presenters: Michael Frankfort, Michael Minchella*

In this session, Michael and Michael will provide some foundational information about incorporating robotics and coding into the elementary mathematics classroom. They will also discuss pedagogical supports about the integration of coding through the various strands of the curriculum and into other subject areas. Participants will explore a few different virtual platforms and supporting resources that can be used with their students. There will also be a competition aspect to this presentation through a series of some virtual coding and robot problem solving scenarios.

## High School Math Sessions

### **Integrating Problem Solving in Grades 9 and 10**

*Presenter: Jason Van Rooyen*

This session will examine the when, the where and the 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.

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### **The Course Everyone Should Take**

*Presenter: Lindsay Parchimowicz*

Financial stress is a fact of our adult lives. Learn how you can run a course to help your students be equipped to deal with all the money issues that begin in post-secondary and continue for the rest of their lives. This is the math everyone needs to know for life! We've successfully run the course for 5 years with many students saying it was the most useful course they took in high school. Come out to get resources to run the full course and hear how we ran a Personal Finance course for our College and University bound students.

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### **Let's Give Them Something to Talk About**

*Presenter: Ellen Thompson*

With the invention of apps like Photomath, math pedagogy is shifting away from "doing" mathematics as the main focus. Interpreting, analyzing and reflecting on mathematics are skills that students will need in the future. Come join Ellen to discuss ways to get your students talking about mathematics! We will look at different activities that you can weave into your daily lessons without sacrificing huge amounts of class time or adding extra prep time to your plate.

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### **Coding in MTH1W – Read, Alter and Write**

*Presenter: Marcel TeBokkel*

In MTH1W, we encouraged coding to be used throughout the course. We will discuss a series of coding activities that build skills and connect to different overall curriculum expectations using a variety of tools – Scratch, TI Basic, and Google Sheets. Consideration will include an examination of pseudocode as well as the ability to read, alter and write code. A basic knowledge of Scratch as we will be coding in the presentation as well. A resource of problems connected to the overall expectations of MTH1W will be shared.

## **Math Acknowledgement**

*Presenters: Amy Scales, Patsy Day*

Patsy and Amy will share collected stories and a few lessons that could be used in mathematics classrooms. Amy will share her learning journey, as a settler, to create lessons which honour Indigenous ways of knowing, being and doing through lessons that make visible the mathematics present in various Indigenous artifacts. Patsy Day, Oneida Turtle clan, joins Amy as a knowledge keeper and to lead our cultural learning. Additionally, we will share the process for responsibly and respectfully facilitating these activities.

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## **Using GeoGebra to Enhance Your Presentations**

*Presenter: Rich Dlin*

Visualization is key to understanding much of high school mathematics (and beyond!). In this presentation, Rich will share his approach to using GeoGebra to enhance his presentations and explanations of topics to students, both in a classroom setting and one-one-one. While graphing software like GeoGebra is an excellent tool for student investigation, the focus of this session will be on how teachers can use graphing software to help with their own presentations. Some topics covered will be:

- Encouraging a deeper understanding of calculus by exploring the graphical interpretation of limits and derivatives, as well as an intuitive understanding of the Fundamental Theorem of Calculus,
- The connection between sinusoidal graphs and the unit circle,
- The relationship between power functions of different degree, and how that extends to an understanding of graphs of polynomial functions

Rich will be sharing some of the how-to behind leveraging the power of GeoGebra, and will also be sharing some of his GeoGebra files that are ready-to-use.

## Computer Science/Technology

### Physical Computing Options with Python

*Presenter: Grant Hutchison*

The goal of every introductory Computer Science course should be to engage students as they build their foundational problem solving and computational creativity.

In this session we will explore how physical computing can be integrated into your CS courses. Specifically, we will share classroom experiences using:

- Micro:bits - getting started with built-in sensors and radio communications
- Phidgets - enhance student inquiry with Pygame Zero or collect data for data science projects
- Pi Pico - Microcontroller options for computer engineering enthusiasts

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### Creating Self-Paced, Blended, and Mastery-based Computer Science Courses

*Presenter: Sarah Strong*

Sarah Strong is a computer science teacher for Waterloo Region District School Board. She will be sharing how she implemented the Modern Classrooms Project to create self-paced, blended, and mastery-based classes for ICS20, ICS3U, and ICS4U.

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### Data Representation

*Presenter: Sandy Graham*

This session is an overview of how different types of data is represented in a computer. We will discuss how negative numbers, fractional numbers, text, and other kinds of data are encoded using only zeros and ones. We will also look at some possible classroom activities related to these concepts.

### **Minecraft Education Edition Modding: An Introduction to Game Design**

*Presenter: Keith Smith*

Many game developers and artists start out not making games but using built in tools to design their own modifications to games like map builders and character creators. Some games like Minecraft allow for modding further to change the game drastically. The goal of my grade 10s is to make a game within a game like a hunger games simulation, a spin on red rover, or an adventure game. Through the development process they apply their knowledge of loops, conditionals, variables, and Minecraft, but also gain knowledge of game loops, tools used in the modding community, and 3D coordinates. I will take you through the resources I built to guide my students through their Minecraft modding journey, and we will visit some of the games created.

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### **Bring Back Fun: Reclaiming Your Robots in a Renewed Classroom**

*Presenter: Mike Washburn*

The past two years have been difficult to prioritize, not the least of which is all those amazing devices and robotics you have sitting on school shelves. It's time to dust off your devices and renew your school's spirit of fun and excitement. In this session, we'll talk about how to get back into the swing of things with coding and robotics including some easy pathways for all ages.

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### **A Curriculum for Meaningful & Creative Learning in Computing with Comics**

*Presenter: Sangho Suh*

This session will introduce ways to promote meaningful, creative learning in CS courses by leveraging comics. Specifically, we will introduce a curriculum containing several learning activities, lesson plans, tips, and tools---a comic authoring tool and a visual programming environment that visualizes code semantics and executions in the form of comics. This session is for teachers interested in learning novel methods for (1) teaching programming concepts and languages using the medium of comics and (2) engaging students through creative, artistic activities. The curriculum will be a collection of insights and tools developed over the last few years based on research on teaching programming with comics -- details about the research can be found at <https://codingstrip.github.io/>.

Please note that this session is conducted by a research team at the University of Waterloo. We want to obtain and use your feedback about this curriculum during the session (or after the session) to improve the curriculum and benefit other teachers who may be interested in this approach. With your consent, we would like to use the anonymized feedback for publication or report (e.g., on our curriculum website). Your feedback will be obtained via a survey. Note that your feedback is voluntary --- you can still participate and not complete the survey.



