

MATH COURSES FOR TEACHERS, PARENTS & STUDENTS

5-6 hours per course

The activities in our math courses have been classroom-tested in several elementary schools, in Canada and in Brazil, and in teacher education settings, over a period of several years.

Flex your imagination, experience the pleasure of surprise and insight, and see math in fresh light!



TEACHERS

- add to your math knowledge
- use with your students to extend their math thinking
- enhance your resume (with a Certificate of Completion)
- *"I love the use of interdisciplinary perspectives, use of language with math, literature with math, art with math."*
- *"I have fallen in love with math again."*



STUDENTS

- get math enrichment
- develop a deep understanding of big math ideas
- *"I can't wait to try this with my dad. I don't think he'll be able to figure it out and I will be able to help him!"*

PARENTS

- add to your math knowledge
- use with your children for home study
- *"Where can I get more of these activities?"*
- *"Wow. I didn't think that complex math concepts could be taught to young children. This is great."*
- *"I love how math activities incorporate a story. This makes it easier for children to relate to!"*



COURSES AND COMPLETION CRITERIA

- **COURSES**
 1. Number
 2. Pattern & Algebra
 3. Measurement & Geometry
 4. Data & Probability
 5. Computational Thinking & Math (**this Certificate course is currently offered at no cost**)
- **FORMAT**
 - **Self-serve format**
 - free access to course content at www.researchideas.ca/wmt
 - **Certificate format**
 - free access to course content at www.researchideas.ca/wmt
 - Certificate of Completion from the Fields Institute
 - \$30/course
 - register at www.fields.utoronto.ca/cgi-bin/register?form_selection=mathcertificate
 - There is no cost for the Computational Thinking & Math Certificate course
- **COMPLETION CRITERIA**
 - see following pages

NUMBER COURSE - Math Certificate Course for Teachers #1



For a **Certificate of Completion** for the *NUMBER* course from the Fields Institute, please follow these steps:

1. Access course **content** at www.researchideas.ca/wmt/c1.html
2. Complete all of the bulleted **tasks** in each module listed below.
3. For each of the bulleted tasks, your response must meet the following **criteria**:
 - 200 words in length
 - connect to the ideas introduced in that section and to your experience
 - write clearly and concisely, using diagrams and images where appropriate
4. Pay the **\$30 fee** to the Fields Institute at http://www.fields.utoronto.ca/cgi-bin/register?form_selection=mathcertificate.

This minimal fee covers the cost of (a) an instructor checking your work and providing feedback and (b) emailing the Course Completion Certificate. We cannot accommodate refunds.
5. Organize all responses in a single Word or PDF document, in the order shown below, and **email** the document to George Gadanidis at ggadanid@uwo.ca



Module 1: Odds and evens

- What do you know about odds and evens?
- What have you learned about representing and finding the sums of odd, even and natural numbers?
- How could you share what you learned about odd, even and natural numbers with students or family and friends so they will experience the pleasure of mathematical surprise and insight?

Module 2: Infinity and beyond

- What did you learn about infinity and limit?
- What did you learn from the interview with mathematician Graham Denham?
- How could you share what you learned about infinity and limit with students or family and friends so they will see the new, wonderful and surprising in mathematics?

Module 3: Numbers and social justice

- What did you learn about numbers and social justice?
- What can you do to help children living in poverty?
- What did you learn about student thinking with big numbers and social justice?



PATTERN & ALGEBRA COURSE - Math Certificate Course for Teachers #2



For a **Certificate of Completion** for the *PATTERN & ALGEBRA* course from the Fields Institute, please follow these steps:

1. Access course **content** at www.researchideas.ca/wmt/c2.html
2. Complete all of the bulleted **tasks** in each module listed below.
3. For each of the bulleted tasks, your response must meet the following **criteria**:
 - 200 words in length
 - connect to the ideas introduced in that section and to your experience
 - write clearly and concisely, using diagrams and images where appropriate
4. Pay the **\$30 fee** to the Fields Institute at http://www.fields.utoronto.ca/cgi-bin/register?form_selection=mathcertificate.

This minimal fee covers the cost of (a) an instructor checking your work and providing feedback and (b) emailing the Course Completion Certificate. We cannot accommodate refunds.
6. Organize all responses in a single Word or PDF document, in the order shown below, and **email** the document to George Gadanidis at gadanid@uwo.ca



Module 1: Repeating patterns

- What did you learn about young children exploring repeating patterns?
- How could you share what you learned about growing patterns with students or family and friends so they will experience the pleasure of mathematical surprise and insight?

Module 2: Growing patterns

- What did you learn about growing patterns and algebra?
- What did you learn from the interview with mathematician Lindi Wahl?

Module 3: Missing number patterns

- What did you learn about missing numbers and algebra?
- What did you learn about student thinking with missing numbers?

Module 4: Circular patterns

- What did you learn about circular numbers?
- What did you learn from the classroom songs about "waves"?
- What did you learn about student thinking with big numbers and social justice?



MEASUREMENT & GEOMETRY COURSE - Math Certificate Course for Teachers #2



For a **Certificate of Completion** for the *MEASUREMENT & GEOMETRY* course from the Fields Institute, please follow these steps:



1. Access course **content** at www.researchideas.ca/wmt/c3.html
2. Complete all of the bulleted **tasks** in each module listed below.
3. For each of the bulleted tasks, your response must meet the following **criteria**:
 - 200 words in length
 - connect to the ideas introduced in that section and to your experience
 - write clearly and concisely, using diagrams and images where appropriate
4. Pay the **\$30 fee** to the Fields Institute at http://www.fields.utoronto.ca/cgi-bin/register?form_selection=mathcertificate.
This minimal fee covers the cost of (a) an instructor checking your work and providing feedback and (b) emailing the Course Completion Certificate. We cannot accommodate refunds.
7. Organize all responses in a single Word or PDF document, in the order shown below, and **email** the document to George Gadanidis at gadanid@uwo.ca

Module 1: Parallel lines

- What did you learn about parallel lines?
- Most people believe that parallel lines never meet. What does this tell us about the mathematics we teach?
- How could you share what you learned about parallel lines with students or family and friends so they will experience the pleasure of mathematical surprise and insight?

Module 2: Fencing your dog

- What did you learn about the relationship between area and perimeter?
- What did you learn from the classroom documentary?
- How could you share what you learned about area and perimeter with students or family and friends so they too will see the new, wonderful and surprising in mathematics?

Module 3: Fermi questions

- What did you learn about Fermi questions?
- Create and solve your own Fermi question?



DATA & PROBABILITY COURSE - Math Certificate Course for Teachers #2



For a **Certificate of Completion** for the **DATA & PROBABILITY** course from the Fields Institute, please follow these steps:

1. Access course **content** at www.researchideas.ca/wmt/c4.html
2. Complete all of the bulleted **tasks** in each module listed below.
3. For each of the bulleted tasks, your response must meet the following **criteria**:
 - 200 words in length
 - connect to the ideas introduced in that section and to your experience
 - write clearly and concisely, using diagrams and images where appropriate
4. Pay the **\$30 fee** to the Fields Institute at http://www.fields.utoronto.ca/cgi-bin/register?form_selection=mathcertificate.

This minimal fee covers the cost of (a) an instructor checking your work and providing feedback and (b) emailing the Course Completion Certificate. We cannot accommodate refunds.
8. Organize all responses in a single Word or PDF document, in the order shown below, and **email** the document to George Gadanidis at gadanid@uwo.ca



Western
Education

Module 1: Probability race

- What did you learn about probability with dice?
- What did you learn about learning about probability through games?
- How could you share what you have learned about probability with dice with students or family and friends so that they will experience the pleasure of mathematical surprise and insight?

Module 2: Taking chances

- What did you learn about probability with coins?
- What did you learn from the interview with statistician Bethany White?
- How could you share what you have learned about probability with coins with students or family and friends so that they too will see the new, wonderful and surprising in mathematics?

Module 3: Lost socks

- What did you learn about lost socks and doing laundry?
- What did you learn about experimental and theoretical probability?
- How could you share what you have learned about probability and doing laundry with students or family and friends so that they too will see the new, wonderful and surprising in mathematics?



COMPUTATIONAL THINKING & MATH COURSE - Math Certificate Course for Teachers #5

For a **Certificate of Completion** for the *COMPUTATIONAL THINKING & MATH* course from the Fields Institute, please follow these steps:

5. Access course **content** at <http://www.researchideas.ca/wmt/c6.html>
6. Complete all of the bulleted **tasks** in each module listed below.
7. For each of the bulleted tasks, your response must meet the following **criteria**:
 - 200 words in length
 - connect to the ideas introduced in that section and to your experience
 - write clearly and concisely, using diagrams and images where appropriate
8. **No payment is needed – this course is currently offered at no cost to you**
9. Organize all responses in a single Word or PDF document, in the order shown below, and **email** the document to George Gadanidis at gadanid@uwo.ca

Module 1: What is computational thinking?

- What is computational thinking?
- How has the relationship between computational thinking and mathematics education evolved over the years? Please make at least 2 references to ideas shared in the videos in this module.
- How might the affordances of computational thinking help your students develop mathematically? Please give a specific example.

Module 2: In the math classroom

- Select one of the classroom activities in this module and discuss what you learned and how you might use some of the ideas in your teaching.
- Select another of the classroom activities in this module and discuss what you learned and how you might use some of the ideas in your teaching.
- Find a math + coding/computational thinking activity using a Web search and discuss what you learned from the activity and how you might use some of the ideas in your teaching. Please share the URL for the activity.

Module 3: Games & simulations

- Select one of the simulations or games in this module and discuss what you learned and how you might use some of the ideas in your teaching.
- Select another of the the simulations or games in this module and discuss what you learned and how you might use some of the ideas in your teaching.
- Design a math simulation or game (you don't need to code the simulation or game) and discuss it from a pedagogical perspective.

