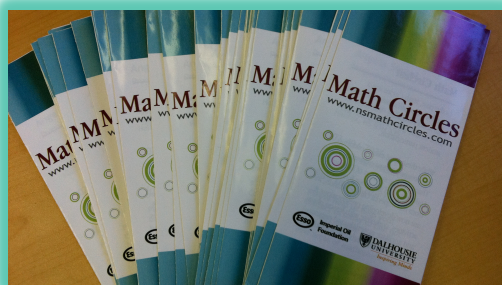


Nova Scotia Math Circles

2011-2012 Year End Summary

June 2012



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Mission Statement

Nova Scotia Math Circles is dedicated to enriching the experiences of Nova Scotia high school students in all areas of mathematics. Our program vision is to foster enthusiasm for mathematics through interactive, creative and meaningful presentations.

NS Math Circles

Join in the fun today!

Many thanks to our sponsors!



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UNIVERSITY**

Inspiring Minds



Executive Summary

NS Math Circles Executive Summary 2011-2012

The 2011-2012 school year marks the third year of our province-wide expansion. During this year both the Math Circles team and coverage area grew.

The Math Circles brand has begun to grow. This year we received requests from many new high schools,

along with junior high, elementary schools and even schools in New Brunswick. We continued our outreach in the Tri-County School Board and within the Halifax Regional School Board, but we expanded to the Strait, Chignecto-Central and

Annapolis Valley Regional School Boards. We also gave several presentations to home educators associations within HRM.

One of the programs biggest achievements this year was our expanded outreach to the Acadian

**“It gave students an opportunity to have fun in math” – Carmen Anderson, Teacher
Shelburne Regional High School**

School Board, CSAP (Conseil Scolaire Acadien Provincial). With the addition of bilingual members to the Math Circles team, we were now able to provide presentations in French to the CSAP schools. Danielle Cox has taken over

the role of Program Director. In her new role, Danielle organizes the outreach trips that take place during the school year. She has also represented Math Circles at several workshops and met with Math Consultants

throughout Nova Scotia to promote the program. In October 2011 Math Circles was represented at the NS Science Teachers Association Conference and the NS Math Teachers Association Conference.



“When I saw the kids Tuesday, I asked them what they thought of your presentation. There were a couple “it was really fun”-type comments, but then they immediately started talking about the numbers and the patterns in it! That’s a sure sign that it was fun AND a mathematically solid presentation at the right level for them. I was thrilled.”

-Megan Snow
Teacher, Barrington Municipal High School

At each conference Math Circles had a booth with sample presentations and promotional material. All promotional materials were branded with the logos of our sponsors.

At these conferences teacher contacts were collected and this resulted in several school visits. During this conference, the Math Circles team was approached and asked to give a presentation at the 2012 NS Math Teachers Association Conference. Also in October 2011 Math Circles was asked to speak at an outreach session at the Science Atlantic Conference at St.

F.X. University. This provided an opportunity for Math Circles to network with not only the high school teachers in attendance, but also with other outreach programs throughout Nova Scotia.

In February 2012, Math Circles had an article in Branching Out, a NS School Board newsletter for teachers. This resulted in teachers contacting Math Circles for school visits.

Math Circles continues to keep events posted on the program website www.nsmathcircles.com but links are also maintained on the Dalhousie University outreach program

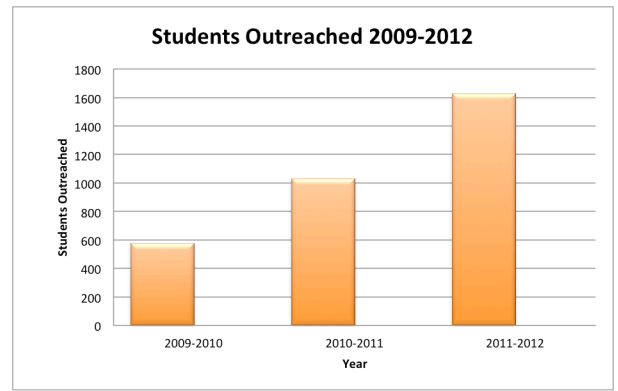
website which promotes free outreach activities available to P-12 students in NS. We have also begun to work more closely with Dalhousie Faculty of Science School Outreach Coordinator, Theresa Myra. Danielle and Theresa visited the Halifax Regional School Board and the Chignecto-Central School Board to promote outreach. For Math Circles, these meetings resulted in many school visits, as our materials were passed along to teachers in these boards via monthly emails sent out by the boards Math and Science consultants. In April 2012 Math Circles hosted a guest, Dr. John

Grant McLoughlin, who is a mathematics education professor at UNB Fredericton. John ran a problem solving for high school teachers and this resulted in Math Circles being invited to Citadel High School to present to over 200 students in 2 days.

We continue to survey teachers for all presentations given. Their input guides our topic choices and decisions as we move forward.

We have found a need for more topic choices as we have been requested to return to schools much more often than we had at first anticipated. Schools are also requesting a full day of presentations, rather than one presentation, so that more students can be positively impacted by Math Circles presentations.

Overall, with local events and on the road presentations, more than 1600 students were outreached to during the 2011/12 school year and we predict this number to grow in the coming school year.



Financial Synopsis

There was a change in the mode of operations. We discovered that it was both cost effective and the best incentive for graduate students to join the program if we paid on a per-project basis rather than having them give a long term commitment. We did have several full time Teaching Assistants, but we hired additional graduate students on a per project basis. Below is a brief financial summary.

Director	\$34,000
Graduate Student on a project Basis	\$32,000
Travel Expenses	\$7,000
Development of French Materials	\$3,000
In-kinds Donations to Math Circles	
Dr. Richard Nowakowski ~100hrs	\$5,000
Dr. Dorette Pronk~ 20hrs	\$1,000

NS Math Circles Staff

The Team

Program Director
Danielle Cox



Presentation Team Coordinator
Karyn McLellan



Mathematics Outreach Coordinator
Dr. Richard Nowakowski



Ideas Team

Rebecca Milley, Julien Ross, Abdullah Al-Shaghay, Alain Gamache, Huda Chuangpishit



Danielle Cox has taken on the role of Program Director. She is responsible for the organization and general direction of the program. She continues to establish and build relationships with members of the Regional School Boards, Department of Education and regional teachers and Math Consultants. She works to build a brand for the program and establish our name around the province.

Karyn McLellan serves as our Presentation/Ideas Team Coordinator. She establishes the structure and format of materials that we are producing to be distributed to high schools. She is the primary point of contact for members of our Ideas Team when they have questions regarding ties to curriculum and material formatting.

Dr. Richard Nowakowski remains the Mathematics Outreach Coordinator (and Professor) for Dalhousie.

University. He continues to act as liaison between our program and the university. He also provides support for the Presentation and Ideas Teams and works with Danielle to further the vision of Math Circles.

Our Ideas team consists of several graduate students, Rebecca Milley, Abdullah Al-Shaghay, Huda Chuangpishit and Julien Ross, along with CSAP teacher Alain Gamache. Julien and Alain provide resources in French. The addition of Alain and Julien to the team now allows Math Circles to provide presentations and materials in French.

As we continue forward, this team will continue to produce new presentations and edit existing presentations as feedback is received from high school teachers.

Outreach

Local Events

Local events have included a nice range of topics and have had similar exposure and interest as in previous years. The presenters were primarily graduate students, along with Alain Gamache.

We hosted 11 events this year, one per month September through June, with an additional presentation

in October that was in French. We have had up to 50 students for an evening event, with an average of 25 students in attendance.

The students ranged from junior high aged students looking for enrichment to calculus students looking to further their mathematical knowledge. We even had some students as young as 10 years old attend with a parent since they were interested in mathematics.

Many of the schools that attended each month were from the HRM, with the exception of Kings Edgehill from Windsor and Ecole Acadienne De Pomquet, from just outside Antigonish. This year we also had a strong attendance from a group of HRM home educators and we held our first evening event in Truro.

Overall, approximately 273 students were outreached to by the local events.



"Wonderfully fun enrichment!"

-Linda Wheadon,
Teacher
Horton High School

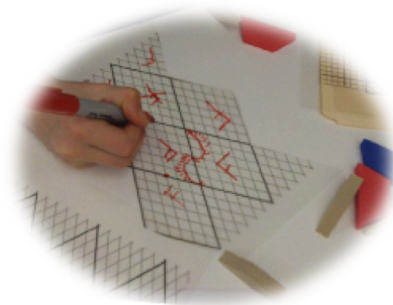
NS Math Circles Local Events 2011-2012

September 21, 2011 Karyn McLellan & Danielle Cox **Fibonacci and the Golden Ratio**

Join Karyn and Danielle in the first Math Circles event of the new school year! We will be exploring the mathematics of the Fibonacci numbers and Golden Ratio. We will even listen to some Fibonacci number inspired music!

October 18 (French) & 19 (English), 2011 Alain Gamache **Numerical Systems**

*Join Alain on a journey that will take you to the very first systems of numerals in ancient civilizations. Learn the needs that lead the Egyptians to develop clever arithmetic methods to fill their everyday needs, the origin of our system for measuring time and why CDLIV*XXVII is not as easy as it looks! We will also try to understand what is the big deal with the 12/21/12!*



November 16, 2011 Rebecca Milley **Primes**

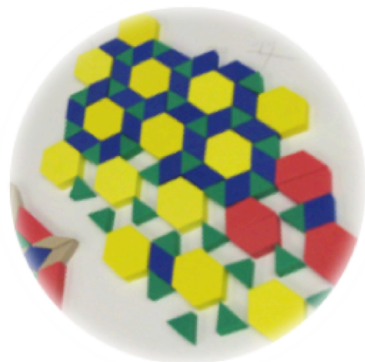
Join Rebecca for a "prime time" Math Circles event! Learn how prime numbers were found by ancient Greeks, and how huge primes today are the secret to internet encryption! We will learn some divisibility "tricks", prove that there are an infinite number of primes, and explore one of the oldest unsolved problems in mathematics: the Goldbach Conjecture!

December 14, 2011 Hoda Chuangpishit, Karyn McLellan & Rebecca Milley **Permutations and Combinations**

Before you take off for the holiday break, join the Math Circles gang for the last event of 2011. We will be exploring the topic of permutations and combinations through fun problem solving activities!

January 18, 2012 Ethan Mombourquette **Logic & Reasoning**

Come learn that math is not all numbers! Join Ethan as he introduces us to formal logic, applies it to some fun activities like the "wolf, goat, cabbage" problem and introduces the idea of 'proof' in a nonthreatening way!

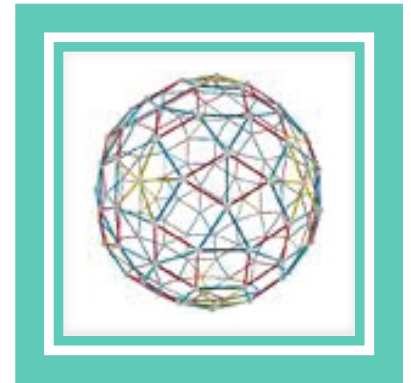


NS Math Circles Local Events 2011-2012

February 22, 2012 Dr. John Grant McLoughlin (UNB)

The Wonder of Numbers

Please join us to share in meeting some of the wonders of numbers through mathematical games, problems, proofs and more. Whether it be curious properties of numbers, the lovely manner in which numbers work together, playfulness in a game, the beauty of patterns and pictorial representations, or a poem, know that your view on numbers will be enriched through a recreational mathematical evening.



March 21, 2012 Karyn McLellan

Pi

We all know Pi is the ratio of a circles circumference to its diameter and that mathematicians around the world celebrate Pi day, but why else is this number so important and interesting? In this talk we will do some activities that generate Pi in a surprising way, learn about the quest to find more and more digits of Pi and will see why people love Pi.

April 18, 2012 Chris Levy

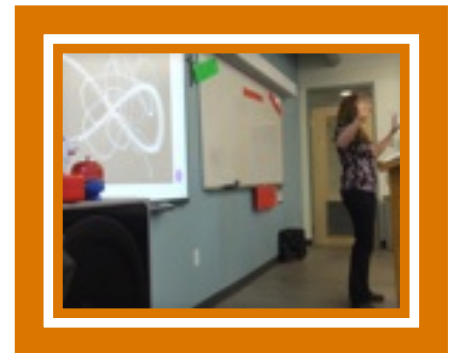
Take it to the Limit

Adding numbers is easy right? What about adding an infinite number of numbers together? We all know that $1+1+1+1+1+\dots+1$ is infinity. But what about adding other series of numbers? Could we possibly get an actual number as the answer, or just infinity, or rather something else? In this talk we will explore this concept by looking at some fun related problems such as the bouncing ball problem and Zeno's paradox.

April 25, 2012 (Truro) Danielle Cox

The Game of NIM

Come and explore the world of combinatorial game theory! We will be playing the game of NIM and through trying to solve the game, we will encounter some interesting mathematical surprises!



May 16, 2012 Hoda Chuangpishit

Hotel Infinity

Join us while we explore Hilberts Hotel! What if we owned a hotel with an infinite number of rooms and every room was occupied. Could we fit one more person in our hotel? 100 more people? A bus load of people? The answer may surprise you!

June 6, 2012 Alain Gamache

e

What do time of death, infinity, a hanging chain, derangements and compound interest all have in common? They all involve one of the most beautiful constants in mathematics: e . This constant has long been in the shadow of pi; let the warm and bright end of the year sun shine some light on this mysterious number that can make the imaginary become real!

School Visits

The school visits this year have been a tremendous success. We had many requests from repeat schools and also have made our way into new school boards. This year we were able to offer presentations in French, ran session for home educator groups and we ran some enrichment program for local junior high students. Schools visits resulted in 1205 students outreached to.



"Students were engaged throughout the presentation"
 -David Salah, Teacher
 Citadel High School

Tri-County Regional School Board

During the Fall we spent a week in the Tri-County School Board, revisiting many of the schools outreached to in the Fall of 2010. Math Consultant, Patsy Height-Lewis worked with Danielle to arrange this trip. Despite a snowstorm midweek causing school cancellation, we presented to 192 students.

Conseil Scolaire Acadien Provincial

This year we were able to offer schools in Conseil Scolaire Acadien Provincial (CSAP), the Acadian school board, presentations in French. Alain Gamache provided two talks, in French, to Ecole Acadienne De Pomquet and Julien Ross provided French outreach to Ecole Beaubassin during Discover Math Days.

Chignecto-Central, Annapolis Valley, Strait Regional School Boards

This year we expanded to several new boards. We visited several schools in the Annapolis Valley, Strait and Chignecto-Central School Boards, resulting in 316 students outreached to. Danielle worked closely with the Coordinator of Mathematics for the Chignecto-Central School Board, Darlene MacKeen Hudson to organize a trip to Cobequid Education Centre and the evening event in Truro. This school board is interested in hosting more evening events for their students.

Home Educators Group & Enrichment

Several local home educator groups have become aware of Math Circles and hosted several events for their students. This year Danielle met with the Halifax Regional School Board and they asked if Math Circles could provide additional enrichment to junior and senior high students in Halifax/Dartmouth. We gave several of our presentations to groups of enriched students, which along with the home educator groups resulted in 179 students outreached to. Many of the students we presented started to attend the local evening events.

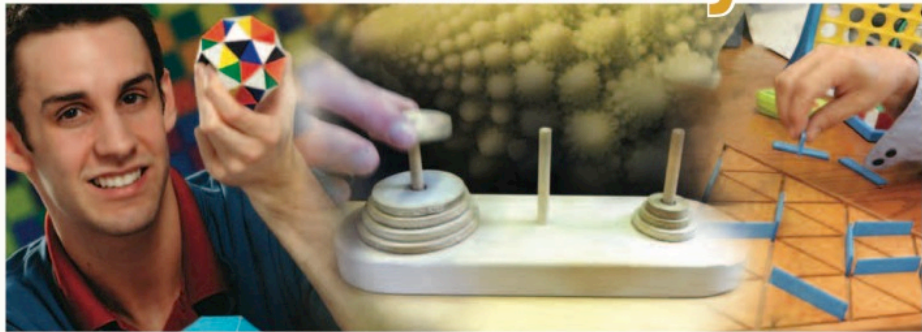
Discover Math Days

This year marks the 3rd year for Discover Math Days at Dalhousie (formerly Math Fun Days). This event brings many schools and students from around the province into Dalhousie for a day of fun and mathematics. As the hosts of this event, all advertising for this event contains our program and supporting logos. This year, we extended the format of the event and offered 5 presentations, two of which were in French. A total of 190 students attended the

presentations. The topics covered at this event included: Tower of Hanoi, Permutations & Combinations and Fibonacci & the Golden Ratio.

With the success of Discover Math Days, the Faculty of Science has asked Math Circles to run a mathematics open house next year in conjunction with other science department open houses.

Discover Math Days



May 16-18, 2012 10 am-noon (snacks provided)

Department of Mathematics and Statistics, Rm 119, Chase Building, Dalhousie University

FREE to Grade 10-12 teachers interested in bringing their students to learn more about math through experimentation and hands-on fun.

Sessions are 2 hours including a break. **Register early – space is limited.**

WEDNESDAY, MAY 16

The Tower of Hanoi

We will learn a bit of the history behind the puzzle, try to solve it and through solving the problem, we will encounter some fun patterns and explore the concept of recurrence relations.

THURSDAY, MAY 17

Fibonacci & the Golden Ratio

In this presentation, students will discover the relationship between the Golden Ratio and Fibonacci numbers. We will learn why the Golden Ratio is found throughout nature and even listen to some Fibonacci number inspired music!

FRIDAY, MAY 18

Permutations & Combinations

How many winning poker hands are there? What is the probability that in a room of 25 people, 2 people will share a birthday? What are your chances of winning Lotto 6/49? In this presentation we will explore permutations and combinations through fun problem solving activities.

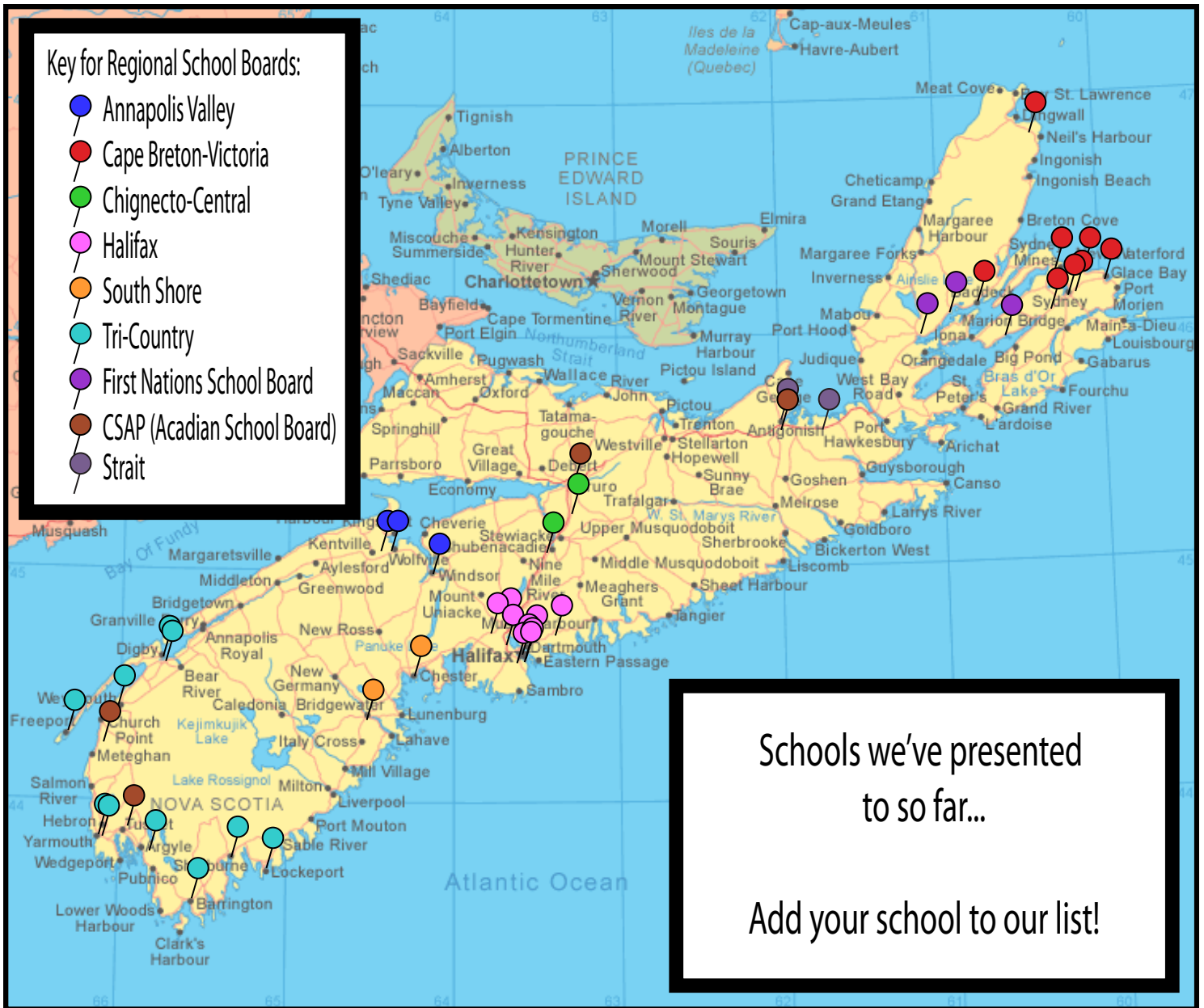
FOR MORE INFORMATION AND REGISTRATION, CONTACT:

Theresa Myra
School Outreach-Faculty of Science
Tel: (902) 494.6448 • Email: theresa.myra@dal.ca

Visit our website:
science.dal.ca/p12



Regional School Boards





2012-2013 Directions

As we move forward into the 2012-2013 school year, we are excited to further our coverage of the province. We feel that the addition of our new staff members will continue to allow us greater flexibility in our travel dates and to increase the number of presentations we give. We plan to continue our expansion and coverage in the Annapolis Valley, Strait and Chignecto-Central Regional School Boards. At the same time, we are excited to be able to revisit the schools that we have seen so far! Each year brings a new level of enthusiasm to our team as we get to see the impact of our work. If you are new to NS Math Circles, let us share the excitement and energy that our program is designed to bring to your math curriculum!

Join in the fun today!

NS Math Circles

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