Nova Scotia
Math Circles

2010-2011
Year End Summary

May 2011
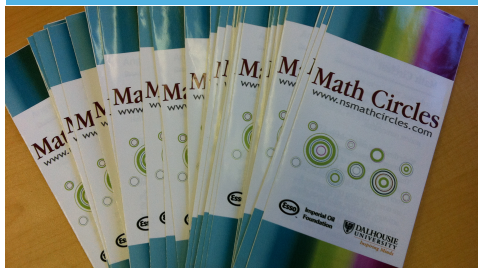
Inside

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.

Math Circles
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DALHOUSIE UNIVERSITY
Inspiring Minds

Executive Summary

Executive Summary

This marks the second year of our province-wide expansion project. The Math Circles team has grown as has the area of our coverage. We are excited to have reached into new regions this year, particularly to many new schools in the Tri-County Regional School Board as well as one in the Acadian School Board (Conseil Scolaire Acadien Provincial, CSAP). We are also thrilled to be able to revisit many of the schools that we had previously established relationships with in the previous year.

Angela Siegel remains the Program Director and continues to coordinate the expansion efforts. She is responsible for the marketing and outreach efforts of the organization.

Marketing efforts have expanded beyond the Nova Scotia Math League schools this year. In October 2010, Math Circles was represented at the Nova Scotia Science Teachers Association, in order to promote the program to the many math and science teachers attending. A large mailing campaign to previously-attended schools resulted in many requests that we return. An effort has also been made to make our events more present on various websites. Not only are upcoming events made public on the Math Circles website (www.nsmathcircles.com), but we are also maintaining links and coverage on various other sites, with the most productive being a Dalhousie site that promotes free outreach
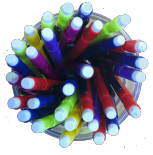
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activities available to P-12 students in the province.

Dr. Richard Nowakowski serves as the Outreach Coordinator for the Dalhousie Department of Mathematics. He serves on both our Presentation and Ideas Teams. Throughout the school year, Dorette Pronk has also served on both the Ideas and Presentation Teams. She has worked with us to produce new materials and topics. As Dalhousie Faculty, the ability to attend presentations is more challenging for Drs. Nowakowski and Pronk during the normal school year. As such, we will be expanding our Presentation Team over 2011 summer months to include four graduate students. Nowkowski and Pronk will remain integral components of our Ideas Team as we continue to develop new materials.

Danielle Cox remains an essential part of our team and will move to a role of Presentation Coordinator. She will work closely with the new staff members to help them develop materials that work within the framework of our program. The goal for our summer 2011 will be to have each member of the Ideas team develop 3-4 new topics, along with presentation slides and pre/post-lesson materials for the teachers.

Our Evaluation Team met over the school year to consider the topics that we've developed so far and discuss the directions that we should move in the future. As a wrap-up to the summer, we will reconvene to evaluate the new materials that are to be developed by the Ideas Team over those months.

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. This need has driven our decision to expand our Ideas Team and focus our efforts on presentation generation over the summer months.

This year we were able to focus heavily on three main areas: the Tri-County Regional School Board (TCRSB), the Acadian School Board (Conseil Scolaire Acadien Provincial, CSAP) and the Cape Breton-Victoria Regional School Board (CBVRSB). Both the TCRSB and CSAP schools were new to our program.

1 Tri-County Regional School Board

We were able to spend nearly 2 weeks in the TCRSB school system. During that time, we gave 17 presentations at 10 different schools (one of which was only reachable via a ferry) to 634 students.

2 Acadian School Board (CSAP)

We were able to reach our first school within CSAP, Ecole Secondaire de Clare, located within the boundaries of the TCRSB. At this school, we gave 4 presentations to 46 students.

3 Cape Breton-Victoria Regional School Board

Mid-May marked the second annual one-week trip throughout Cape Breton area schools. We visited 6 different schools giving 11 presentations to 201 different students.

primary

Staff

Dr. Angela Siegel

Program Director

Danielle Cox

Presentation Team Coordinator

Dr. Richard Nowakowski

Mathematics Outreach Coordinator

Dr. Dorette Pronk

Ideas Team

staff

Organization

Internally, we have four primary staff that continue to move Math Circles forward.

Dr. Angela Siegel remains our 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.

Danielle Cox will serve 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 helps us to organize local events through obtaining volunteers, in the form of graduate students and professors from the department, for local events.

Dr. Dorette Pronk remains an integral component of our Ideas Team. She continues to develop more high-level talks, including those with a focus in fractals, geometry and calculus.

In order to meet the increased demand for repeat presentations at schools, we are in the process of adding four new members to our Ideas/Presentation Team. During the summer months, these staff members will focus their efforts on material

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generation. Our goal will be for each new member to produce three to four new topics throughout the summer months. With the aid of the other staff members, they will work to produce the materials needed for each topic, including talking points and PowerPoint slides for the presentation and pre- and post-lesson materials for the teachers. During the school year, commencing September 2011, we anticipate that many of these new staff will stay on to travel with us to various locations around the province and to help give presentations at the high schools.
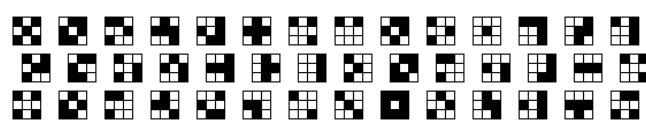
Outreach

Local Events

Local events have included a nice range of topics and have had similar exposure and interest as in previous years. As was done in the past, we made use of Dalhousie resources, including graduate students and faculty, as presenters at the local events. We hosted one event per month during the school year and had varied attendance, from 18 to 47 students. The topics presented covered a wide range of mathematical areas. As we have done in the past, we made use of this "known audience" to test some newer materials that are to be taken on the road. However, we also made sure to include the work of other mathematicians in the Halifax area so that this interested group of students continued to have exposure.

October 2010: County & Symmetries

The school year began with a presentation by Dr. Peter Selinger on Counting and Symmetries. Many objects have a symmetry, for example, a mirror symmetry, or a rotation by 90 or 180 degrees. We took a look at symmetries in 2 and 3 dimensions. We learned how to count objects up to symmetry. For example, how many ways are there, up to a rotation, to tile a 3x3 square with black and white tiles?

November 2010: How to deal, mathematically, with things that we can never point to

Question1: Imagine a circle of radius 200kms with centre at the clock on Citadel Hill, are there two points diametrically opposite on the circle with the same temperature?

Question 2: Angela starts up a hiking trail at 8am and reaches the top at 6pm. She stays at the top over night. She starts down at 8am the next day and reaches the bottom at 6pm. Is there one time during the day when she was at the same spot on the trail on both days.

Dr. Richard Nowakowski helped guide us towards a single technique that solves both of these problems. This technique is a major reason why calculus works. (No knowledge of calculus was required.)

December 2010: Math & Art Show

Dr. Dorette Pronk and Dr. Eva Knoll, from MSVU, put on this art show with a mathematical twist. We viewed pieces of art that were completely produced from mathematical equations and looked at some of the mathematics involved in traditional art pieces. We ended with a game that connected the math and the art. And, of course, there were artfully decorated circular pizzas.

March 2011: Braids & Permutations

Andrew Hoefel, a Ph.D. student of mathematics at Dalhousie, helped us explore braids and permutations. Activities included: factoring balls and cups; parity in play; live demonstration of the non-commutation of socks and shoes; cyclical processes and how you can get stuck in the game of life; and examples of braiding your way through complex punctured spaces.

April 2011: Statistics – Turning 5 dimensions into 2!

Professor Michele Millar helped us answer the question: Can you really predict your height from your age? From this, we moved towards a representation of 5 dimensions on a flat sheet.

May 2011: Graph Colouring & Planarity

Danielle Cox and Rebecca Keeping, Math Circles staff and Ph.D. students at Dalhousie University, took a look at the graph coloring problem and graph planarity.

June 2011: Trifecta of Fun

For our last event, we will wrap up the year with a trifecta of fun! Weather permitting, we will have an outdoor warm-up activity of Geocaching and trigonometry. Back indoors, we will build a hyperdodecohedron and explore 1, 2, 3 and 4-dimensional spaces. Also, we will have laptops on hand for further fun with the Game of Life.

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. In general, we had many new schools contacting us. The spring term became more of a challenge to get into schools due to the large number of snow-days that we encountered this year. These "lost days" made it challenging for teachers to cover all of their necessary materials before the timing of IB and provincial exams. However, we had great successes despite these set-backs. Some of the highlights of this year's travels are listed below.

Tri-County Regional School Board

The primary target during the fall was the Tri-County Regional School Board (TCRSB), which we had previously not had strong contacts in, with the exception of Digby High School. In the fall of 2010, we were able to make two separate trips down to TCRSB schools. We spent an entire week in that school board touring the bulk of their high schools and then returned the following week to hit most of those that we had missed. In total, we gave 17 different presentations to 10 TCRSB schools, presenting to 634 students during that time. We feel that this represents a very solid coverage of this school board, which we are quite pleased with.

Conseil Scolaire Acadien Provincial

We were very fortunate last year to have two schools from the Conseil Scolaire Acadien Provincial (CSAP), the Acadian school board, attend our first annual Math Fun Days event. This exposure served to help us gain our first presentation tour in a CSAP school. In the fall, we were able to give a days' worth of presentations at École Secondaire de Clare. The primary instructor that we worked with at this school, Alain Gamache, was enthusiastic about our future involvement in his and other CSAP schools. His enthusiasm was such that he has volunteered to be a part of a committee that will vet the materials that we plan to distribute to schools and offer French translations of marketing materials.
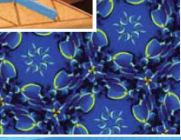
Cape Breton – Victoria Regional School Board

This year marked our second week-long trip into the Cape Breton – Victoria Regional School Board (CBVRSB). We were able to 6 high schools, one of which was a new school to us in a very rural region. We gave 11 presentations to over 200 students in that region.

Science & Engineering Days

Not only are we reaching students through classroom exposure, our team has also been a part of two major initiatives that bring students into the university environment. For the first, we presented at Dalhousie's 2010 Science & Engineering Days. Our presence and participation at this event allowed for advertising of our program to students from varied schools and school boards. Due to this fact, and the enthusiasm with which our presentations were received, we may play a greater role in this event in the fall of 2011. There are currently efforts underway to have the program renamed Science and Mathematics Days. This would allow greater emphasis on the mathematics and allow for our program and associated funding support logos to be displayed on the marketing material for this event. This is advantageous to us as this event is well-known around the province and its marketing initiatives are both well-established and well-received.

2nd Annual Math Fun Days

This year marks the second year of the Math Fun Days event at Dalhousie. 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 five separate days' worth of presentations, to a total of 50 students per day. In the end, all but one day has been booked to capacity. The topics that will be covered at this event include: Counting and Symmetries; Mathematics and Art; and Mathematical Games.

Regional School Boards

Below is a map of the schools that we have been able to present to so far. We are very excited to see that our coverage is starting to fill in the map on both ends of the province.
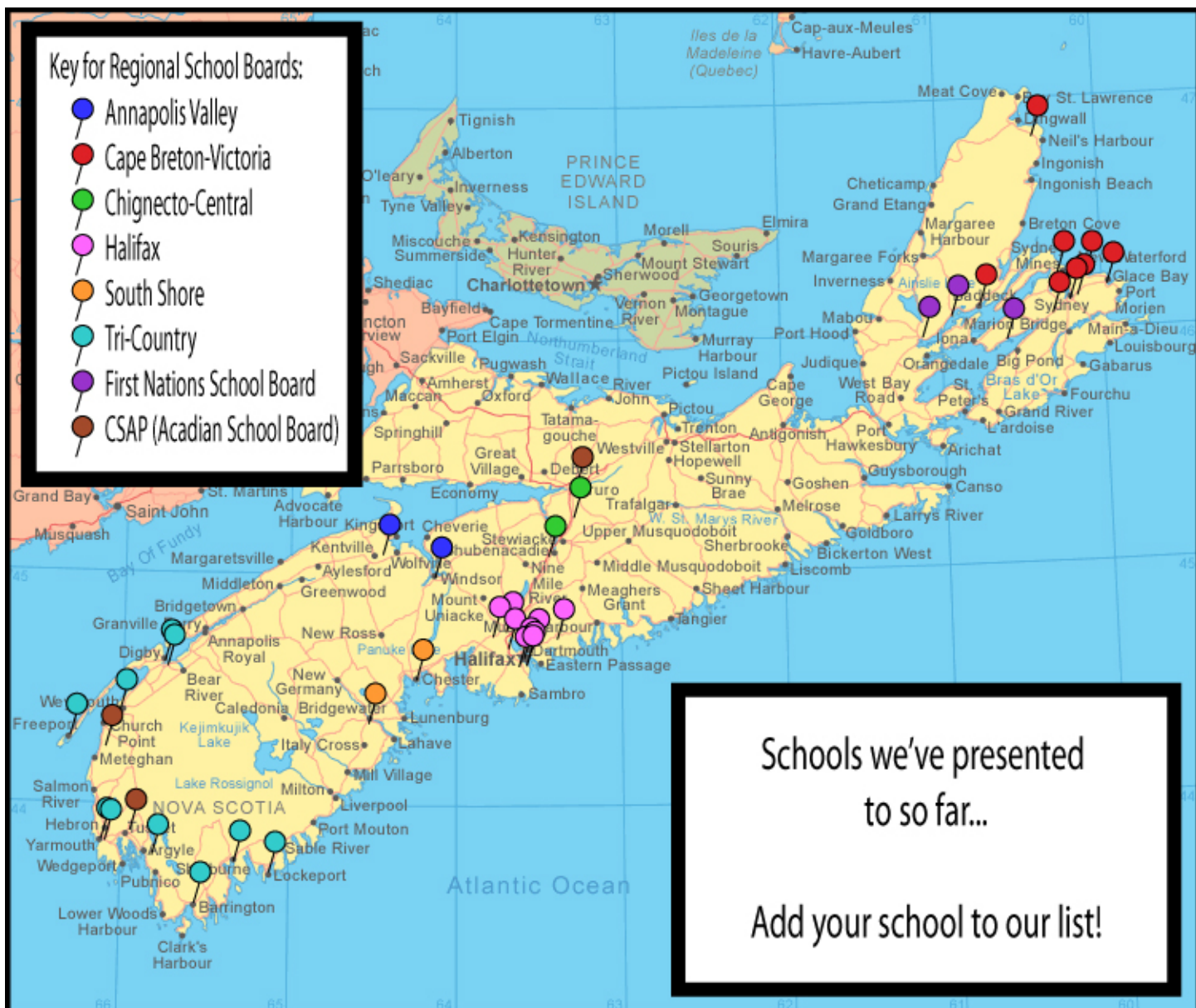
2011-2012 Directions

As we move forward into the summer and the new school year, we are excited to further our coverage of the province. We feel that the addition of new staff members will allow us greater flexibility in our travel dates and even possible overlap of presentations. We plan to focus our expansion and coverage in the Annapolis Valley, South Shore 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!

2010 – 2011 Year End Summary

NS Math Circles

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Math
Circles

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