Canadian Mathematical Society

# Math Camp Report

## 2024

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# About the CMS Math Camps

Since its inception in 2000, the CMS Math Camps program has captured the spirit of mathematics from coast to coast and has inspired young minds across the country. The program offers a unique opportunity for young Canadian students to explore a side of mathematics that is not accessible in a traditional classroom setting. Although the CMS gives local organizers the freedom to choose the topics and activities of their camps, the main goal of a typical camp is to engage students in an authentic learning environment in mathematics and its broad applications to Science, Technology and Engineering. This is achieved through stimulating presentations, hands-on activities, building projects and competitions. Students who attend the camps leave with new friends who share the same passion for the subject, new ideas to explore, and a fresh outlook on mathematics and the role it plays in our lives.

The CMS hosted a total of 22 camps, regional and specialty combined, in 2024. These camps took place in British Columbia, Alberta, Ontario, Québec, New Brunswick, New Foundland and Labrador, Nova Scotia and Yukon. On average, close to 85% of students who attended a CMS math camp in 2024 indicated an increased interest in STEM following their participation.

For 2025, a total of 25 CMS Math Camps are projected to be held around the country.


Photo credits: Rachel Hardeman

# 2024 Regional Math Camps

Regional camps are a series of mathematics enrichment programs held as either day or overnight camps, and last anywhere from one day to two weeks.

# Blundon Seminar Math Camp

Quick facts and figures

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|---|---|---|
| **Camp Location**<br>Memorial University<br>St. John's, Newfoundland | **Camp dates**<br>May 23, 2024 | **% of students indicating an increased interest in STEM after the camp**<br>90% |
| **Students' Grade Level**<br>Grades 10 to 12 | **Number of students**<br>27 (18 m & 9 f) | **% of students considering STEM careers**<br>90% |

Efforts made to attract under-represented groups:
Students were selected based on their results in various written math contests including Blundon Contest, COMC, Euclid, Fermat, etc. Efforts were made to invite students interested in mathematics from under-represented groups. This year, 9 girls attended the event and 18 people of colour. We hope to be able to invite more students from remote parts of the province in the future with help of our sponsors.

Efforts made to help students with financial difficulties:
There is no fee to attend the camp. Meals are provided for the entire duration of the camp for all students attending the camp. Students' transportation to St. John's from outside of the town is also covered.

STEM related activities that took place at the camp:
During the seminar, students attended a one-hour lecture about computational mathematics and its applications. There were two problem-solving sessions and a Paper Chase activity, where groups of students competed in solving mathematical problems.

Best practices/activities at the camp:
The Paper chase activity (scavenger hunt) is usually the best rated activity during the camp.

Sample Student Comments:
"*I loved working together to solve math problems. It was very rewarding.*"

"*I got to learn some new concepts while also encountering some old ones.*"

Organizer's General Comments:
"*It was a rewarding experience to see students engaged in problem solving and doing mathematics together.*"

# Camp de l'AMQ pour le cégep 2024

Quick facts and figures

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|---|---|
| **Camp Location**<br>Université de Sherbrooke (Sherbrooke, Québec) | **Camp dates**<br>June 9 to 14, 2024 |
| **Students' Grade Level**<br>Cégep (17-19 yrs old) | **Number of students**<br>19 (17 m & 2 f) |

STEM related activities that took place at the camp:

The week of workshops was launched by Mr. Jean-Frédéric Laprade, research professional at the Quantum Institute, with his workshop titled "Linear algebra transforms qubits". In the afternoon of this first day, Mr. Anik Trahan, mathematics teacher at Cégep de Sherbrooke, put mathematics to work in drawing with his presentation "Drawing with equations". The day ended with a visit to the Quantum Institute, where a magnetic levitation train allowed participants to see an effect of superconductivity unfold before their very eyes.

On Tuesday, Prof. David Sénéchal, from the Université de Sherbrooke's physics department, drew campers' attention with the warning "Black holes (enter at your own risk)". Afterwards, Prof. Vasilisa Schramchenko of the Université de Sherbrooke's mathematics department presented several riddles and problems to the campers, in her "Math Circle" activity. The afternoon began with a visit to the Faculty of Engineering's premises and laboratories, then Mr. Juan Carlos Bustamante, lecturer in the mathematics department at the Université de Sherbrooke, gave a presentation entitled "Seeing is telling: an audio-active sequence of integers", focusing on Conway's *Look and say* sequence.

Wednesday morning was led by Prof. Jean-Philippe Burelle, from the mathematics department, who, in an experimental workshop with *polydron* triangles entitled "Topology and geometry of polyhedra", led students towards the discovery of the Gauss-Bonet Theorem.

Thursday was spent at Bishop's University, in Lennoxville, discussing projective geometries and an Euler problem, led by Prof. François Huard of Bishop's Mathematics Department. This day devoted to games continued with a workshop on combinatorial games, given by Sylvain Bérubé, lecturer in the mathematics department at the Université de Sherbrooke and mathematics teacher at the Cégep de Sherbrooke. The closing activity was a simultaneous chess game for campers with Claude Dupuis, an expert from the Sherbrooke Chess Club.

Finally, on Friday, Prof. Éric Marchand of the Université de Sherbrooke's mathematics department presented the math and intuition that enabled Abraham de Moivre to make the connection between binomial probabilities, Stirling's formula and the famous "normal law" curve. This was followed by a quantum-flavoured version of the card game "Go fish", presented by Prof. Virginie Charette, from the mathematics department of the Université de Sherbrooke. Finally, Friday afternoon kicked off with a talk entitled " From Pythagoras to Python, the monumental alliance of mathematics and computer science", by Sylvain Bérubé, followed by " Pavings and self-pavements", by Anik Trahan.

# Camp de l'AMQ pour le secondaire 2024

Quick facts and figures

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|---|---|
| **Camp Location**<br>Cégep de Ste-Foy and Cégep Garneau<br>Québec, Québec | **Camp dates**<br>June 24 to 29, 2024 |
| **Students' Grade Level**<br>Grades 10-11 | **Number of students**<br>25 (20 m & 5 f) |

STEM related activities that took place at the camp:

Each day consisted of two lectures, a series of exercises and an activity (sports or other). A short survey among participants confirmed that the lectures were very much appreciated. Here's a brief overview:

- Combinatorics and permutation structure (Laurent Pelletier, professor at Cégep Garneau)
- The Rubik cube (Alexandre Girouard, professor at Université Laval)
- Archimedes (Yvon Fortin, Centre de démonstration en sciences physiques)
- Mathematical archaeology (Yvan St-Aubin, professor at Université de Montréal)
- Cryptography: history and methods (Jean-Xavier Caron-Aparicio and Marc Bergeron, professors at Cégep de Sainte-Foy)
- Paradoxes (Benoit Pouliot, Innovmetric)
- Triangles and Catalan numbers (Véronique Bazier-Matte, professor at Université Laval)
- Fermat (Mario Fortin, professor at Cégep Garneau)
- Mathémagie (AQJM)

Each day had its own theme. Tuesday at Cégep Garneau was Rubik's Cube Day, to celebrate the 50th anniversary of this legendary game. Each participant received a Rubik's Cube with the AMQ logo as a gift, and learned how to solve the puzzle. Some of them brought the cube with them all week to practice. Wednesday at Cégep Garneau was Math in Antiquity Day. At Cégep Ste-Foy, Thursday was Cryptography Day and Friday was Demonstration Day. The series of exercises were linked to the day's theme.

Organizer's General Comments:

*"What surprised us most was that a great group spirit was established right from the start of the camp. In fact, our welcoming activity was riddle solving, where the main aim was for the campers to get to know each other over a delicious BBQ. With each riddle, we changed teams so that participants could get to know each other better. A great success!"*

# Camp Scientifique : Voyage au coeur de la Science Moderne

Quick facts and figures

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|---|---|---|
| **Camp Location**<br>Université de Moncton<br>Shippagan, New Brunswick | **Camp dates**<br>July 2 to 5, 2024 | **% of students indicating an increased interest in STEM after the camp**<br>100% |
| **Students' Grade Level**<br>Grades 7 to 11 | **Number of students**<br>37 (17 m & 20 f) | **% of students considering STEM careers**<br>60% |

Efforts made to help students with financial difficulties:
Reduced rates and lower costs were offered for multiple registrations from the same family or participation in several camps.

STEM related activities that took place at the camp:

- Mathematics applied to robotics programming
- Using formulas in chemistry
- Weighing product mixtures
- Dosing
- Subtraction and addition

Best practices/activities at the camp:
An educational and safe environment with life-size installations, which was very impressive for the students.

Organizer's General Comments:
*"100% of the campers were satisfied with their camp and would like to come back with a friend next year. Thanks to the support of the CMS, we were able to offer t-shirts to the kids as a symbol of belonging, but we'll need to plan for more gifts."*

# CMS–AARMS Dalhousie Math Camp

Quick facts and figures

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|---|---|---|
| **Camp Location**<br>Dalhousie University<br>Halifax, Nova Scotia | **Camp dates**<br>July 21 to 25, 2024 | **% of students indicating an increased interest in STEM after the camp**<br>80% |
| **Students' Grade Level**<br>Grades 10-11 | **Number of students**<br>17 (6 m, 9 f & 2 non-binary) | **% of students considering STEM careers**<br>100% |

Efforts made to attract under-represented groups:
An effort was made to evenly distribute the number of male, female and non-binary students.

Efforts made to help students with financial difficulties:
Camp fees were waived for one student who required financial help.

STEM related activities that took place at the camp:
The students participated in many lectures/presentations by various faculty and graduate students on mathematics, biology, physics, and computer science topics. Each presentation had some form of activity to have the students spend time experimenting and learning the topic with the others in the camp.

Best practices/activities at the camp:
The chaperones were very active and were included in the games, activities, and events with the students, this very much helped all of the students feel more comfortable and included in the event. Additionally, during meal times, the chaperones ate with and spent time with the students, rather than separating themselves as a group of chaperones and a group of students.

The first day, students were nervous and shy, to remedy this early on, after dinner, we brought out board games and did some mathematical puzzles to get the students talking, laughing, and working together for the night. At the first dinner, there was some concern about some very anxious students not wanting to be included with others, but after the games/puzzles night, all of the students were excited to be talking and interacting with their new friends.

Sample Student Comments:
*"The chaperones were extremely friendly and caring. It allowed space for bonding and laughter. I found really nice that they ate with us on the same tables and slept in the same wing as the campers, making us feel included."*

*"I really enjoyed learning about black holes and their properties. Mathemagic was particularly fun and interesting. In general, I could better understand the lectures with examples, visuals, or experiments."*

Organizer's General Comments:
*"The camp was very well received by the students and I felt that it went very well, and of course some optimizations can be made for future years about scheduling and planning. In the future, we would hope that more funding would be included so that we can bring a larger group of students, originally we planned for 20, ended up on being able to accept 17. There were over 30 applications to the camp from schools all around Nova Scotia."*

# CMS Alberta Regional Mathematics Summer Camp

Quick facts and figures

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|---|---|---|
| **Camp Location**<br>University of Alberta<br>Edmonton, Alberta | **Camp dates**<br>July 14 to 21, 2024 | **% of students indicating an increased interest in STEM after the camp**<br>93% |
| **Students' Grade Level**<br>Grades 7 to 10 | **Number of students**<br>30 (20 m & 10 f) | **% of students considering STEM careers**<br>100% |

Efforts made to attract under-represented groups:
The participants for the camp were selected and invited based on results from various local, national, and international mathematics competitions. When two students had similar results, it was always the female student who was selected over the male student.

In the past, more female campers were recruited by asking each female camper to suggest a friend who would also benefit from attending the camp. Unfortunately, as this is a camp for the highest-motivated and highest-achieving students in Alberta, the invited friends were clearly not of the same caliber as the initially selected students. It resulted in negative feelings in both the initially invited female students and also the invited friends.

Efforts made to help students with financial difficulties:
Most of the camp fees were covered through grants from generous sponsors. No parents indicated that the fees were an issue (although fees certainly would have been waived for any campers whose families indicated such a problem).

STEM related activities that took place at the camp:
The camp program included lessons and activities surrounding number theory, computer programming, topology, infinite sequences, recurrence relations, probability, and many more subjects.

Best practices/activities at the camp:
The team activities (Heaven & Earth Contest, Math Battle, Team Contest, Scavenger Hunt) are an excellent way to have the campers collaborating in problem solving, sharing their ideas, and collectively creating mathematical arguments. These are some of the most important camp activities that the students rarely get to experience in any other setting.

Sample Student Comment:
*"I definitely enjoyed the classes. I learned a lot of new functions, skills, techniques, etc. even if I didn't fully understand them all. I also enjoyed meeting new people and creating friendships. The coding classes were fun as I explored new terminology."*

Organizer's General Comments:
*"This year's camp was a complete success. The campers really bonded and made excellent friendships that I am sure will continue as they develop into world leaders in Science and Technology."*

# 2024 CMS–PIMS SFU Surrey Math Camp

Quick facts and figures

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|---|---|---|
| **Camp Location**<br>Simon Fraser University<br>Surrey, British Columbia | **Camp dates**<br>June 25 and 26, 2024 | **% of students indicating an increased interest in STEM after the camp**<br>98% |
| **Students' Grade Level**<br>Grades 9-10 | **Number of students**<br>48 (26 m & 22 f) | **% of students considering STEM careers**<br>73% |

Efforts made to attract under-represented groups:
Teachers were asked to encourage female students or visible minorities. As a result, the gender ratio among students was almost 50%-50% female and male.

Efforts made to help students with financial difficulties:
One student asked about fee waiver as there are 8 children in the family and they have financial hardships. The fee waiver was granted.

STEM related activities that took place at the camp:
Students were introduced to various aspects of mathematical science (Fibonacci's numbers, elements of graph theory, operations research, modelling), some aspects of engineering when building various structures that used golden ration.

Best practices/activities at the camp:
Combination of theoretical presentations, math solving contest, hands-on activities (creating mathematical an engineering models) and campus tour gave students the opportunity to see the university, mingle with current undergrad and graduate students, faculty and still be energetic as all activities were taking turns.

Sample Student Comments:
"*I liked that the math camp connected concepts to real life. A lot of the lectures were very inspiring and interesting.*"

"*I loved the entire course and I believe it sparked my interest in math even more.*"

Organizer's General Comments:
"*The camp was very successful. Every participant left a positive evaluation.*"

# Math Experience

Quick facts and figures

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|---|---|---|
| **Camp Location**<br>York University<br>Toronto, Ontario | **Camp dates**<br>July 8 to 12, 2024 | **% of students indicating an increased interest in STEM after the camp**<br>100% |
| **Students' Grade Level**<br>Grades 7 to 10 | **Number of students**<br>50 (34 m & 16 f) | **% of students considering STEM careers**<br>100% |

Efforts made to attract under-represented groups:
Strong Grade 7, 8, and 9 students were selected based on their outstanding achievement on the Pascal, Cayley, Fermat, Euclid, Fryer, Galois, CIMC or CSMC (University of Waterloo) competitions and COMC. Preference was given to females to balance out the male: female ratio.

Efforts made to help students with financial difficulties:
The organizer made financial assistance available to students. In the past, when financial difficulties were reported, families were invited to pay whatever they could afford. This year, there were 7 students who paid what they could.

STEM related activities that took place at the camp:
In several of the presenters presentations, and during the daily problem solving and competition sessions, in addition to the morning warm-up and brainteaser sessions, the "process of STEM" (identifying a problem, and developing innovative and creative problem solving strategies towards solving it) was encouraged and promoted.

Best practices/activities at the camp:

- Students traditionally enjoy the brainteaser/warm-up (logic) problems at the beginning of camp, and the problem solving/team competitions at the end of camp;
- Students enjoyed our Escape Room trip on the last day of camp and the opportunity to socialize with their peers.

Sample Student Comment:
*"I really enjoyed working with my friends. I don't have anyone to talk about these kinds of hard questions in school because people were not very interested in math. However, in the camp, I felt very free to talk about my ideas. Working with someone in the similar age was way different from only being taught by the teacher, because when it is always the teacher who teaches you math, sometimes you just rely on them to give you the solutions and answers, and you cannot really think about how to solve the problem."*

Organizer's General Comments:
*"This year, I continued to promote mathematics through multi-layered questions with several entry points such that they are more accessible to a wider range of students and their ability levels. The level of ability of students this year appeared considerably weaker than in previous years."*

# Math Plus Tutors Math Camp

Quick facts and figures

| **Camp Location**<br>Sarnia, Ontario | **Camp dates**<br>July 8 to 12, 2024<br>August 5 to 9, 2024 | **Students' Grade Level**<br>Grades 1 to 9 | **Number of students**<br>24 (16 m & 8 f) |
|---|---|---|---|
| **% of students indicating an increased interest in STEM after the camp**<br>40-50% | | | |

Efforts made to attract under-represented groups:
Families of low income were contacted through non-profit organizations and school boards. The local mosque was also contacted to attract students from visible minorities. FREE and subsidized membership was offered for both math camps. The subsidized camp info was also shared on our social media channels.

Efforts made to help students with financial difficulties:
FREE and subsidized membership was offered for both math camps for students from low income families. The County of Lambton (YRASP) program was contacted to enable families with low income to utilize the financial assistance to attend these camps.

STEM related activities that took place at the camp:

- Tie-Dye T-Shirt (using permanent markers and, t-shirts, pillow cases, and 95% alcohol spray students were able to create a quick tie dye T-shirt or pillow case based on a math theme);
- Building Contest (Students went through a lesson on how to create urban cities, and houses. They were given a chance to come up with a model project for their group. They selected the proper materials to use for their projects. And they had a 90 minutes period to build their projects. Teams were awarded prizes by the end of contest);
- Math Contest (Teams were selected to compete through a pencil-and-paper math contest based on grades 1-8 Ontario curriculum. By the end of the contest, instructors went over the sheets and corrected the mistakes with the students);
- Kahoot Contest (This math contest method was used frequently. It was applied to small groups as well as big groups. All math strands were tested through that game).

Best practices/activities at the camp:
1- Differentiated learning
2- Using game based learning to make the learning enjoyable
3- Complementing the abstract concepts with hands on projects to keep the students engaged
4- Presenting challenging questions, and projects in a competitive way to motivate the children

Sample Student Comment:
*" [...] math is very important, and is very relevant when I want to pursue a career. [...] Maybe a lawyer or an interior designer. To be an interior designer, I'll have to make measurements and calculations."*

Organizer's General Comments:
*"This year was an excellent year in terms of turn out. We were able to host the three age groups in the second camp. The first camp was also a good one but on a smaller scale. Students benefited from learning and competing in math using hands on activities, and relating math to their daily life."*

# Fractals, Figures, inFinity!

Quick facts and figures

| | | |
|---|---|---|
| **Camp Location**<br>University of the Fraser Valley<br>Abbotsford, British Columbia | **Camp dates**<br>July 2 to 5, 2024 | **% of students indicating an increased interest in STEM after the camp**<br>70% |
| **Students' Grade Level**<br>Grades 4 to 6 | **Number of students**<br>19 (10 m & 9 f) | |

Efforts made to attract under-represented groups:
Advertisement is done through all school district offices, and also specifically to Indigenous Principals and Educational Assistants in our local communities. Posts are also made via Facebook, Instagram, X, and UFV Blog, and social media posts are shared through the UFV Indigenous Student Centre.

Efforts made to help students with financial difficulties:
Highly discounted registration fees were offered for local Indigenous families and some discounts for families with multiple siblings signing up, UFV students and alumni, or families signing up for multiple camps.

STEM related activities that took place at the camp:
Making (marble) roller coasters, fractals, mini catapults, tinfoil boats, Lego bridges, magic egg activity, scavenger hunt, 3D printing, and computer lab.

Best practices/activities at the camp:

- Online payment is being put in place;
- The website is good (for parents);
- Undergraduate science students run the camps (and plan the activities), and additional undergraduate science students are involved as volunteers;
- Favourite activities included: using microscopes, making slime, building a (Lego) bridge (and testing it!), and marble roller coasters.

Sample Student Comments:
*"It's a fun, cool, amazing, smart and inclusive week"*

Organizer's General Comments:
*"Our camps are well known and popular in the community. This year we tested out expanding one camp that had a large waitlist (we hired a 4th Facilitator and increased the camp size to 32 students). This was not ideal, the group was too large, and splitting them up to do parallel activities was not feasible. We will keep our max enrolment at 24-26 in future. We also tried new lunch vendors this year, including a local business; expenses were more, but the food was well received."*

# Fire, Flood, Frost!

Quick facts and figures

| | | |
|---|---|---|
| **Camp Location**<br>University of the Fraser Valley<br>Abbotsford, British Columbia | **Camp dates**<br>July 8 to 12, 2024 | **% of students indicating an increased interest in STEM after the camp**<br>70% |
| **Students' Grade Level**<br>Grades 4 to 6 | **Number of students**<br>32 (20 m & 12 f) | |

Efforts made to attract under-represented groups:
Advertisement is done through all school district offices, and also specifically to Indigenous Principals and Educational Assistants in our local communities. Posts are also made via Facebook, Instagram, X, and UFV Blog, and social media posts are shared through the UFV Indigenous Student Centre.

Efforts made to help students with financial difficulties:
Highly discounted registration fees were offered for local Indigenous families and some discounts for families with multiple siblings signing up, UFV students and alumni, or families signing up for multiple camps.

STEM related activities that took place at the camp:
Rocket build, frost in a can, flood simulator, play doh volcano, fire snake

Best practices/activities at the camp:

- Online payment is being put in place;
- The website is good (for parents);
- Undergraduate science students run the camps (and plan the activities), and additional undergraduate science students are involved as volunteers;
- Favourite activities included: using microscopes, making slime, building a (Lego) bridge (and testing it!), and marble roller coasters.

Sample Student Comments:
*"I learned a lot of things including fire, physics and biology."*

Organizer's General Comments:
*"Our camps are well known and popular in the community. This year we tested out expanding one camp that had a large waitlist (we hired a 4th Facilitator and increased the camp size to 32 students). This was not ideal, the group was too large, and splitting them up to do parallel activities was not feasible. We will keep our max enrolment at 24-26 in future. We also tried new lunch vendors this year, including a local business; expenses were more, but the food was well received."*

# Flora, Fauna, Fossils!

Quick facts and figures

| | | |
|---|---|---|
| **Camp Location**<br>University of the Fraser Valley<br>Abbotsford, British Columbia | **Camp dates**<br>July 15 to 19, 2024 | **% of students indicating an increased interest in STEM after the camp**<br>70% |
| **Students' Grade Level**<br>Grades 4 to 6 | **Number of students**<br>21 (11 m & 10 f) | |

Efforts made to attract under-represented groups:
Advertisement is done through all school district offices, and also specifically to Indigenous Principals and Educational Assistants in our local communities. Posts are also made via Facebook, Instagram, X, and UFV Blog, and social media posts are shared through the UFV Indigenous Student Centre.

Efforts made to help students with financial difficulties:
Highly discounted registration fees were offered for local Indigenous families and some discounts for families with multiple siblings signing up, UFV students and alumni, or families signing up for multiple camps.

STEM related activities that took place at the camp:
Crystals, elephant toothpaste, slime, nature walks around campus, plating saplings.

Best practices/activities at the camp:

- Online payment is being put in place;
- The website is good (for parents);
- Undergraduate science students run the camps (and plan the activities), and additional undergraduate science students are involved as volunteers;
- Favourite activities included: using microscopes, making slime, building a (Lego) bridge (and testing it!), and marble roller coasters.

Sample Student Comments:
"*Fun making friends and doing cool experiments*"

Organizer's General Comments:
"*Our camps are well known and popular in the community. This year we tested out expanding one camp that had a large waitlist (we hired a 4th Facilitator and increased the camp size to 32 students). This was not ideal, the group was too large, and splitting them up to do parallel activities was not feasible. We will keep our max enrolment at 24-26 in future. We also tried new lunch vendors this year, including a local business; expenses were more, but the food was well received.*"

# SFU Math Camp

Quick facts and figures

| | | |
|---|---|---|
| **Camp Location**<br>Simon Fraser University<br>Burnaby, British Columbia | **Camp dates**<br>July 24 to 28, 2024 | **% of students indicating an increased interest in STEM after the camp**<br>100% |
| **Students' Grade Level**<br>Grades 9-10 | **Number of students**<br>25 (14 m & 11 f) | **% of students considering STEM careers**<br>100% |

Efforts made to attract under-represented groups:
Information for the camp was distributed to all high-school math departments heads in the Greater Vancouver area. Targeted emails were also sent to teachers who have nominated students in prior years. Information was also sent to the British Columbia Association of Math Teachers email list.

Efforts made to help students with financial difficulties:
Information sent to students/teachers indicates to check with their school to see about opportunities for the school to pay the registration fee. No inquiries were received about students in financial difficulties this year. However, waiving of fees is certainly an available option if necessary.

STEM related activities that took place at the camp:
Groups, Graphs, and Games was the theme of the camp this year. Students were introduced to a number of combinatorial games - which they played in the morning on the first day of the camp. Students then learned about graph theory, worked on problems, and analyzed some graph theoretic games: instant insanity, bridg-it, and sprouts. Students then were introduced to group theory, worked on problems, and applied group theory to analyze some games: nim and peg solitaire. Proof techniques (contradiction, induction) were introduced in problem solving sessions. The final day brought all the topics together to develop winning strategies for the games introduced on the first day of the camp.

Best practices/activities at the camp:
Lunch in the university dining hall is the one of the best decisions we've made. They meet all dietary needs, students get a healthy meal. Organization is simple, we arrange meal tickets a few weeks in advance, and for the week of the camp enjoy a nice walk across campus daily. Different faculty members in the department join each day to eat and have informal conversations with camp participants.

Sample Student Comments:
*"The SFU Math camp was a very good experience where I could learn new things while having fun. I would definitely come back and I'm sure other students would enjoy with opportunity as well."*

*"I think this camp is very helpful for exposing young minds to new and interesting concepts that are not usually taught in high school and should continue."*

Organizer's General Comments:
*"Many students were excited to see new types of mathematics (graph and group theory) and took home games to share what they learned with their families during the week. From the camp organizers here a SFU we offer a BIG thank you to the CMS for your support of the camp this year."*

# UNB/CMS Math Camp

Quick facts and figures

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|---|---|
| **Camp Location**<br>University of New Brunswick<br>Fredericton, New Brunswick | **Camp dates**<br>May 24 to 26, 2024 |
| **Students' Grade Level**<br>Grade 10 | **Number of students**<br>21 (13 m & 8 f) |

STEM related activities that took place at the camp:

During the 52 or so hours that students were on site, several engaging problem-solving sessions were organized, which saw students working in small groups, meeting peers from other schools in other parts of the province) and presenting their solutions to the group. On Friday evening, the campers played a game of "Basketball math" at the gym, which encourages group participation in solving problems that get progressively more challenging. Furthermore, several guest speakers visited the camp.

Sample Student Comments:

*"The camp brought many people who share similar interests and goals together, this is what classroom in regular school can't do. It allows students to know others from different regions in the province as well."*

*"This camp was an amazing opportunity to explore the wonderful world of numbers and look at math from a completely different perspective compared to school."*

Organizer's General Comments:

*"We will be continuing this valuable outreach project in 2025."*

# University of Ottawa Math Camp

Quick facts and figures

| | | |
|---|---|---|
| **Camp Location**<br>University of Ottawa<br>Ottawa, Ontario | **Camp dates**<br>June 23 to 29, 2024 | **% of students indicating an increased interest in STEM after the camp**<br>90% |
| **Students' Grade Level**<br>Grade 10 | **Number of students**<br>48 (28 m & 20 f) | **% of students considering STEM careers**<br>80% |

Efforts made to attract under-represented groups:
In all correspondence with schools and parents, it was clearly mentioned that one of the selection criteria is to have a balanced camp in terms of gender. In particular to encourage more girls to participate.

Efforts made to help students with financial difficulties:
Substantial funding was secured for the camp in order to reduce costs for students and their families.

STEM related activities that took place at the camp:
The camp welcomed various guests who delivered lessons and activities about fractions, cryptology, statistics, quantum computing, Diophantine equations, probability, physics, chemistry, etc.

Best practices/activities at the camp:
The most successful activities at the camp were the competitions (team and individual), as well as any hands-on activities.

Items provided to students:
Every student participating in the camp was awarded at least a book, but in most cases there were other prizes like Indigo gift cards, Maple software and others. Also, material was provided to each student to build a team project.

Efforts made to increase awareness of the camp:
The camp was talked about in the local newspaper, on social media, and during interviews.

Sample Student Comment:
*"I wanted to say thank you again for the amazing time I had at CMS camp. It was incredibly eye-opening and, I feel like I got a better understanding of what math is capable of."*

# Western University Beta Math Camp

Quick facts and figures

| | | |
|---|---|---|
| **Camp Location**<br>Western University<br>London, Ontario | **Camp dates**<br>July 8 to 12, 2024 | **% of students indicating an increased interest in STEM after the camp**<br>84% |
| **Students' Grade Level**<br>Grade 8 | **Number of students**<br>23 (16 m & 7 f) | **% of students considering STEM careers**<br>68% |

Efforts made to attract under-represented groups:
A bursary was offered to an Indigenous student who showed interest in the camp.

Efforts made to help students with financial difficulties:
A discount code was offered to families who signaled a financial need.

STEM related activities that took place at the camp:
Talks and competitions are the two main components of the Math Camp at Western.

- Talks: Each day we had two talks—one before noon and one after noon—that were delivered by mathematicians, including mathematics professors, postdoctoral researchers, graduate students. A wide range of topics was covered, from financial math to geometry, and from game theory to cryptography. Students with 8th grade mathematics knowledge were able to follow the talks, and the only requirement was that they engaged and participated in the activities suggested by the speakers.
- Contests: Math contests were another part of this year's Math Camp. Three contests were held every day: Morning Mysteries, The 5 Day Math Race, and Indianapolis 800. Seven students were awarded prizes for their combined scores from all camp contests.

Best practices/activities at the camp:
Updating and creating documents of policies and procedure: This year, we have updated policy for the camp. These are codes of conduct that are to be always followed to ensure the safety and staff and students, as well as to make sure we stay within legal guidelines. We have also completed a procedure guide for the camp and future camp staff. These procedures outline the new five-day camp period and the hourly deconstruction of the days. It gives advice on what to do, reminders of things to look out for, as well as rules to follow.

Sample Student Comment:
"*I loved the morning mysteries because they felt like a really fun way to exercise my brain.*"

# Western University Gamma Math Camp

Quick facts and figures

| | | |
|---|---|---|
| **Camp Location**<br>Western University<br>London, Ontario | **Camp dates**<br>July 15 to 19, 2024 | **% of students indicating an increased interest in STEM after the camp**<br>80% |
| **Students' Grade Level**<br>Grade 9 | **Number of students**<br>22 (11 m, 10 f & 1 non-binary) | **% of students considering STEM careers**<br>75% |

Efforts made to attract under-represented groups:
Indigenous Students' Bursary (ISB) for Western Math Camp: To encourage and increase Indigenous student attendance in the camps we initiated an Indigenous students bursary this year. The bursary covered the registration fee (225CSN+tax) for up to three indigenous students in each camp (10 percent of the camp attendance).

Efforts made to help students with financial difficulties:
A discount code was offered to families who signaled a financial need.

STEM related activities that took place at the camp:
Talks and competitions are the two main components of the Math Camp at Western.

- Talks: Each day we had two talks—one before noon and one after noon—that were delivered by mathematicians, including mathematics professors, postdoctoral researchers, graduate students. A wide range of topics was covered, from financial math to geometry, and from game theory to cryptography. Students with 8th grade mathematics knowledge were able to follow the talks, and the only requirement was that they engaged and participated in the activities suggested by the speakers.
- Contests: Math contests were another part of this year's Math Camp. Three contests were held every day: Morning Mysteries, cryptographic challenges, and the Indianapolis 900. Seven students were awarded prizes for their combined scores from all camp contests.

Best practices/activities at the camp:
Introducing Two Assistant Coordinator Positions: This year, we introduced two full-time 8-week assistant coordinator positions. These positions were partially supported by the Canadian Summer Job Program. The assistant coordinators were the main representatives of the program, handling the daily operations of the camp and working with different people involved in it.

Sample Student Comments:
*"I liked crypto because I learned things I've never even heard of. I liked morning mysteries because it let you get to know people."*

*"This camp was very fun and made math fun and interesting."*

# Western University Theta Math Camp

Quick facts and figures

| | | |
|---|---|---|
| **Camp Location**<br>Western University<br>London, Ontario | **Camp dates**<br>July 22 to 26, 2024 | **% of students indicating an increased interest in STEM after the camp**<br>93% |
| **Students' Grade Level**<br>Grade 10 | **Number of students**<br>17 (13 m & 4 f) | **% of students considering STEM careers**<br>81% |

Efforts made to attract under-represented groups:
Indigenous Students' Bursary (ISB) for Western Math Camp: To encourage and increase Indigenous student attendance in the camps we initiated an Indigenous students bursary this year. The bursary covered the registration fee (225CSN+tax) for up to three indigenous students in each camp (10 percent of the camp attendance).

Efforts made to help students with financial difficulties:
A discount code was offered to families who signaled a financial need.

STEM related activities that took place at the camp:
Talks and competitions are the two main components of the Math Camp at Western.

- Talks: Each day we had two talks—one before noon and one after noon—that were delivered by mathematicians, including mathematics professors, postdoctoral researchers, graduate students. A wide range of topics was covered, from financial math to geometry, and from game theory to cryptography. Students with 10th grade mathematics knowledge were able to follow the talks, and the only requirement was that they engaged and participated in the activities suggested by the speakers.
- Contests: Math contests were another part of this year's Math Camp. Three contests were held every day: Morning Mysteries, cryptographic challenges, and the Indianapolis 1000. Seven students were awarded prizes for their combined scores from all camp contests.

Best practices/activities at the camp:
Bank of Lesson Plans: Throughout the years, various talks have been suggested, developed and presented in the camps. We have been able to collect the different versions of the talk and sometimes their lesson plans (if it was created or suggested by the coordinator). This year, the assistant coordinators were assigned and supervised the creation of additional lesson plans for a handful of new topics. Developing a bank of lesson plans is essential for two reasons: on one hand, it helps maintain the involvement of graduate and undergraduate students as speakers, and on the other hand, it ensures a consistent level of content across different camps in various years.

Sample Student Comments:
*"It was interesting, i learned something, the time was managed nicely and i developed some interest in the topic."*

*"Fun and interesting challenges. I wasn't sure what would exactly happen at Math Camp, but i'd definitely say it was a good time."*

# Western University Zeta Math Camp

Quick facts and figures

| | | |
|---|---|---|
| **Camp Location**<br>Western University<br>London, Ontario | **Camp dates**<br>July 29 to August 2, 2024 | **% of students indicating an increased interest in STEM after the camp**<br>84% |
| **Students' Grade Level**<br>Grades 11-12 | **Number of students**<br>20 (9 m & 11 f) | **% of students considering STEM careers**<br>94% |

Efforts made to attract under-represented groups:
Indigenous Students' Bursary (ISB) for Western Math Camp: To encourage and increase Indigenous student attendance in the camps we initiated an Indigenous students bursary this year. The bursary covered the registration fee (225CSN+tax) for up to three indigenous students in each camp (10 percent of the camp attendance).

Efforts made to help students with financial difficulties:
A discount code was offered to families who signaled a financial need.

STEM related activities that took place at the camp:
Talks and competitions are the two main components of the Math Camp at Western.

- Talks: Each day we had two talks—one before noon and one after noon—that were delivered by mathematicians, including mathematics professors, postdoctoral researchers, graduate students. A wide range of topics was covered, from financial math to geometry, and from game theory to cryptography. Students with 11th grade mathematics knowledge were able to follow the talks, and the only requirement was that they engaged and participated in the activities suggested by the speakers.
- Contests: Math contests were another part of this year's Math Camp. Three contests were held every day: Morning Mysteries, bitcoin challenge, and the Indianapolis 1100. Five students were awarded prizes for their combined scores from all camp contests.

Best practices/activities at the camp:
Visiting Guest Teachers: Since summer 2023, we started inviting local math teachers who had worked with us on different programs during the academic year to visit our math camps. This year this program was fully implemented, and we had a math teacher visiting almost every day of the camp (some of them visited the camp for several days).

Sample Student Comments:
"*Fun, teamwork, lots of calculations. I know how bitcoin works now.*"

"*I enjoyed everything here, especially the volunteers and staff. Everyone is so smart.*"

# 2024 Specialty Math Camps

Specialty camps follow the same format as regional camps, but are specifically designed for underrepresented groups in math, including, but not limited to Indigenous, Black, and female-identifying students. These camps are tailored to the needs of the community they serve, allowing students to understand mathematics in a culturally and socially relevant context.

# Black Educators Association/DAL Math Camp

Quick facts and figures

| | | |
|---|---|---|
| **Camp Location**<br>Dalhousie University<br>Halifax, Nova Scotia | **Camp dates**<br>July 7 to 12, 2024 | **% of students indicating an increased interest in STEM after the camp**<br>90% |
| **Students' Grade Level**<br>Grades 7 to 9 | **Number of students**<br>24 (12 m & 12 f) | **% of students considering STEM careers**<br>70% |

Efforts made to attract under-represented groups:
This is a camp for African-Nova Scotian Youth. Efforts are made to recruit students from across NS.

Efforts made to help students with financial difficulties:
There is a $25 registration fee (to assure attendance) and no other charge.

STEM related activities that took place at the camp:
The camp has Math & Coding sessions every day, with a minimum of 4.5 hours of Math & Coding per day. The math sessions included binary representation, error correcting codes, liar's bingo, and math & music. The coding sessions included programming in SCRATCH, and the robotics session included solving FIRST Lego League robotics problems.

Best practices/activities at the camp:

- The use of SCRATCH for coding. The programming exercises required drawing polygons and spirograph like patterns of polygons and spirals.
- The application of coding to robotics exercises.

Sample Student Comment:
*"Though I had never showed interest in coding or engineering prior to this camp, the BEA program has undoubtedly heightened my knowledge and intrigue in said subject."*

*" I wanna be a math teacher to help kids reach they're [sic] full potential and see that math can be fun and it isn't all pen and paper."*

Organizer's General Comments:
*"We had a camp packed with fun learning opportunities. The Robotics Sessions (introduced this year: (I traded leading a Math session for a Physics Camp, in exchange for our campers being able to use the Robotics lab) were a great success with about 75% of the campers (this was also the success rate of campers learning to code)."*

# Connecting Math to Our Lives and Communities Summer Camp

Quick facts and figures

| | | |
|---|---|---|
| **Camp Location**<br>St. Francis Xavier University<br>Antigonish, Nova Scotia | **Camp dates**<br>August 14, 2024 | **% of students indicating an increased interest in STEM after the camp**<br>100% |
| **Students' Grade Level**<br>Grades K to 12 | **Number of students**<br>28 (14 m & 14 f) | **% of students considering STEM careers**<br>100% |

Efforts made to attract under-represented groups:
CMTOLC serves Black and Indigenous communities. There is a long-standing relationship with community partners and all students come from these communities. Transportation is provided to the event and all meals are covered for the event.

Efforts made to help students with financial difficulties:
Transportation and meals are provided. There is no cost to attend. Costs are supplemented with funds from NSERC Promoscience and the Canadian Mathematical Society.

STEM related activities that took place at the camp:
The Amazing Math Race, which included:

- X-Oceans
- X-Chem
- Bio Department
- Balance station
- Marshmallow Tower
- Build a number
- Shape Safari

Best practices/activities at the camp:
A key component to our success is sustained relationships with community partners that allow us to have strong community engagement. Community members offer workshops, support the development of ideas, and encourage youth.

Sample Student Comment:
"*I've learned that math can be fun!*"

"*Math is in everything!*"

# Dalhousie Indigenous Math Camp

Quick facts and figures

| | | |
|---|---|---|
| **Camp Location**<br>Dalhousie University<br>Halifax, Nova Scotia | **Camp dates**<br>July 22 to 27, 2024 | **% of students indicating an increased interest in STEM after the camp**<br>92% |
| **Students' Grade Level**<br>Grades 8-9 | **Number of students**<br>14 (7 m & 7 f) | **% of students considering STEM careers**<br>75% |

Efforts made to attract under-represented groups:
With the assistance of Mi'kmaw Kina'matnewey (MK: The Indigenous School Board in Cape Breton), we asked principals of schools in indigenous communities across Nova Scotia to help find indigenous students for the camp. Female students were especially encouraged to apply.

Efforts made to help students with financial difficulties:
All fees to all students were waived.

STEM related activities that took place at the camp:
During each of the four days of teaching, various mathematics activities took place (including games and those based on mathematical principles), as well as sessions in a computer lab to learn to program in the programming language SCRATCH.

Best practices/activities at the camp:
It is helpful to spread the teaching out among faculty, rather than try to hire specific teachers, as the former are well versed at teaching and a large cadre of instructors can be used for other camps both presently and in the future.

Items provided to students:
Various prizes (gift cards) were presented, as well as mathematic gifts (including decks of the game SET) and indigenous gifts (including dreamcatchers).

Organizer's General Comments:
*"The camp was very successful! Students formed an online group at the end of camp and all said they planned to attend university."*

# Entrepreneurship Summer Camp

Quick facts and figures

| | | | |
|---|---|---|---|
| **Camp Location**<br>Yukon University<br>Whitehorse, Yukon | **Camp dates**<br>July 8 to 12, 2024 | **Students' Grade Level**<br>Grades 7 to 9 | **Number of students**<br>12 (6 m & 6 f) |
| **% of students indicating an increased interest in STEM after the camp**<br>25% | | | |

Efforts made to attract under-represented groups:

- Early registration for Indigenous youth, allowing to access funding such as Jordan's Principle;
- Split registration (girls & non-binary youth, boys & non-binary youth) to allow for equitable access to our programming.

Efforts made to help students with financial difficulties:

Thanks to the funding from the Canadian Math Society and complementary funding obtained through the University of Regina, the cost of camps was decreased from the typical $350 weekly fee to $50.

STEM related activities that took place at the camp:

The camp as a whole was STEM focused programming - from math involved in business planning, to engaging with general STEM activities (slime, tie dye, paper airplane challenge, etc.) and free-time with a science spin.

Best practices/activities at the camp:

- Deep and meaningful engagement with community entrepreneurs;
- Building a safe space for youth to imagine and participate fully as their authentic selves;
- Good inclusion of activities where the participants get to be outside, to move and to break up the full days;
- Having a Bear Cave (a.k.a. Dragon's Den).

Sample Student Comment:

*"While helping with our "businesses", our facilitators also included everyone in fun camp games, making everyone feel included and bringing us closer together."*

Organizer's General Comments:

*"This camp was a great success. Running it for a second year in a row has helped build enthusiasm amongst the community - youth are starting to look forward to it as a staple of our programming. Our staff continued to involve a significant amount of guest speakers from the community from brands that are recognized. This funding has made the camp more accessible to a larger basin of kids, and has given another avenue to include math skills in our summer programming!"*

# Full Camp List

*__Black Educators Association/DAL Math Camp__, Halifax, NS

__Blundon Seminar Math Camp__, St. John's, NL

__Camp de l'AMQ pour le cégep 2024__, Sherbrooke, QC

__Camp de l'AMQ pour le secondaire 2024__, Ste-Foy, QC

__Camp Scientifique: Voyage au cœur de la Science Moderne__, Shippagan, NB

__CMS -AARMS Dalhousie Math Camp__, Halifax, NS

__CMS Alberta Regional Mathematics Summer Camp__, Edmonton, AB

__2024 CMS-PIMS SFU Surrey Math Camp__, Surrey, BC

*__Connecting Math to Our Lives and Communities Summer Camp__, Antigonish, NS

*__Dalhousie Indigenous Math Camp__, Halifax, NS

*__Entrepreneurship Camp__, Whitehorse, YT

__Fractals, Figures, inFinity!__, Abbotsford, BC

__Fire, Flood, Frost!__, Abbotsford, BC

__Flora, Fauna, Fossils!__, Abbotsford, BC

__Math Experience__, Toronto, ON

__Math Plus Tutors Math Camp__, Sarnia, ON

__SFU Math Camp__, Burnaby, BC

__UNB/CMS Math Camp__, Fredericton, NB

__University of Ottawa Math Camp__, Ottawa, ON

__Western Math Camp (Beta Camp)__, London, ON

__Western Math Camp (Gamma Camp)__, London, ON

__Western Math Camp (Theta Camp)__, London, ON

__Western Math Camp (Zeta Camp)__, London, ON

*Specialty camps

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