NEW HAMPSHIRE TEACHERS OF MATHEMATICS

Mathesis

Volume 45, Issue 3 February 2013

NHTM Celebrates Fifty Years

Upcoming Deadlines:

- March 15 NHTM Conference Early Registration
- March 15 NCTM Annual Conference Early Registration
- April 1 Nominations for Presidential Award of Excellence in Mathematics and Science Teaching 7-12 due. Completed applications due May 1.
- May 1 NCTM 2014 Annual Conference Speaker Proposals,

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By Judy Curran Buck, Past President

50 Years of Achievement...Infinitely More to Come!!

That's the theme of NHTM's 50th Anniversary Conference and Celebration that will soon be happening at the Radisson Hotel in Manchester on April 4 & 5. We as teachers of math do have a lot to celebrate - and we are always learning. This is a great opportunity to meet with old friends and new, share your knowledge, and take home much more. To register for the Dinner Celebration and/or the Conference, go to **nhmathteachers.org**.

The dinner banquet on Thursday evening, April 4th, is sure to be a memorable and entertaining event. The evening will begin at 4:00 PM with a social hour and an NHTM Artifact Museum. You won't want to miss the round of Hollywood Squares after dinner that is being planned by NHTM's "Celebration Committee" – we'll have some special guests!

Friday's conference on April 5th will have over 40 sessions, with something for everyone, pre-K through college. You will be able to attend your choice of hands-on activities and group sessions with information on everything from the Common Core to integrating technology to critical thinking and algebra .

We are pleased to have as our keynote speaker, NHTM Past-President Joan Ferrini-Mundy, returning from her current role at the NSF in Washington, DC. Other notable speakers include Linda Gojak, NCTM president, Hank Kepner, Laurie Boswell, and more - too many to list here! Be sure to check the online "Schedule at a Glance" to see the amazing group of speakers we've gathered for you (nhmathteachers.org). There you will also be able to see descriptions of the sessions to help you plan your day.

At the conference, you will also be able to network with friends and colleagues over a hot lunch. Make sure you peruse the Exhibit Hall – exhibitors will be showcasing many new materials for implementing the Common Core. Finally, we will end the day with **NHTM's Annual Business Meeting** and give away lots of **door prizes** for you lucky folks who stay until the end!

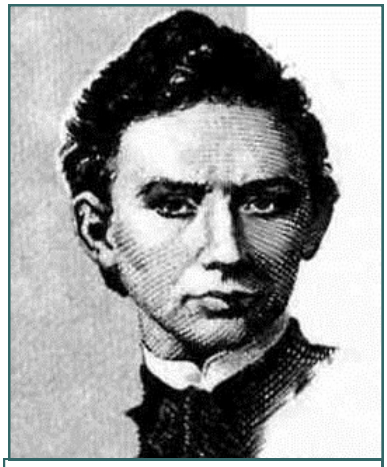
Hope to see you there!

Art's Attic: Janos Bolyai

By Art Johnson

The last *Art's Attic* discussed Nicolai Lobachevsky, one of the founders of non-Euclidean Geometry. This column focuses on Janos Bolyai (1802-1860), who independently discovered non-Euclidean geometry.

Janos Bolyai was the son of a famous mathematics professor, Farkus Bolyai. Farkus had attended Gottingen University with Carl Gauss, and soon after graduating had tried to solve the problem of Euclid's Fifth Postulate by developing a new system of non-Euclidean geometry. After much effort he finished his explorations and sent his manuscript to his old classmate. Gauss found an error in the proof of the system and returned the manuscript to Farkus. There the matter rested until some decades later.



http://www-groups.dcs.st-and.ac.uk/history/BiogIndex.html

As early as 1823, Janos Bolyai began to explore non-Euclidean geometry. Perhaps Farkus remembered the time and effort he spent in his futile pursuit of non-Euclidean geomery. He advised his son

> *"For God's sake, please give it up…it [the study of non-Euclidean geometry] may take up all your time, and deprive you of your health, peace of mind, and happiness in life."*
> http://www-groups.dcs.st-and.ac.uk/history/BiogIndex.html

Unfortunately, events would prove Farkus right.

Janos did not listen to his father. At the sames time that Lobachevsky labored in Russian obscurity to develop his findings, Janos was applying the same proof by contradiction to the Fifth Postulate. In the midst of his explorations with the Fifth Postulate he wrote his father

> *"I have resolved to publish a work on the theory of parallels…I have created a new universe from nothing. All that I have sent you 'til now is but a house of cards compared to a tower. I am fully persuaded that it will bring me honour...."*

Seeing his son was determined to continue his pursuit of non-Euclidean geometry, Farkus urged Janos to publish new ideas promptly.

> *"First, because ideas pass easily from one to another, who can anticipate its publication… and secondly,…many things have an epoch, in which they are found at the same time in several places, just as violets appear on every side in the spring. Also, every scientific struggle is just a serious war, in which I cannot say when peace will arrive. Thus we ought to conquer when we are able, since the advantage is always to the first comer."*

As it turned out, neither honor nor the claim to be first was to be Janos Bolyai's destiny.

Eventually Bolyai constructed the same sys-

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President's Message:

What do you really want your students to learn?

By Greg Superchi

The title of this message was the question asked at a recent professional development day in our district for all teachers. The facilitator let us "free write" about it for three minutes. Before you read mine, please stop and write about this for three minutes as well. *(OK, let's be honest, most of you are not going to do that simply because you don't have the time. So, at least stop and think for one minute!)*

I can remember it not taking long at all. This is what I wrote…

> Yes! I want them to be problem solvers! Does this mean that I do not want them to know specific mathematical topics? No! Of course I do. However, mathematics is just one tool in professional and personal life that I use every day. I continually draw on the things I learned during my formative years in language arts, science, history, typing class, summer jobs, church, and in my grandfather's wood shop. They all came together to mold me into the person I am today.

So what *do* I remember from those places that are not directly connected to my mathematics education training? Let's face it, for most of our students, mathematics will not be the *focus* of their college studies or professional careers. What are the core pieces of knowledge that I still use today? Some of them are more practical. For instance, I'm using what I learned in Mrs. Andross' typing class as I write this! And, probably use that skill in my daily life as much as any. However, I don't remember everything I was taught in that class like the difference between pica and elite fonts or even the correct spacing on a business letter versus a personal letter (anyone remember having to do this on a typewriter? – and, we had a test on it!). I no longer remember the entire preamble to the Constitution or the date of the Geneva Convention. Honestly, I don't even remember an algorithm for how to calculate the square root of 231 with only paper and pencil. However, I do know where to find all of that information.

So I ask the question to myself again, "What *do* I remember?" Mr. Younkins, in history class, taught me passion for learning and life, that "those who fail to learn from history are doomed to repeat it," and to look below the surface for causes of events and conflicts between human beings. Mr. Haywood, in English class, taught me about standing up for what you believe in, why it is important to communicate in writing clearly and effectively, and to think critically. Mr. Perham, in science class, taught me to have fun when you work, that there is a cause and effect between, among, and within biological organisms, and to be curious about everything around me. Collectively, my elementary teachers at Campton Elementary School (Go Foxes!) taught me probably some of my most important lessons: if you are nice to others then they are usually nice to you, if you continually work hard at something you will eventually get it, and the value of community.

What about my math classes you might ask? Being brutally honest, if I had not studied mathe-

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Elementary Representative

Student Engagement…They Have An App For That

By Stephanie Wheeler

In my opinion, student engagement is simultaneously the most difficult and most essential component of student learning. Teachers work tirelessly to make instruction meaningful and to offer it in a way that entices students to want to learn. While it is certainly not the only way to engage students, utilizing technology is definitely a way to capture student attention and a means by which we can get students reasoning and communicating about mathematics.

Many teachers in my building have found ways to incorporate technology, including iPads, into their math blocks. From using the iPads as interactive whiteboards with Apple TV's to using iPads as station work, students are engaged everyday with technology in school. One important component of technology integration for students is incorporating time to reason, discuss and apply the lessons learned to the mathematics they are studying.

Below are a few apps I have found not only engage students in mathematics, but come recommended by them. Use them at school or make suggestions of apps to download at home. Either way, students are practicing and having fun!

FACT PRACTICE APPS:

Each of the Apps below provides practice with addition, subtraction, multiplication and division, but with a fun, game quality to the practice.

- **Math Bubble**
- **Math Bingo**
- **Meteor Math**
- **Rocket Math**
- **Jet Ski**
- **Chicken Bounce**

ESTIMATION APPS:
Each of the Apps below requires estimating before solving.

- **Wishball**
- **Pick-a-Path**

LANDMARK NUMBER APPS:
Each of the Apps below provides practice with elementary Landmark numbers.

- **Tenser – Created by NHTM's Rich Andrusiak!**
- **Super 7**

ALGEBRA APPS:
Each of the Apps below incorporates an unknown or requires a student to "balance" a scale/equation.

- **Math Balance**
- **Number Pyramid**

EVERYDAY MATH APPS:
Each of the Apps below is an Everyday Math App. Several times a year, Everyday Math offers a free download of some of their apps. I have highlighted only a few:

- **Divisbility**
- **Beat the Calculator**

GEOMETRY APPS:
Each of the following apps provides practice with geometry concepts:

- **Symmetry Shuffle**
- **Odd 1 Out**

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Post-Secondary Representative

You Can Make the Difference… Standards For K-12 Mathematics Need Your Attention Now!

By Rich Andrusiak

Did you know that the School Approval Standards (ED 306) are expiring July 1, 2013 and that the revision process of the new set of standards has begun? NHTM wants to ensure these standards support the mathematical rigor demanded by college and career readiness. We want to reach out to the NH Department of Education and encourage them to involve content expertise in the process – not just mathematics but all content areas.

My last two articles focused on a revision to a NH State Task Force Report statement. That revised statement was adopted by the State Board of Education and put into the revised report and reads:

> Encourage all students to complete mathematics each of their four years in high school demonstrating proficiency and substantial depth of understanding that is directly aligned to any of the four model course pathways articulated in *Common Core State Standards for Mathematics Appendix A : Designing High School Mathematics Courses Based on the Common Core State Standards*. In addition, ensure that the high school mathematics curriculum focuses on mathematical practices, quantitative literacy, and statistical reasoning so all students meet rigorous competencies in these areas that are aligned to Common Core State Standards. Develop flexible paths that allow students to meet these standards through a focus on communication, reasoning and sense making, and mathematical modeling.

You can find the report here: http://www.education.nh.gov/instruction/curriculum/math/documents/math-report.pdf. When the State Board of Education adopted this statement, they charged those of us (Greg Superchi, Christine Downing, and myself) who appeared in front of the board to make certain the statement makes it into policy. Paul Leather, Deputy Commissioner, supported the policy effort when he was a guest on *The Exchange*, on NHPR in December. In fact, our own president, Greg Superchi was a guest on the show as well. You can listen to the archive of that show here: http://www.nhpr.org/post/solving-our-math-problems.

The Ed 306 standards set the minimum standards for public school approval – this includes elementary, middle, and high school standards. We have contacted the Department of Education to encourage a dialogue between mathematics educators in the state and DOE administrators so that NHTM can be involved in the revision of the school approval standards. It isn't clear if the Department of Education plans on making any changes to content. However, it is clearly the time to make changes due to the impact of the Common Core. You can find the charge of the committee and the timeline for revision here: http://www.education.nh.gov/legislation/ed306review.htm. The timeline indicates that the State Board of Education will approve the Initial Proposal in May 2013. This would seem to indicate that the standards themselves need to be revised by this point. We have

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Middle Level Representative

Modeling Mathematics

By Katrina Hall

A constant ponder amongst educators is why so many students have trouble learning mathematics. At the start of the year, a common teacher practice is taking a student inventory and it is sad to say that there are responses which include "I can't do math." Whether or not this is true is another topic of discussion but one can say that many students make this statement based on the fact that they struggle with learning mathematics.

One of the best tools for struggling students is to provide concrete and visual representations to supplement the abstract concepts which are taught at the middle level. Concrete representations may include pattern blocks, unit cubes, 3D models, fraction bars, balance scales, colored counters and other items which students can manipulate during the mathematical process. Visual representations may include area models, graphs, number lines, tables, and diagrams. And with classrooms being filled with 21st century tools, the usage of technology cannot be forgotten when looking for resources for visualization in mathematics.

The goal of exposing students to visualization tools is to support them in developing efficient and effective strategies when working with abstract mathematics. This is not to say that teachers expose students to one tool and quickly revert to the abstract. Providing students with a multitude of visuals where they are asked to apply, create and prove their mathematical work over and over develops a strong foundation for the learner. This means asking students to take ownership in the visualization of mathematics and creating deep roots of understanding long before moving onto the abstract usage of mathematical symbols.

Apps For Engagement

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FRACTIONS/DECIMALS/PERCENTS APPS:

Each of the following apps provides practice with placing fractions, decimals and percents onto a number line.

- **Number Line**
- **Motion Math**
- **Coop Fractions**

NHMathEd Listserv

Are you a member of the NHMathEd listserv? This is a free service for Mathematics Educators throughout the state of New Hampshire. Messages relating to workshop opportunities, participation in projects, collaboration with fellow mathematics educators; and much more are posted through this service.

Use the link http://toto.plymouth.edu/mailman/listinfo/nhmathed and follow the directions provided. If you have questions about this service, contact Christine Downing at Christine.downing@yahoo.com. Please consider joining today!

http://toto.plymouth.edu/mailman/listinfo/nhmathed

Candidates Seek Positions on NHTM Board

NHTM 2013 Elections

Official postcard ballots will be mailed to all NHTM members in February. Completed ballots must be mailed by March 22, 2013 or brought to the NHTM Annual Spring Conference at the Radisson in Manchester on April 5th and deposited by 10 A.M. in the ballot box at the registration table. A BIG thank-you to the following candidates for their willingness to run in this year's election:

Candidates for President-Elect:

Cecile Carlton

Cecile currently serves as a mathematics consultant to school districts and as an adjunct at Rivier University, teaching math methods to graduate students aspiring to become certified teachers. She began her career as a secondary mathematics teacher in Massachusetts and in 1983 moved to Nashua where she became mathematics coordinator and curriculum supervisor of mathematics. As a curriculum specialist, she was active on numerous state committees connected to developing New Hampshire's State Standards for mathematics, served on many NHEIAP and NECAP committees connected to assessment and was trained in state initiatives including First Steps and INTEL Mathematics, providing professional development for elementary teachers. Cecile has remained active in NHTM through the years. She presents at conferences, often serves as conference registration chair, and has served as NHTM membership chair for 27 years. Cecile has a dream that all New Hampshire students become proficient in their learning, understanding, and achievement in mathematics. That is the goal that drove her while actively teaching and still keeps her busy in retirement and as she seeks to continue her service to NHTM.

Tim Kurtz

Tim is currently teaching mathematics at Hanover High School. He earned an MS in mathematics and an ABD in mathematics education from UNH before heading to the mathematics department at St. Bonaventure University in western New York State. While at SBU, he organized an Internet based mathematics question answering program with his students called "Ask Prof. Maths". He returned to NH as the mathematics specialist at the NH Department of Education before taking over the curriculum and assessment group in the Department where he ran both the NHEIAP and NECAP assessment programs. Upon retirement from state service, he returned to the high school he graduated from in 1972 to teach mathematics. Over the course of his career he has worked with mathematics teachers at all levels, taught in six states and Switzerland, written Challenge 24 newspaper columns in two states, supported the MathCounts middle school math program, and supported numerous state and national initiatives in mathematics and mathematics education. He has received the NHTM Balomenos Award for service to the state, a NH-ATMNE commendation for service to the NH MathCounts program, and a commendation from Governor Lynch for meritorious service to education in NH.

Candidates for Treasurer:

Michelle Fox-Bushaw

Michelle Fox-Bushaw has been working as a Secondary Mathematics Teacher at Groveton High School since 1999. For the past fourteen years, she has been teaching courses with varying ability levels and rigor, ranging from Algebra I to Calculus. She graduated from Elmira College in Elmira, NY and received her Master's degree in Education from Plymouth State University (2008) specializing in Secondary Mathematics Education. Michelle served as the High School Program Chair for the 2007 and 2008 NHTM Annual Spring Conferences, and she has also been a presenter at the Annual Spring Conference. She is an active leader in her school, serving on many different professional teams/groups including the Common Core Leadership Team and the Freshman Extended Support Team. She is very involved in student activities at GHS including pep-rallies, the spring prom, the Winter Carnival, and other such activities held each year, while she serves as an advisor to the Student Council. In addition, she is the Treasurer of the Groveton Teacher's Association. Michelle is motivated, hard-working, energetic, and organized, and

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Secondary Representative

Teaching Without a Textbook – Our Great Experiment

By Greta Mills

At my school, several of our courses are taught without textbooks: Mathematical Modeling, Introduction to Calculus, and Selected Topics in Mathematics have traditionally been taught without a textbook. These courses are semester-long "niche" courses, and the lack of a textbook has not been a major concern. However, our Algebra I course has been taught without a textbook for several years, and this year we decided to drop the textbook in another foundation course – Advanced Mathematics. The curriculum follows a fairly traditional precalculus sequence, and the students who take Advanced Mathematics enter the class with a wide variety of experience, interest, and commitment to mathematics. Many of them have enjoyed success in mathematics because they are "good at formulas," striving to reduce every problem to a recognizable problem for which they have an established algorithm. While I believe that facility with algorithms and formulas is a desirable skill, it often replaces the creative and sometimes messy problem solving that leads to a deeper and more satisfying understanding of mathematical ideas. Our textbook, while adequate for providing example and practice problems, reinforced this notion that problems are best solved if you can follow the steps of an established example. This year, a colleague and I decided to take the plunge and eliminate the textbook entirely from the Advanced Math classes. We are now nearing the end of the first semester teaching without a textbook, and I thought it might be helpful to share our experience.

The Good:

- The classroom dynamic is positive, the students energetic and motivated
- There is a greater emphasis on collaboration and students are speaking to each other using more mathematically-appropriate language
- Students report that they feel like they are learning instead of memorizing
- Students feel free to explore ideas without the fear of being wrong
- Activities and projects are based on realistic scenarios; for example, determining the optimum layout of an art gallery based on security concerns
- Students who forget a formula are more inclined to experiment with a variety of approaches; for example, students who forgot a formula for the angle between two vectors tried to solve the problem using the law of cosines (essentially deriving the formula) or a formula involving the tangent function (connecting vectors to slope in a way that students in the past had not)
- Class quizzes have allowed students to hear their classmates' ideas and have helped further student understanding
- The curriculum is much more fluid and we have the flexibility to resequence and integrate topics
- This year, a team of Advanced Math students participated in a math modeling contest. Their submission was thorough and appropriate, and they earned an Honorable Mention for their project

The value of professional collaboration that curriculum development affords can not be overstated –

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FUN WITH LASER POINTERS

Secondary Activity submitted by Greta Mills

Activity 1 Materials:

Two laser pointers
Large board compass
Tape

Activity 2 & 3 Materials:

Patty paper

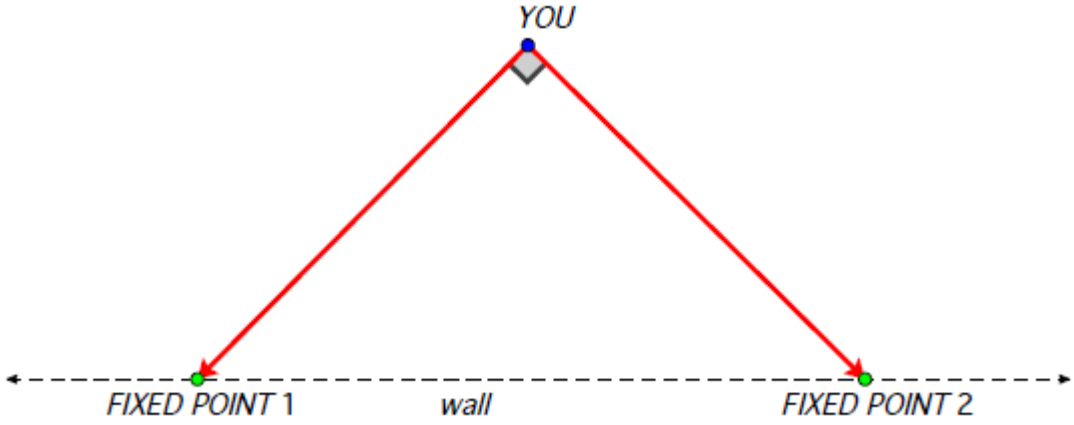
Scenario: *Two laser pointers are attached to the ends of a compass that is set to 90°. There are two fixed points on the wall.*

Without changing the angle of the compass, and keeping the compass against your sternum, can you move from one end of the wall to the other while keeping the laser beams on the two fixed points?

Question: What will your path look like?

Activity 1: *One student should keep the board compass fixed against the sternum. The student may move his or her body but cannot move the compass. Move from the left side of the board to the right, keeping the laser beams on the fixed points.*
Another student should mark the position of the first student by placing tape on the floor every time the student changes position.

Activity 2: *Using the diagram below, construct other possible locations for your position.*



What do you notice about the *locus of points*?

Model With Mathematics: Use *algebra* to describe the locus of points.

Let the fixed points have coordinate (-r, 0) and (r, 0).
Let your position have coordinate (x, y).

Note that the laser beams and the wall create a right triangle...

Activity 3:

Extension: What if the compass angle was not restricted to 90°? How might that change your solution?

- Each person in your group should draw a different angle in the space provided below.
- Using patty paper, carry out enough constructions to sketch the path.
- Share your results with your group.
- What do you notice?

Model With Technology: Dynamic Geometry software can reveal underlying patterns.

High School Students to Compete

41st Annual NH State High School Mathematics Contest

By David G Kent, Contest Coordinator

NHTM (New Hampshire Teachers of Mathematics), and the **Mathematics Departments of the University System of New Hampshire** invite you to form one 10 member mathematics team with no more than four seniors and a maximum of eight juniors and seniors and to join us for our 41st annual competition this year on Tuesday, 19 March, 2013 at Plymouth State University. Your team will have the opportunity to meet with other students from throughout the state in a day of exciting, challenging, competitive mathematics exercises in six different categories.

The **Team category** involves all 10 members of the team separated into two groups of five. One of the four team category questions will require each group of five students working together to submit an expanded, detailed written response. That particular response will be judged on the style of solution, the coherence of the explanation and the organization of the correct solution. In other words, teams will need to present more than the correct answer to receive maximum credit for this question! A special group of judges will be responsible for scoring these papers. Each registered school will be assigned a code to be used for this category.

The remaining categories in the contest are **Recreational Mathematics**, **Algebra 1**, **Geometry**, **Algebra 2**, and **Advanced Mathematics**. Each of these 12 minute categories will consist of three questions of equal value taken by six members from each team. In these categories students work independently.

Any non-lap top type calculator allowed in the mathematics sections of the SATs and the mathematics achievement exams of the College Boards may be used in the contest. It is assumed that every participant will have a graphing calculator available to use in the contest.

There will be four divisions of competition, (determined by school enrollment figures). The contest is scheduled to begin at 9:40 am and the awards ceremony at 1:00 pm. The registration fee, per school, is $50.00. For further information. Please contact: David G Kent, Contest Coordinator, 603-746-5505, «**dg_kent@mcttelecom.com**».

Awards: Certificates of participation will be awarded to all schools. In each division there will be team awards, individual prizes to the highest scorers, and members of the first place team in each division will receive medallions. Certificates of achievement will be awarded to all those obtaining a perfect score in a category.

Don't Forget, NHTM is celebrating a huge milestone this year as we are turning 50! We are looking for help from its members to celebrate this event...

Who: YOU, Your math department, and/or Your students
What: NHTM's 3 Words Project
Where: Wherever you want to film your short video
When: Create your SHORT video between now and March 1st. Final video of all clips will be showcased on April 4th, 2013 during 50th Celebration Dinner.
Why: Share with others what Math/NHTM means to you in three words
How: Email your submission to nhtm50celebration@gmail.com

To learn more about this cool, fun initiative, please visit the 'NHTM's 3 Words Project' - goo.gl/qUnXn All information is explained on the website!
We hope to get as many video clips from people all over the state! Have fun with this and may the 'mathpiration' be with you!

Questions? Email at nhtm50celebration@gmail.com

NHTM Pre-Service Mathematics Education Scholarships for High School and College Students

By Rich Andrusiak, Post-Secondary Representative

The New Hampshire Teachers of Mathematics provides a $1000 scholarship for a graduating high school senior and a $1000 scholarship for a college student who will obtain junior or senior status in the 2013-2014 academic year.

The high school scholarship will be awarded to a graduating senior who will be attending an accredited college or university in the fall and plans to major in mathematics or mathematics education with the intent of becoming a mathematics educator. The selection team will consider academic achievement, financial need, extra-curricular activities, and community and school service.

The college scholarship will be awarded to a student preparing for certification to teach mathematics. Eligible candidates will be enrolled in an elementary, middle, or secondary mathematics certification program, and preference will be given to students attending a New Hampshire institution of higher education. The selection team will consider academic achievement, financial need, and will look for evidence of promise of a teacher of mathematics.

In January, I e-mailed information about these scholarships to high schools and institutes of higher education across NH. Additional information, along with the on-line application, can be found at http://www.nhmathteachers.org/ by following the resources drop-down menu. The application deadline is May 3, 2013.

If you have any questions, please contact me at randrusiak@ccsnh.edu.

Candidates for the NHTM Board

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would be honored to serve the NHTM membership as the NHTM Treasurer.

Kellie Gabriel

Kellie is a core head teacher at Nashua High School South. In this role she teaches ¼ of the day, leads the math department (6-12) in curriculum redesign, and supports teachers as the high school transforms to a competency based assessment and grading system. She has led the development of PLCs and helps sustain these groups by promoting the collegial expertise within the department. She is passionate about engaging students in the learning process and enjoys creating activities and helping teachers do the same. Kellie strongly believes her colleagues motivate her to be a better teacher and leader; she will tirelessly help to guide and support their efforts. She has implemented a school-wide celebration of pi-day and supports the high school community to incorporate numeracy across all disciplines. She is particularly proud of the accomplishments of the math team that she has coached for the past six years, and the four 1st place banners that adorn the walls of NHSS. Kellie is looking forward to this opportunity to serve New Hampshire math teachers in this new role as treasurer of NHTM.

Candidates for Post-Secondary Representative:

Rich Andrusiak

Rich Andrusiak currently teaches mathematics at River Valley Community College in Claremont, NH, where he has recently co-developed a mathematics/science degree program. He is the current post-secondary representative for the NHTM board. While serving in this position, Rich has worked on restoring the fall focus professional development event and continues to work closely with the NHTM board and NH

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Across the Regions

South East Regional Event:

Preparing for the Common Core: Numbers and Operations from an Algebraic Perspective, February 27, Exeter

Join us as we prepare for the Common Core and a focus on broadening our knowledge in the domain of numbers and operations in grades K-8 from an algebraic perspective. We will deepen our understanding of the progression of numbers and operations across grades as it relates to the Smarter Balance assessment. Flow between the different domains of mathematics will be discussed, moving into a unified discipline over the grade levels and into college and career readiness. We will balance between the procedural and conceptual, and focus on fluency while retaining a holistic picture of mathematics. Technology applications will be available that align with the specific content and Common Core Standards we discuss. The event time is 4:30-7 p.m. on February 27th and the location is the Seacoast Professional Development Center in Exeter, NH. For directions, please see https://sites.google.com/a/spdc.org/home/directions. The cost of the event is $20 for NHTM members and $25 for non-members. Please send checks payable to the NHTM to the following address: 65 Whitehall Road, Amesbury, MA 01913 BEFORE FEBRUARY 20th. We will have full access to the internet and technology tools, but feel free to bring your own laptop, ipad, etc. A warm dinner and dessert will be served and Certificates of Professional Development will be available upon completion.

South Central Regional Event:

Addressing the Common Core Mathematical Practices Through Collaboration & Fun, March 13, Hollis

You are invited to attend an NHTM regional event: Addressing the Common Core Mathematical Practices Through Collaboration & Fun to be held on March 13, 2012 at Hollis Brookline Middle School in Hollis, NH from 4:30 p.m. - 6:30 p.m. Preregistration and payment are required by March 8th (see form).

The event is described as an evening of fun, networking, resources, and prizes. Walk in with one idea and leave with many! Bring a written hardcopy of a favorite math activity, a great problem, lesson, or idea to share. For every shareable idea, your name will be entered in a drawing for prizes. Electronic submissions are welcome. Please email them to patricia.marquette@sau41.org by March 8th. Any veteran teacher who brings a new teacher (4 years of experience or less) will be entered into a drawing for prizes as well.

Date: March 13, 2013 Time: 4:30 pm to 6:30 pm Location: Hollis Brookline Middle School (Library), 25 Main Street, Hollis NH This NHTM sponsored event includes a Certificate of Attendance and a light dinner menu.

The cost of the event is $10 for NHTM and NHJEM members, $15 for nonmembers. A nonmember may join NHTM and attend this event for $35. Members are encouraged to bring a nonmember colleague to this event. The cost for the two will be only $15 total.

If you have any questions or wish to register, please contact Katrina Hall, NHTM Regional Coordinator: katrinaleighhall@gmail.com or Pat Marquette, NHTM South Central Regional Coordinator: patricia.marquette@sau41.org.

Regional Coordinators:

North: Kim Knighton kknig@profile.k12.nh.us

Southwest: Bernadette Kuhn bkuhn@mrsd.org

West Central: open

South Central: Pat Marquette & Katrina Hall
patricia.marquette@sau41.org
katrinaleighhall@gmail.com

Central: open

South East: Lauren Provost
laureneliz2@yahoo.com

Art's Attic: Janos Bolyai

(*Continued from page 2*)

tem of geometry that Lobachevsky had discovered a few years earlier (1826). Bolyai developed his findings into a twenty-four page paper in which he detailed this new geometry and also the implications of his discovery across all of mathematics. His paper formed the appendix in a book written by his father, *Essays for Studious Youths on the Elements of Mathematics,* in 1832. The appendix has been called 'the most extraordinary two dozen pages in the whole history of thought." Unfortunately, few mathematicians paid any attention.

Farkus Bolyai, no doubt proud to see his son succeed where his own explorations to prove the Fifth Postulate as a young professor had fallen short, sent a copy of the new book to his former classmate Carl Frederich Gauss. In a letter to Farkus Bolyai, dated 6 March, 1832, Gauss comments on the work by his son.

> *"To praise it (the new geometry) would be to praise myself. Indeed the whole contents of the work, the path taken by your son, the results to which he is led, coincide almost entirely with my meditations, which have occupied my mind partly for the last thirty or thirty-five years…I am very glad it is the son of an old friend who takes the precedence of me [in publishing non-Euclidean geometry]."*

This was a great disappointment to Janos Bolyai. He was not the first to explore non-Euclidean geometry. Worse, in 1840 Bolyai learned that he was not even the first to publish the new geometry. Word reached him that Russian mathematician Nicolai Lobachevsky had published the same discoveries, but even earlier. Although Bolyai had developed his geometry independently of Lobachevsky, he was devastated to be second. He rightly thought that no one remembers who was second, only who was first. Bolyai soon developed a deep depression that plagued him for the rest of his life. Bolyai even thought that the articles attributed to Lobachevsky were actually written by Gauss under a pseudonym. Boloyai never published another mathematics article.

President's Message

(*Continued from page 3*)

matics in college and then had to do my student teaching, I think that this would be my answer: Mr. Brown taught me what a professional is, that mathematics is the greatest tool man has to solve problems and describe the world we live in, and the value of being organized, clear, and accurate in my work. When I got ready to do my student teaching my senior year of college I realized all the mathematics I had forgotten. Scary. Sure, I'd taken the proper courses for a mathematics education major. However, some of the finer details of that work were lost as I worked through courses like *Abstract Algebra* and *Calculus from an Advanced Viewpoint*. Once started teaching, I can remember spending many hours at night working through trigonometric identities (that I had used very little since the calculus sequence) to be prepared to teach a lesson the next day. The same can be said for miscellaneous theorems in geometry, how to solve absolute value inequalities, and solving systems of equations for which there are three variables and three equations.

(*Continued on page 22*)

Post-Secondary Representative

Participate in School Standard Revisions

(Continued from page 5)

invited the staff from the Department of Education to attend the February NHTM board meeting to update us on the process and our involvement. Keith Burke, who is working as a consultant for the Department of Education will be giving the update.

While the existing elementary, middle, and high school mathematics standards (306.43) are acceptable, the amount and level of mathematics that students need for career and college readiness needs attention. I would urge you to contact the administrator for school approval, Dr. Judith Fillion, at Judith.Fillion@doe.nh.gov and encourage her that NHTM and its members need to be involved in the revision of the standards to ensure fidelity with the Common Core Standards and the recommendation in the revised task force report. It is the goal of NHTM to advance mathematics education for all students in New Hampshire and setting school approval standards is the first step in reaching this goal.

Two candidates Vie for Post-Secondary Representative

(Continued from page 12)

Department of Education on aligning the high school mathematics graduation requirement with the model pathways in the Common Core. He is involved in the development of the Early Mathematics Specialist Credential, and has recently co-taught three Intel Mathematics courses. He recently received the Phi Theta Kappa Teacher of the Year Award and President's Award for Service Excellence at River Valley Community College. As a mathematics instructor, Rich believes that all students should receive a deep conceptual understanding of the material they are studying while taking an active role in building and constructing knowledge for themselves. Rich has served as the State Supervisor of Mathematics for the NH Department of Education, is a former high-school teacher, and has worked as a mathematics editor for an integrated publishing service.

Sharon McCrone

Sharon is an Associate Professor of mathematics education and mathematics at the University of New Hampshire in Durham. She has been a member of the faculty at UNH for the last 6 years and before that was a member of the faculty at Illinois State University for 10 years. Sharon works with mathematics preservice teachers for grades K-12 in both mathematics content and methods courses. She stresses investigations, conceptual understanding and reasoning in all of her courses and conducts educational research of student learning in these areas. She also works with doctoral students to guide their dissertation work in mathematics education. Sharon was the lead author of NCTM's *Focus in High School Mathematics: Reasoning and Sense Making in Geometry*, and she freely admits that geometry is her passion. Sharon has been a member of the NCTM for 20+ years, and has presented at more than 15 state, regional, and national NCTM conferences. Sharon has served (and continues to serve) NCTM in various capacities such as referee for all of its journals, contributing author, and reviewer of various other publications. She is now looking forward to serving the NH affiliate (NHTM) as the Post-secondary representative.

Secondary Representative

Teaching Without a Textbook

(*Continued from page 8*)

with a common goal of improving the course and providing students with a positive learning experience, our discussions are rich and thought-provoking

Concerns:

- This is far more of an investment of time than simply creating supplemental materials - we have spent untold hours developing the materials for this class
- Students who like having a textbook as a resource do miss this option
- The class period can feel more unstructured which is difficult for students who prefer a concrete structure
- With the emphasis on student collaboration and classroom discourse, it is absolutely crucial that students can also work independently

The development of materials for a course can be very personal. If you haven't yet developed a thick skin, you will need to do so and quickly – students and parents will be brutally honest with their feedback!

Have you been teaching without a textbook? Please consider sharing your experience!

If you are interested in hearing from other teachers who teach without a textbook, check out "Escape From The Textbook!" (http://www.edweb.net/escape), a community for teachers who want to leave their textbook for a lesson, a unit, or, as in our case, an entire course. The discussions are lively and interesting – there is a wealth of information and advice, and it's a good place to start if a teacher is looking for resources.

If you haven't seen Dan Meyer's TED talk "Math Class Needs a Makeover", check out http://www.ted.com/talks/dan_meyer_math_curriculum_makeover.html. It is well worth the time and encapsulates the dilemma that we were facing when looking for a replacement textbook. We truly do need more patient problem solvers, and we need to create classrooms that allow for creative thinking rather than rote learning.

Note: I am not against textbooks in principle – like any teacher, I have "favorite" textbooks. I do, however, think it's important that the curriculum should stand on its own, independent of whatever text is used, and a textbook that does not support the curriculum should not be forced to fit.

NHTM members participate in a problem-solving workshop at last year's Spring Conference at Plymouth State University.

Make Plans to Attend NHTM's
50th Celebration and Conference!

Radisson Hotel, Manchester NH

Thursday, April 4, Social and Dinner Banquet beginning at 4:00 pm., honoring our history

Friday, April 5, Spring Conference:

8:30-9:30 Sixty minute sessions

9:40-10:40 Keynote address by Joan Ferrini-Mundy

10:50-12:05 Sessions of varying lengths

12:10-1:10 Lunch

1:15-2:30 Seventy-five minute sessions

2:40-3:40 Sixty minute sessions

3:50-4:30 Business meeting and door prizes

Exhibits throughout the morning!

News Bytes

- Help is needed at the 50th Anniversary Celebration and Conference. Contact Terri Magnus at tmagnus@rivier.edu if you can help either during the conference or a couple of days before.
- Did you catch the New Hampshire Public Radio Show "The Exchange" on December 18? The topic was Math Curricula in New Hampshire and one of Laura Knoy's guests was NHTM President Greg Superchi. You can still access this program at http://nhpr.org/post/solving-our-math-problems.
- NCTM is offering interactive professional development institutes this summer: Algebra Readiness for Every Student (grades 6-8) July 8-10 in New Orleans LA, Connecting Number and Operations in the Classroom (grades K-5) July 11-13 in New Orleans LA, and Engaging Students in Learning: Mathematical Practices and Process Standards (grades 9-12) August 1-3 in Washington DC.
- ATMNE is looking for volunteers to help with the fall conference in Killington VT. Volunteers are needed for the following committees: Equipment & Technology, Exhibitors, General, Hospitality, Local Arrangements, Program, Publicity, Registration & Membership, Session & Workshop Support, Signs & Printing, Special Events & Volunteers, Special Needs, and Student Hosts. Contact Greg Superchi at gsuperchi@yahoo.com if you are interested.

Calling K – 8 Mathematics Teachers!

Classroom Teachers, Special Education Teachers & Title I Teachers

Join in a State-wide Initiative to Improve Student Learning in Mathematics!

At no cost to you –
Earn 80 Hours of Professional Development
& 6 (Paid-in-Full) Graduate Credits*

The ***State of New Hampshire is on the move to improve student learning in mathematics*** and is proud to bring the **Intel® Mathematics Program** to K – 8 mathematics educators. This program is funded through a $500,000 per year Math Science Partnership Grant gained through the efforts of the Rochester School District, Plymouth State University, New Hampshire Impact Center, University of New Hampshire – Manchester, University of New Hampshire – Leitzel Center, North Country Education Services, River Valley Community College, Rivier University, and New Hampshire Department of Education.

The **Intel® Math** course is a content-intensive professional development program developed by Dr. Kenneth Gross, Professor of Mathematics and Education at the University of Vermont. **Intel Math®** provides eighty hours of professional development in the form of a course co-facilitated by a practicing mathematician and a mathematics educator. The course places emphasis on deepening the participants' understanding of core K – 8 mathematics concepts. It is grounded in a ***problem solving approach to topics such as integer arithmetic, the decimal number system, place value, rational number arithmetic, rates, linear equations, and functions***. About 90% of the course is focused on mathematics content knowledge and the remaining 10% on pedagogy.

You are eligible to participate in this program if you meet **both** criteria:
1. You currently teach in New Hampshire at K - 8 level.
2. You are K-3, K-6, or special education certified, but not 5-8 or secondary math certified.

Six Intel® Math Program sites have been established!

Please see next page for locations and dates.

Please visit **http://math.arizona.edu/~ime/intelmath/** for more information on the **Intel Math® Program**.

To register go to: http://bit.ly/IntelMathNHRegistration2013

Register Early - spots are limited!

Please complete **Intel® Math Program New Hampshire Participant Teacher Agreement** found at the link below and **e-mail it to Matt Treamer** matt@ncedservices.org.

http://bit.ly/IntelMathNHTA2013

Additional inquiries can be made by contacting the site coordinator at the location of your choice.

*There is a $30 registration fee for the graduate credits that will need to be paid by each participant.

Intel® Math Program for the year 2013		
Site Coordinator/Instructors	**Location**	**Dates and Times**
University of New Hampshire – Manchester Roberta Kieronski robertak@unh.edu **Betty Erickson & Roberta Kieronski**	400 Commercial St. Manchester, NH	7/8; 7/9; 7/10; 7/11; 7/15; 7/16; 7/17; 7/18; 7/23; 7/24 8:00am – 4:30pm
Durham/Rochester at UNH Leitzel Center Karen Graham karen.graham@unh.edu **Karen Graham & Judy Curran Buck**	Kingsbury Hall UNH – Durham Durham, NH	7/8; 7/9; 7/10; 7/11; 7/22; 7/23; 7/24; 8/12; 8/13; 8/14 8:00am – 4:30pm
Plymouth State University Natalya Vinogradova nvinogradova@plymouth.edu **John Donovan & Greg Superchi**	Hyde Hall Plymouth, NH	7/8; 7/9; 7/10; 7/11; 8/22; 7/23; 7/24; 8/6; 8/7; 8/8 8:00am – 4:30pm
North Country Education Services Matt Treamer matt@ncedservices.org **Cecile Carlton & Tim Kurtz**	North Country Education Services 300 Gorham Hill Road Gorham, NH 03581	6/24; 6/25; 6/26; 6/27; 7/1; 7/2; 7/3; 7/8; 7/9; 7/10 8:00am – 4:30pm
Claremont Nickole Milo nmilo@ccsnh.edu **Christine Downing & Rich Andrusiak**	River Valley Community College One College Place Claremont, NH 03743	6/24; 6/25; 6/26; 6/27; 7/8; 7/9; 7/10; 7/15; 7/16; 7/17 8:00am – 4:30pm
Nashua Teresa Magnus tmagnus@rivier.edu **Teresa Magnus & Ann Gaffney**	Rivier College 420 S. Main St. Nashua NH 03060	7/17; 7/18; 7/19; 7/22; 7/23; 8/15; 8/16; 9/28; 10/19; 11/2 8:00am – 4:30pm

Funding for NH Intel Math is awarded by the Mathematics and Science Partnership (MSP) Competitive Grant program through the NH Department of Education. The grant is part of Title IIB of The No Child Left Behind Act at the US Department of Education.

From the Desk of the Membership Chair

Thank you for your membership renewals. Currently NHTM full membership is at 338 as of 31 January, 2013. *Check your dues – renew early – avoid the Fall rush!*

	Dues Lapsed **Dec 2011** **10-11**	Dues lapsed 2012 **11-12**	**12-13**	**13-14-15**	Up-to-date **Total**	NHJEM
Individual	176	117	300	35	335	14
Institution-al	6	1	3		3	
Totals	182	118	303	35	338	14

At our April 4 – 5 2013 – 50th NHTM Spring Conference to be held in Manchester NH we honor our members who have been in the organization for 25 years. We plan to continue this recognition at our Thursday night banquet. Do plan on attending the Conference this year and if you fall into this veteran category – check with me through e-mail Cecile.carlton@comcast.net so you too will be recognized!

NHTM Board members also want to thank all of the individuals who made additional contributions to our scholarship fund.

Cecile Carlton

Common Core Inspires New England PD Offerings

Plymouth State University workshop to focus on success in algebra

The New Hampshire Impact Center at Plymouth State University invites all 6-10 Mathematics teachers to participate in a two-day institute, **Help Your Students Succeed with Algebra by Implementing Common Core Standards,** March 29-30. Participants will be encouraged to explore how to build algebraic reasoning using multiple representations, use differentiated instruction in presenting algebraic ideas, and adhere to standards for mathematical practice.

This institute is a continuation of the one offered in November 2012. At the same time it can be considered as an independent unit. While everyone interested in innovative ways of teaching algebra is welcome, teachers who participated in the first part of this institute offered in November are especially encouraged to apply. For more information and to register visit http://www.plymouth.edu/outreach/impact-center/upcoming-events/.

Rhode Island College hosts Problem Solving workshop

Mark your calendars! There will be a full-day Mathematics Conference for K-12 teachers in Rhode Island on Saturday, March 16, 2013 at Rhode Island College. The RI STEM Center at Rhode Island College, Boston College and Rutgers University's Leadership Program in Discrete Mathematics (LPDM) in collaboration with Rhode Island Mathematics Teachers Associations (RIMTA) are sponsoring the 8:30 a.m. – 3:00 p.m. event.

The 2013 conference theme is, "Problem Solving: at the Heart of the Common Core." Questions and problems of a practical nature inspired mathematical development over the centuries that comprise the content in the CCSS. Students in the 21st century are also inspired by questions and motivated to seek answers using technological tools not available to early mathematicians. The day will consist of a series of concurrent sessions that address problem solving and core content at each of the grade levels: lower

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NHTM Executive Board

Professional Development Opportunities in New England

(Continued from page 20)

elementary, upper elementary, middle school, middle/secondary and secondary.

We are excited to have Joseph Malkevitch a Professor Emeritus from York College (CUNY) and an Adjunct Professor at Teachers College of Columbia University as the keynote presenter. Joe's keynote talk, "Need a Fairness Expert? Who Do You Call?" and his follow-up session on the bankruptcy problem, one of the fairness problems from his talk, is sure to provide good food for thought and some engaging new contexts for problem solving. Joe reports that equity is important for a democratic society to function, and there are many issues in a democracy that have been solving using mathematics – often arithmetic and simple logic. His talk will have appeal for teachers at all levels.

Details and registration information will be posted on the ATMNE under professional development link in early January or at: http://www.trworkbench.com/stem/mar16conf/

For more information contact: ristem@ric.edu.

President: What do You Really Want Students to Learn?

(*Continued from page 14*)

Why do I tell you all this? I want you to keep in mind what you really learned from all *your* teachers when you are teaching *your* students. Don't forget, the teachers teaching in all the other disciplines think their field is the greatest and that we should all remember everything there is to know about them, too! Heck, I know math teachers who say things like, "I haven't taught geometry in 10 years! How am I supposed to remember the [Blank] Theorem?" If some of "us" can't remember it as adults, why would we expect our students to?

I'm not saying that we should not teach certain topics students may not remember or use in their daily lives. I am just reminding us to keep the bigger picture in mind. Like, the set of Habits of Mind we see hanging in many of our classrooms across NH, NCTM's Process Standards, and the Common Core's Mathematical Practices. However, if we are focusing on reasoning, communication, and problem solving, will our students remember the "hows" and "whys" better? I hope so! If not, won't our students be better prepared for life?

Recently, when I spoke at the funeral of one of my teachers, I made this comment, "He could not prepare me for everything, but he did his best to prepare me for anything." That's the kind of teacher I want to be. What do you want to be remembered for? What do you really want your students to learn?

Professional Development and Conferences

National		
T3 Annual Conference	Philadelphia PA	8 - 10 March 2013
ICTCM 25th Annual Conference	Boston MA	21-24 March 2013
NCSM 45th Annual Conference	Denver CO	15 - 17 April 2013
NCTM 91st Annual Meeting & Exposition	Denver CO	17 - 20 April 2013
AMATYC 39th Annual Conference	Anaheim CA	31 October –3 November 2013
Joint Mathematics Meetings	Baltimore MD	15-18 January 2014
Regional		
NEMATYC	Danvers MA	5-6 April 2013
NCTM Regional	Baltimore MD	16-18 October, 2013
ATMNE Getting to the Core	Killington VT	24-25 October 2013
State		
NHTM Annual Spring Conference	Manchester NH	4-5 April 2013
41st annual State Mathematics Contest	Plymouth NH	March 2013

Mathesis is the newsletter of the New Hampshire Teachers of Mathematics. It is published four times a year: August, November, February, and May. The mission of the New Hampshire Teachers of Mathematics is to provide vision and leadership in improving the teaching of mathematics so that each student is ensured quality mathematics education and each teacher of mathematics is ensured the opportunity to grow professionally.