Mathematical Practices Explored at October Dine and Discuss

Current and prospective mathematics teachers gathered at the Holiday Inn in Concord for the annual fall Dine and Discuss. During the keynote presentation entitled "Bringing the Mathematical Practices to Life in Our Classrooms," Kim Knighton, mathematics teacher at Profile High School, engaged the audience in determining the number of squares with vertices on a given lattice. Kim demonstrated and noted how teachers can put the Common Core Mathematical Practices into action.

Kim Knighton speaks at the NHTM Dine and Discuss.

After a delicious pork and pasta dinner, participants chose between three breakout sessions, each geared to a particular grade range. NHTM Elementary Representative Stephanie Wheeler and Jess Jacques, Mathematics Specialist for the Merrimack Valley School District, led elementary school teachers in activities that demonstrated how rich mathematical tasks help bring the 8 mathematical practices to life in their classrooms. Led by Annie Wallace, NCTM Representative for NHTM, Middle grades teachers worked together on problems, examining features that make a task worthwhile and ways to ensure access and challenge for all students. See "Middle Levels Breakout Explores Rich Tasks" inside this edition. Michelle Fox, NHTM Secondary Representative, led High School teachers in a task which involved not only solving a problem about shadows, but critiquing partial "student" solutions to the problem. Participants appreciated the value of critiquing and understanding multiple approaches and how this activity met most of the CCSSM mathematical practices.

The NHTM Board was pleased that a large number of pre-service teachers attended, but would like to increase participation by early- and mid-career teachers. Suggestions for professional development events that would increase this group's participation are welcome.

Art's Attic:
The Fields Medal

By Art Johnson

Did you read the recent article about the Fields Medal? You know, the mathematical analog to the Nobel Prize. The Fields Medal is awarded every four years to four mathematicians. Usually the announcement of awardees is a footnote in world news, but not this year. This year one of the winners is a woman, a milestone the New York times noted on the front page.

The first woman Fields Medal awardee is Iranian mathematician Maryam Mirzakhani. Mirzakhani was born in Iran in 1977 and educated mostly in Iranian schools, culminating in a Ph.D. from Harvard in 2004. She was an outstanding mathematician as a teenager, wining gold medals in both the 1994 and 1995 Mathematical Olympiads. She finished with a perfect score in the 1995 Olympiad. She received the Fields Medal for "her outstanding contributions to the dynamics and geometry of Reimann surfaces and their moduli spaces." (For a more detailed explanation of this topic, feel free to contact Kellie Gabriel.)

In her comments about the award, Dr. Mirzakhani said "This a great honor. I will be happy if it encourages young female scientists and mathematicians. All researchers in mathematics will tell you that there is no difference between the math done by a woman or a man."

Why did the Fields Medal make headlines this year?

Is there a Nobel Prize for mathematics?

Dr. Mirzakhani's award begs the question why there is no Nobel Prize in mathematics. The Nobel Prize was endowed by Alfred Nobel on his death in 1896. Nobel had become wealthy from his invention of dynamite, but its military uses plagued him, and the Nobel Prize was his attempt to generate a positive message amongst all the destruction he knew his dynamite would bring. All well and good, but why didn't Nobel endow a mathematics prize?

There is a persistent account of a rivalry between Nobel and Swedish mathematician Gosta Mittag-Leffler, due to some alleged improprieties between Mittag-Leffler and Nobel's wife. Many consider this to be no more than a scandalous myth, but others see it as a reasonable explanation for Nobel's omitting mathematics from his award categories.

Shortly after World War I Canadian mathematician John Charles Fields created the Fields Medal to fill the void. He intended to not only honor past accomplishments of awardees, but also to encourage further achievements, resulting in the tradition of awarding the Fields Medal to only mathematicians under 40.

To those of you under 40, best you get going if you hope to win a Fields Medal. To those over 40…

President's Message:
NHTM—Working for you

By Cecile Carlton

New Hampshire Teachers of Mathematics is proud to be the organization that works to serve our teachers as they work daily to teach our students and ensure that they are learning high quality mathematics. We have continuous challenges facing the mathematics education community and opportunities for systemic improvement that include mathematics teaching and learning. Our challenges center around the standards we should identify within our districts, communicating that standards are not a curriculum and that standards do not teach; teachers teach. The opportunities include the resources that are being made available to teachers and communities of learners with shared goals identifying effective teaching, citing the research, enacting and reflecting upon practices that support the teaching and learning of mathematics.

Our role is to help keep you connected and networked to worthwhile resources. NHTM continues to offer resources through Professional Development opportunities and resource updates on our web site www.nhmathteachers.org. Our most valuable resources are the people who volunteer and serve on our Executive Board and various committees. Our grade level representatives are available as a resource for teachers – read on in this issue of Mathesis and throughout the year for ideas and suggestions. If you have questions and need another contact, feel free to connect with your grade level representative: for the elementary level, contact Stephanie Wheeler (stwheeler@mvsdpride.org); at the middle level, Katrina Hall (katrinaleighhall@gmail.com); secondary level, Michelle Fox (m_fox@sau58.org)

and post-secondary level, Rich Andrusiak (randrusiak@ccsnh.edu). The regional structure is an additional effort to connect and support teachers within a region via a communication network and provide increased opportunities for professional development. The state of New Hampshire has been geographically divided into 6 regions. A map of those regions along with the name of the regional representatives can be found on our website under the 'Resources' tab in the menu. We can also use additional representatives – if you are willing to help out, please contact Judy Curran Buck (jcurranbuck@aim.com).

To stay informed about what's happening within mathematics education in our state, regionally, and nationally, join the listserv. If you're not a member, go to http://toto.plymouth.edu/mailman/listinfo/nhmathed to sign up.

On October 29th we held our Dine & Discuss at the Holiday Inn in Concord New Hampshire. We our indebted to Rich Andrusiak for organizing and promoting the event that focused on "Bringing Mathematical Practices to Life in Our Classrooms". We must also thank Gretchen Scruton and Kellie Gabriel who took care of registrations. Many thanks to our breakout session facilitators Stephanie Wheeler, Jessica Jacques, Annie Wallace, and Michelle Fox – each shared insights and activities of mathematical practices. And of course we must also recognize the informative presentation of our keynote speaker, Kim Knighton, our own NHTM member who has also done comparable sessions for NCTM's summer institutes. We are very fortunate to have

President's Message: Become Involved, Network

(Continued from page 3)

local talent within our membership who are willing to share their expertise.

That is what our organization is about – identifying leadership capabilities, encouraging skilled teachers to share their expertise and network with other teachers– with the intent of strengthening mathematics education across the state. Have you considered serving on the **NHTM Board**? An interest in mathematics education is the only pre-requisite. This year we are seeking those who are willing to serve as Treasurer, Elementary Representative, NCTM Representative or President-Elect. Contact Greg Superchi (gsuperchi@yahoo.com) for more information.

Since NCTM is having its annual meeting in April 2015 in Boston MA, NHTM will not hold an all day conference this spring. In its place on **March 25, 2015** (save the date) we will be holding a Dinner Meeting. Our plans include an event similar to a Dine and Discuss, where we will have a keynote speaker, recognize our awardees and hold the required General Meeting for our membership. In order to recognize outstanding educators we need to have you nominate individuals. Our web page describes each of the Awards, contains nomination information, and lists past recipients. If you know of a deserving educator, check out the requirements and send in the information soon: deadline dates include **December 15th** for **Prevost** and **Evans nominations** and **January 1st f**or the **Balomenos nomination**. Take some time to check it out on nhmathteachers.org under the 'News' page (http://www.nhmathteachers.org/page-1712364). While on that page also consider nominating (or self nominate) a New Hampshire edu-

cator for the 7-12 grade mathematics and science (including computer science) teachers for the **Presidential Awards for Excellence in Mathematics and Science Teaching (PAEMST).** Details are on our website.

NHTM continues to work for you – let's review some of the services we offer:

- Nhmathteachers.org – website (NHTM can also be found on Twitter and Facebook)
- Executive Board Leadership: Kindergarten through Post-Secondary levels
- Regional Structures to extend intimate professional development within regions across the state
- The NH Mathematics Education listserv http://toto.plymouth.edu/mailman/listinfo/nhmathed for keeping members informed of up-to-date activities and resources
- Teacher Recognitions (Fernand J. Prevost and Richard C. Evans teaching awards, Richard Balomenos service award, PAEMST, 25-Year Membership recognition, and Honorary Lifetime Members.)

In addition, NHTM offers recognitions and opportunities for students:

- Annual State Mathematics Contest
- Scholarships for High School Seniors and College Students
- Certificates for Student Recognition for Achievement in mathematics

On behalf of the NHTM Board, best wishes for the holiday season and for 2015! NHTM is dedicated to working for you and with you, so you can make a difference in your classrooms and in the lives of your students! If you have any further suggestions for us to improve our work with you, please contact me at Cecile.carlton@comcast.net.

Secondary Representative

Discussing NCTM's *Principles to Actions*

By Michelle Fox

At the annual Dine and Discuss Mini-Conference on Wednesday, October 29th, I had the pleasure of speaking to 30+ high school and post-secondary school mathematics teachers in my breakout session. A primary focus of my talk was to provide an overview of some of the new Mathematical Teaching Practices outlined in the NCTM's ***Principles to Actions: Ensuring Mathematical Success for All***.

The eight Mathematics Teaching Practices outlined in ***Principles to Actions*** are described as "high leverage" and "research informed" instructional practices. Collectively, these practices are meant to provide a framework for strengthening the teaching and learning of mathematics. The Mathematics Teaching Practices are:

Establish mathematics goals to focus learning.
Implement tasks that improve reasoning and problem solving.
Use and connect mathematical representations.
Facilitate meaningful mathematical discourse.
Pose purposeful questions.
Build procedural fluency from conceptual understanding.
Support productive struggle in learning mathematics.
Elicit and use evidence of student thinking.

Principles to Actions: Ensuring Mathematical Success for All. 2014. Reston, VA: NCTM.

These Mathematics Teaching Practices can also be found (with detailed explanations) at www.nctm.org/principlestoactions, on the ***Principles to Actions*** Overview PowerPoint.

Two of these Teaching Practices really stood out to me: Supporting productive struggle in learning mathematics and pose purposeful questions. In the 16 years I have been teaching mathematics at both the college and high school levels, I have found that productive struggle is the key to learning for most students. Students who struggle through problems, having to persevere and push past any obstacles that might come their way also feel a great sense of pride when done with a particular problem, even if they don't get the "right" answer. I found the following on the Overview PowerPoint in regards to productive struggle: "Effective teaching of mathematics consistently provides students, individually and collectively, with opportunities and supports to engage in productive struggle as they grapple with mathematical ideas and relationships."

Posing purposeful questions is also a key to effective teaching of mathematics. Students need to be invested in the mathematics at hand, in order to make it a meaningful learning opportunity. If students aren't invested in the problem, do they really care if the problem gets solved? Some students will do the problem regardless of a real-life connection, but some will feel like they shouldn't have to do the problem if it doesn't connect to their life some way… so posing purposeful questions that can make some real-life connections can peak their interest. On the ***Principles to Actions*** Overview PowerPoint it states that "Effective teaching of mathematics uses purposeful questions to assess and advance student reasoning and sense making about important mathematical ideas and relationships."

And, don't get me wrong – of course there is still a time and place in the mathematics classroom for direct instruction, skill and drill work, and necessary mathematics skill building so that students can master particular skills, learn vocabulary, and get a basic toolbox of mathematical skills and ideas that they can then build on (when we pose those purposeful questions and expect them to struggle through meaningful problems) in the future. There has to be a balancing act of sorts between the rote and the applied that will allow students to be successful in any mathematics class.

I could go on for days about what I took away from this book. If you haven't had a chance to browse the ***Principles to Actions***, or at least the Overview PowerPoint, I strongly encourage you to do so. All mathematics educators can bring something away from this publication. I know I certainly did!!

Elementary Representative

High-Yield Routines

By Stephanie Wheeler

Elementary School days are built around routines. We have morning routines, math block routines, snack routines, lunch time routines, literature block routines and clean-up routines, each routine providing structure to our day. Routines make the day predictable and thus more manageable for both students and teachers. Every elementary school teacher will tell you how important it is to have well established routines in place.

The National Council of Teachers of Mathematics published **High-Yield Routines** in 2013, which promotes implementing math routines, as well as integrating math into well-established, non-mathematical routines to optimize time in the classroom. In the book, authors Ann McCoy, Joann Barnett and Emily Combs offer the following seven routines to be implemented in the classroom:

Today's Number
Mystery Number
Alike and Different
Number Lines
Quick Images
Guess My Rule
How Do You Know?

None of the routines are new, but the premise is the "high-yield" outcomes stem from the fact that these are not stand alone activities, but routines that are well-established and practiced every day. Every chapter begins with a glimpse into what the routine might look like in the classroom. The routines are offered for students starting in Kindergarten all the way up through the grades. The book is an easy read, and in my estimation, it will be well worth your time. Please share your thoughts on the book with me at slwheeler3@aol.com.

Jessica Jacques shows Betty Erickson and Susan Kurtz how to use a deck of cards to reinforce number facts and encourage reasoning in the elementary grades breakout session at the October 29 Dine & Discuss.

Post-Secondary Representative

Alternative Algorithms – Russian Peasant Algorithm

By Rich Andrusiak

When I worked at the NH Department of Education, I received a lot of phone calls regarding school districts adopting mathematics programs that focused on alternative algorithms for arithmetic operations. The majority of the phone calls were from angry parents, teachers, or administrators fearful that children would no longer build fluency with standard algorithms. There was a misconception that these programs didn't value the standard algorithms and efficiency. In my opinion, students who think and reason about why algorithms work, whether alternative or standard algorithms, make connections between concepts, discover patterns, and make sense of mathematics. Teaching alternative algorithms without a focus on discovery of patterns and a sense and feel of how numbers "work", results in students using alternative algorithms simply as an algorithm is defined – a set of instructions to carry out a procedure. Of course, procedural fluency is extremely important, but understanding why algorithms work is not only a beautiful aspect of doing mathematics, but also a way for students to discover what mathematics is all about. However, this article isn't about the merit of teaching alternative algorithms. I've simply made the observation that the majority of my traditional community college students are now using alternative algorithms, but none of them have been exposed to one of my favorite algorithms for multiplication of whole numbers – The Russian Peasant Algorithm.

(If you're curious, my students who have been exposed to alternative algorithms for multiplication tend to use area models, partial products and decomposition of numbers with the distributive property, or the lattice method.)

The exact age and origin of the Russian Peasant Multiplication Algorithm is difficult to pinpoint, but it may have its roots in a similar method developed in ancient Egypt around 1650 B.C. and could be much older. The method requires, doubling, halving, the parity of an integer (i.e., if the integer is odd or even), and addition. The algorithm avoids our base-10 multiplication facts.

I'll demonstrate how the algorithm works with an example. To determine 23×47, we create a column where we successively compute halves starting at 23 until we reach 1 and a second column where we double 47 until we have an entry in the same row as the 1 obtained in the halving column. While halving, we ignore any remainders; that is, we determine $\lfloor x/2 \rfloor$, the floor of (or greatest integer less than or equal to) half of the preceding number x in the column. Finally, we cross out any rows that contain an even number in the halving column and add the remaining entries in the doubling column to obtain our result: $23 \times 47 = 1081$.

Halving	Doubling	
23	47	47
11	94	94
5	188	188
~~2~~	~~376~~	
1	752	+ 752
		1081

Now, assuming you do not already know this method of multiplication and without looking anything up, determine why the algorithm works. And, if you defer to any other algorithms in your explanation, make certain to explain why those algorithms work. Why do you cross off rows that contain even numbers in the halving column? Does it matter which factor you use in the halving column? Will a similar algorithm work if you create columns by multiplying or dividing your original factors by whole numbers other than 2? Enjoy the exploration.

Please contact me with any comments or questions at randrusiak@ccsnh.edu.

Middle Levels Representative

Basic Skills Practice

By Katrina Hall

Not long ago mathematics classrooms were skill-based and reliant on regular practice of such skills. It was common practice for students to stand in front of the classroom and recite the times tables. Looking around the classroom, stars and rockets could be seen identifying individual levels of achievement. Students were given homework focused on basic skills. Enter back into the classroom, and one could see timed tests and flashcards. For some, these are still essential aspects in developing mathematicians.

With a focus on mathematical literacy, educators can be torn as to how to fit in skill-based practice. There is confusion and wonder as to how it might fit into the curriculum or if this is even permissible as good practice.

Reflection on the goal of skills-based practice can help to define and bring about meaning and clarity as to a teachers reasoning behind this practice. Mathematically proficient students tend to precision, calculate with accuracy, and focus on detail. Mathematically proficient students look for repetition, and generalizations. They can reason abstractly and quantitatively beyond computations. These students use mathematical knowledge to prove the reasonableness of solutions, back their reasoning with mathematical models, and critique the work of others. A mathematically proficient student goes beyond the basics of calculating but utilizes calculations in developing proficiency.

Within the classroom, teachers should consider ways to combine the skills based practice with the practices needed for mathematical proficiency. Consider talking about the calculations. Look for students to explain their processes. Ask students to model the calculation. What are the different ways in which a solution can be reached? Discuss the processes, the misconceptions, and the understandings of students. When an incorrect solution is shared, this is the problem to discuss. Look for students to communicate, and reason. Ask students to make connections and model what appears to be basic.

Keep the basic skills practice in the classroom. The mathematically proficient student relies on automaticity and needs the basic skills to progress. However, extend the practice. Bring out the next level of thinking to develop mathematically literate students.

BRAIN DUMP

Players

    This is practice where the class competes with the teacher. However, players can be divided into groups or individuals.

How to Play

    Begin by writing one concept on the board. This may be a number, a model, a graph, a vocabulary or any other mathematical concept.

    One student adds to this concept in any mathematical way possible. This student must explain the connection to the initial concept.

    Play then goes to the teacher, who makes a connection to anything on the board and also must explain the connection. Consider adding new terminology and concepts to extend the students.

    Play returns to the students who proceed with connections and explanations.

Rules

    Rules can be developed based on the class goals. For instance, the teacher may say no more vocabulary, decimals or fractions may be used.
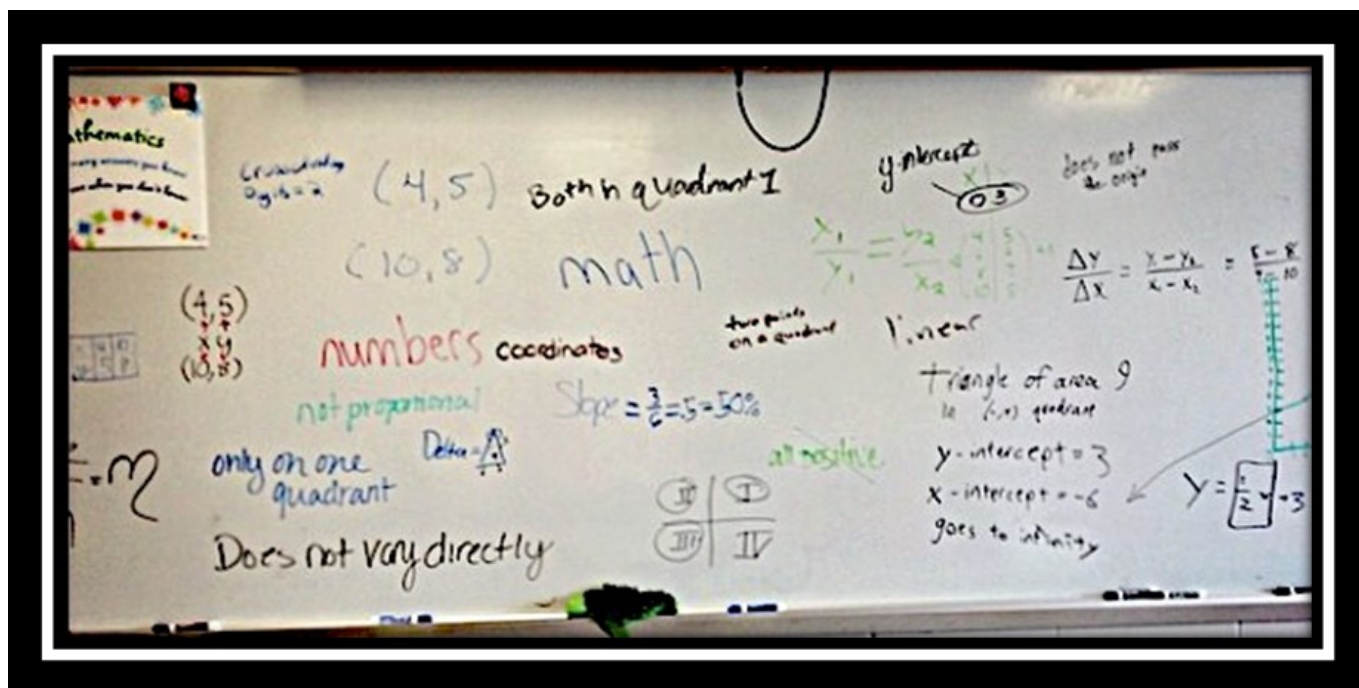
Winner

    The winner relies on the one who makes the last connection.

    This practice can also be played with no winner and just a set time limit.

Options

    Choose the date as the beginning concept.

    Make this a daily or weekly practice.

Dine and Discuss

Middle Level Teachers Explore Worthwhile Tasks

By Annie Wallace

The Middle School Breakout session at the recent NHTM Dine and Discuss was able to jump off from Kim Knighton's thought-provoking and interactive keynote address. We worked together on some problems, examining features that make a task worthwhile; namely, that the task (1) aligns with relevant mathematics content standard(s), (2) incorporates the Mathematical Practices, (3) encourages the use of multiple representations, (4) allows for multiple approaches and strategies, and (5) provides opportunities for students to develop and demonstrate the mathematical practices, concepts and skills. Worthwhile tasks also involve students in an inquiry-oriented or exploratory approach, allow access to the mathematics at both a low entry level and a high ceiling, and connect previous knowledge to new learning while engaging students in explaining the meaning of the result.

Good tasks also allow us, as teachers, to assess beyond skills to determine what understandings and misunderstandings students may have which can support our instructional planning and scaffolding student learning to more sophisticated and complex levels. However, it is important to remember that it is what we, as teachers, do in facilitating the task that creates the learning and not just the task itself.

We then worked together on more tasks and shared our approaches, discussed what entry points are available and challenges may be presented to students. Being aware of these things we can give the proper support to students to allow the productive struggle and learning to occur.

A sample activity from the Middle Level Breakout Session:

It takes Sam 2/3 pint of paint to paint 2/5 square ft. How much paint is needed to paint 1 square ft.

What features of this problem allow multiple entry points for students?

Which feature(s) may cause difficulties for students?

If a student is struggling with this task, what are some of the strategies they might use to approach the task?

Annie Wallace, NCTM Representative, presents the Middle Level Breakout session at the Dine & Discuss.

News From the NCTM:

National Conference Comes to Boston

By Annie Wallace, NCTM Representative

The regional conferences are quickly finishing up and the last steps of getting ready for the 2015 NCTM Annual Meeting and Exposition in Boston are underway. If you can take the opportunity to attend, even for one day, I highly recommend it. To be able to interact with people involved in all aspects of math education from all over the United States, Canada and even the world is amazing. **SAVE THE DATES: April 15 – 18th 2015.**

Featured presenters this year are **Elizabeth Green**, Author and cofounder, CEO and editor-in-chief of Chalkbeat, who will be the opening presenter with *"Building a Better Teacher: How Teaching Works (and How to Teach It to Everyone)"* and Mike North**,** Host and Producer of the Discovery Channel, who will be giving the closing presentation with *"Math, The Language of a Creative Genius".*

Freeman Hrabowski, President of UMBC (The University of Maryland, Baltimore County), will also be a key presenter on equity in math education with *"Mathematics Education for the 21st Century: Creating a Climate of Success."* Hrabowski's research and publications focus on science and math education with special emphasis on minority participation and performance. Also featured will be the three key writers of the CCSSMath Standards, Jason Zimba, William McCallum, and Philip Daro. For more information on any of these featured speakers/presenters and other featured presenters, please go to http://www.nctm.org/bostonprogram/#featured .

Registration is now open! Rates and information can be found at http://www.nctm.org/conferences/content.aspx?id=42063 . Need a hotel room or travel information --- these can be found at http://www.nctm.org/bostonhousing/.

Want more?!? Think about attending the Research Conference April 13 – 15th, 2015 which is also in Boston. Here you can examine and discuss current issues in mathematics education, benefit from exposure to alternative points of view, and interact and network with beginning scholars and veteran researchers in the field.

Missed the opportunity to apply for a grant to further your research or expand your professional horizons? The MET (Mathematics Education Trust) has a new cycle of grant applications opening up with the deadline for application being May 4, 2015. Some of these grants are: Prospective Middle School Mathematics Teacher Course Work Scholarships, Prospective 7-12 Secondary Teacher Course Work Scholarships, School In–Service Training Grants, Professional Development Scholarship Emphasizing the History of Mathematics, Pre-K–8 Pre-service Teacher Action Research Grants, and Program of Mathematics Study & Active Professionalism Grants. For more information on these and more see http://www.nctm.org/resources/content.aspx?id=198 .

Come February you may be tired of the snow and cold…think about getting warm in Charleston, SC on February 6 and 7 attending the NCTM Interactive Institute featuring *Effective Teaching with Principles to Actions: Implementing College- and Career-Readiness Standards.* Further information can be found at http://www.nctm.org/winter/ . In the past, this Winter Institute has filled quickly, so if the warmth and good learning and sharing sounds good, consider looking into it soon.

Remember that you can follow NCTM and get updates and participate in sharing learning and teaching experiences on Twitter, Facebook and the Blogs associated with each grade band journal.   Sign onto NCTM.org and explore their site for articles, problems and many other resources --- some are available to all and some are available to members. Either way, NCTM provides many resources for us as learners and teachers.

Nominations Sought for NHTM Board

By Greg Superchi, Past-President

Each year NHTM Officers and Members of the Council complete their terms and elections need to be held. We are having a call for nominations for President-Elect, the office of Treasurer, and Council members including Elementary Level representative and the NCTM representative. Information about the candidates and a ballot will be sent out via email to current members in January.

Please consider nominating a member, in good standing, who is interested in a mathematics leadership role or self-nominate by contacting Greg Superchi, NHTM Past-President, at gsuper-chi@yahoo.com. For more information, read through our Constitution about the responsibilities for the offices. More explicit details of the duties may be found by visiting the NHTM Board webpage and clicking on each position. The election will take place electronically this year with members receiving instructions via email just before our annual business meeting in the spring on how to vote.

The **Treasurer** is elected to a two-year term and gives a quarterly report to the Executive Board and at the annual business meeting of NHTM. In addition, s/he is responsible for deposits, paying bills, and keeping records of all financial transactions.

The **Elementary Representative** serves a three-year term. S/he attends all Executive Board meetings; prepares/secures articles for the NHTM newsletter as directed by the Executive Board of NHTM and assume other duties that may be assigned by the Executive Board of NHTM.

The **NCTM Representative** holds a three-year term and represents NHTM at the annual delegate assembly of NCTM, reports on these meetings and other NCTM information to the Executive Board of NHTM, and assumes other duties as may be required by the Board of Directors of ATMNE or assigned by the Executive Board of NHTM.

Escher in Manchester!

Currier Museum of Art in Manchester is hosting an exhibition, M.C. Escher: Reality and Illusion.
http://www.currier.org/exhibitions/now-on-view/

See Science Museum's exhibit *Escher: The Science Angle* explores an Escher-like approach to science and mathematics.
http://www.see-sciencecenter.org/

Both exhibits run now through January 5.

Rivier University students explore a problem during the Secondary breakout session at the Dine and Discuss.

Crawf's Cauchy Corner:

A Tutor's Observations on Math Teaching

By Jim Crawford

Tutoring at Central Arizona College has been an interesting experience. The mathematics classes run the gamut from Basic Arithmetic to Modern Differential Equations. Consequently, the student population is quite diverse and makes the transition between tutees quite challenging as there may be a change from explaining how to do long division to finding the derivative using the chain rule.

The Basic Arithmetic class is just what it sounds like. It starts with addition of whole numbers and proceeds through fractions and decimals. It also includes a section on the ever-popular Mean, Median, and Mode. How the Modern Differential Equations class differs from the Ordinary Differential Equations class which precedes it is still a mystery to me.

Many of the students I work with are adults in their twenties who have come to the college with a sense of purpose. They wish to better themselves by taking courses that lead to Associate degrees in technical fields that are offering good starting salaries. Ah, "technical fields" means they have to pass an advanced level Algebra course to get the degree. This course would be quite similar to an honors high school Algebra II course.

Unfortunately, some of these students who now know where they want to go, never developed study skills in high school. They get help on their homework in the Learning Center and think they are done. At the end of each session it is necessary to explain to them that they need to go over every question again to make sure they know how to do it. Completing the assignment with the help of a tutor who has a Master's degree in Mathematics does not constitute "getting all my homework done." Most of them understand this and are dedicated enough to go home and try them again.

One of the major problems students have is studying for the exams. Most of the teachers provide a practice exam and tell the students that the questions will be "like" those on the practice. The practice tests are usually straight forward. If it is on systems of equations in the Algebra I course, for example, there are usually a couple involving the three methods that are taught – graphing, substitution, and elimination, plus some inane word problems about John and Mary painting the garage together or the ever popular boat going up the stream and down the stream. These provide a challenge, but the students usually rise to the task and they know the rules or procedures they are supposed to use.

When it comes to the test, however, some of the instructors now insert fractions and decimals into half the equations. It may seem simple, but they weren't practiced at all in the homework or the review. These are students who are not comfortable with fractions and the sight of one literally freaks them out. If the test is on methods of solving systems, does it make any sense to insert questions involving math skills that have not been practiced or the teacher has not demonstrated?

Granted, the student should know how to use fractions, but then the test becomes one of fifth and sixth grade mathematics (at least in my day, it is probably second grade now) and not one on the process of solving systems. Tricking students into believing they are completely prepared for a test, when they are not, may be fun, but it is not educationally sound.

From the desk of the Membership Chair...

As of November 2014

	Lapsed Members	Current Members	NHJEM 2014	NHJEM 2015	Up-to-date Total
Individual	133	270**	2	1	
Institutional		2			
New FREE 1 yr. Memberships		12			
Totals	133	284			287

** Includes 8 Honorary
Lifetime Members

We currently have 12 teachers who have recently joined NHTM through our FREE one-year membership offer. Please continue to share NHTM's offer for free membership to all elementary and first year math teachers in NH so that we may offer membership to ALL elementary teachers and first year math teachers across the state. Membership renewals have been coming in both online and through the mail. There is still time to renew! You may renew your membership online or go to the NHTM website for a renewal application form.

Mail forms to: Gretchen Scruton, NHTM Membership Chair, 44 Greenough Rd. Plaistow, NH 03865

NH-JEM Memberships
The New Hampshire Joint Elementary Membership (NH-JEM) is for elementary teachers in NH. A $50 annual membership fee provides you with most of the membership benefits of four organizations (NHTM, New Hampshire Council of Teachers of English, New Hampshire Council for the Social Studies, and New Hampshire Science Teachers Association). Note that the NH-JEM membership does not include ATMNE benefits. Check out the link on our website to join NHJEM and consider recommending NH-JEM to your colleagues that teach at the elementary level.

Enjoy the Holidays! If you would like to check on your membership status please email me at Gretchen.Scruton@gmail.com

ATMNE News:

Save the Date and Submit Proposals for Fall 2015 Conference

ATOMIM-The Association of Teachers of Mathematics in Maine is hosting the next ATMNE Fall Conference: "Make Your Teaching Distinctively Different—Show Us Your Moxie!" October 29 & 30, 2015 at the Holiday Inn by the Bay in Portland, Maine. They invite teachers to join Don Balka, Diane Briars, Dan Meyer, and Greg Tang and to submit a speaker proposal form by February 18, 2015. Questions or concerns about the proposal form should be directed to Darlene Ulrickson, dulrickson@msad53.org. Pam Rawson, pamela.rawson@gmail.com, is happy to answer questions regarding the conference.

Dover High School mathematics teachers consider some problem solutions in the secondary Dine & Discuss breakout session, October 29, 2014.

Newsbytes:

Nominations for the 2015 **Presidential Awards for Excellence in Mathematics and Science Teaching** are now being accepted. Teachers who teach 7-12 grade mathematics or science (including computer science) will be considered. This highest national honor recognizes teachers who serve as models for their colleagues, leaders in their community, and who "develop and implement a high-quality instructional program that is informed by content knowledge and enhances student learning." Nominations are due April 1, 2015. Mathematics and Science teachers in grades K-6 are recognized in even years. More information at https://www.paemst.org/.

NCTM offers ANYTIME e-seminars on a wide variety of topics related to mathematics teaching including Common Core implementation, RTI, Effective Mathematical Tasks, Multiple Representations, and Research in Teaching and Learning. Visit http://www.nctm.org/profdev/content.aspx?id=26594 for more information.

There's not much time left to nominate your deserving colleagues for the **NTHM Teaching and Service Awards**. Details can be found at www.nhmathteachers.org. There have been years when no award was given due to a lack of nominations. Let's make sure that doesn't happen this year!

The **University of New Hampshire** (UNH) offers an MST degree in Mathematics for secondary and middle school teachers. The degree can be earned in two years through in-class and online coursework. You do not need to matriculate into the MST degree program to take MST courses. A 1-credit mathematics elective will be offered on-line during J-term (12/29/14 -01/17/15). Visit www.math.unh.edu/graduate/teach for more information.

Earn your MAT with evening and summer coursework at **Rivier University**. Register now for courses beginning January 12, 2015, including MA530 Technology in the Secondary Math Classroom, MA532 Classical Geometries, and courses in Education. Visit www.rivier.edu for more information.

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Please visit <www.nhmathteachers.org> for more detailed Board information.

Professional Development and Conferences

National

Joint Mathematics Meetings	San Antonio TX	10-13 January 2015
T^3 Annual Conference	Fort Worth TX	13-15 March 2015
ICTCM 25th Annual Conference	Las Vegas NV	12-15 March 2015
NCSM 47th Annual Conference	Boston MA	13-15 April 2015
NCTM 92nd Annual Meeting & Exposition	Boston MA	15-18 April 2015
MAA Mathfest	Washington DC	5-8 August 2015
AMATYC 40th Annual Conference	New Orleans LA	19-22 November 2015

State & Regional

Christa McAuliffe Technology Conference	Manchester NH	2-4 December 2014
NHTM Spring Dinner Meeting	Concord NH	25 March 2015
41st Annual State Mathematics Contest	Plymouth NH	16 or 17 March 2014
ATMNE Fall Conference	Portland ME	29-30 October 2015

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