NEW HAMPSHIRE TEACHERS OF MATHEMATICS

Mathesis

Volume 47, Issue 1 August 2014

NHTM Introduces Free Memberships for New Teachers and Students

Upcoming Deadlines:

- September 16 Deadline for submission of abstracts to MAA Contributed Paper Sessions at the Joint Mathematics Meetings.
- September 26, October 10, October 17: Early registration discounts for Indianapolis, Richmond, and Houston Regional NCTM Meetings, respectively.
- November 1 Information for November Mathesis due.
- December 15 Prevost and Evans Award Nominations due.
- January 1 Balomenos Award nominations due.

Inside this issue:

NHTM President Cecile Carlton sent the following letter to administrators and mathematics teachers in New Hampshire regarding our new membership policy. You are encouraged to share this information with your colleagues:

Working together NHTM can make a difference by continuously and consciously focusing on improving mathematics instruction in New Hampshire.

As you prepare for the upcoming school year I am excited to inform you about the New Hampshire Teachers of Mathematics (NHTM) membership opportunities. At our May 2014 Executive Board Meeting, a motion was passed that offers first year teachers and teachers new to teaching mathematics in New Hampshire a free one-year membership in our state professional organization. The resolution as passed reads:

Available beginning the 2014-15 school year, NHTM will offer free one-year NHTM memberships to undergraduate students, preservice teachers, first year teachers, PreK-6 teachers who have not held a NHTM (or NHJEM) membership previously, and experienced teachers in their first year of teaching within New Hampshire. The free one-year membership will also make the member eligible to receive the "reduced rate" at the NHTM Dine & Discuss and Spring Conference (which typically is set just high enough to cover meals) for that membership year.

Proof of eligibility for the membership will need to be forwarded to the membership chair, via email or paper mail, by the applicant, before exercising any membership benefits.

Do pass this information on to the teachers in your school and district. Read more about resources, membership, and professional development opportunities for your teachers by visiting our website: http://www.nhmathteachers.org/, completing the attached membership application and sending it to our Membership Chair, Gretchen Scruton via e-mail at gretchen.scruton@gmail.com or mailing via USPS to Gretchen care of 44 Greenough Road, Plaistow NH 03865.

The mission of the New Hampshire Teachers of Mathematics is to provide vision and leadership in improving the teaching and learning of mathematics so that each student is ensured quality mathematics education and each teacher of mathematics is ensured the opportunity to grow professionally.

Art's Attic:
Friends in High Places

By Art Johnson

This fall you might ask your students to name a mathematician. If they can name anyone, they will likely pick a European (Newton, Einstein, Archimedes, Pascal, etc.). Many mathematic texts likewise focus on mathematicians from Europe. It is unfortunate. Many outstanding mathematicians hailed from other areas such as Egypt, India, or Persia, as did this column's mathematician.

Ghiyath al-Din Jamshid Mas'us al-Kashi (1380-1429) was born in northwestern Iran, at the foot of the Central Iranian Range. The area was a hardscrabble location, and poverty was widespread. Conditions worsened beginning in 1370 when Tamerlane proclaimed himself sovereign and restorer of the Mongol empire at Samarkand (now Uzbek). Tamerlane then expanded his small kingdom by a series of successful campaigns that enlarged his empire to rival the size of Alexander the Great's.

The expanding empire meant even harder times for al-Kashi. Military raids caused al-Kashi's family to move frequently. In 1405 Tamerlane died and his son Shah Rokh became ruler of the eastern part of Tamerlane's empire. This resulted in a more stable period with a vastly improved economic climate. Rokh was an enthusiastic supporter of the arts and sciences. His son, Ulag Beg established a University and Observatory at Samarkand that soon became that part of the worlds most esteemed learning center.

We know little about al-Kashi himself, except for letters he wrote to his father and the habit he had of dating every manuscript when he finished it. In 1420 he was invited by Ulag Beg to join other scholars at the University and contribute to the research being conducted at the Observatory that had recently been built. Al-Kashi joined the faculty in Samarkand, despite the fact that he was rough around the edges and not used to cosmopolitan society. His talent in mathematics outweighed his lack of social graces, however, and he remained at the University until his death in 1429.

Al-Kashi published his first work in 1407 and dedicated it to a local noble, hoping to curry the nobles' favor. It worked. The noble became al-Kashi's patron and supported him for a time. Eventually the support dried up and al-Kashi had to resort to more dedications, including one for Ulag Beg. It was that dedication in 1415 that resulted in his invitation to join the faculty in Samarkand.

Among al-Kashi's many works is *Treatise on Astronomical Observational Instruments*, where he described the proper use of a wide range of astronomical instruments, including several he invented. In *Treatise on the Chord and Sine*, al-Kashi was the first to provide an explicit statement of the law of cosines. (In France the law of cosines is named Théoréme d'Al-Kashi.) In his treatise on *Circumference* he published the value of π to sixteen decimal places. He used a polygon with 3×2^{28} sides to calculate the value. He also produced astronomic tables, developed an algorithm for finding the nth root of a number, and explored solving all forms of cubic equations. Some believe he was instrumental in the development of decimal fractions.

Al-Kashi died a young man in 1429. Some historians believe his patron, Ulag Beg, had him murdered. It is hard to believe, but perhaps Beg, a fair mathematician himself, was jealous of the man whom he eulogized as "…a remarkable scientist, one of the most famous in the world, who had a perfect command of the science of the ancients, who contributed to its development, and who could solve the most difficult problems."

Perhaps there is an object lesson in all this. It is good to have friends in high places, but tread very lightly around them.

President's Message:
Reiterating 'CORE Truths' about CCSSM

By Cecile Carlton

It was about four years ago when the New Hampshire Board of Education adopted in principle the Common Core State Standards (CCSS) for English Language Arts (ELA) and Mathematics. The NH Department of Education (NHDOE) sponsored workshop sessions to introduce the Common Core to the school administrators and teachers. As part of that effort I can recall schools still wrapping their understandings around the Grade Level Expectations (GLEs) and now roll in the CCSSM. Historically in 1996 the schools were introduced to the NH State Standards in mathematics which were used in the New Hampshire Educational Improvement and Assessment Program (NHEIAP) – statewide assessments of that era. In 2006 a review of new iteration of the mathematics standards in consortia with Vermont and Rhode Island were the basis for the New England Common Assessment Program (NECAP). Remember the requirement for meeting guidelines for No Child Left Behind (NCLB) – don't you just love the acronyms… So where is this leading? For the SY 2014-2015 we are embarking on preparing students to meet the newest standards (CCSSM just think of them as the latest iteration and in ten years we will have another) via assessments that will be administered in the Spring of 2015. But do recall back in 2009 we were getting rationales and related information from the NHDOE (and NHTM) on how CCSSM was developed and how to prepare for the newest standards. Resources were gathered and made available to school administrators and classroom teachers. We may have neglected parents but depending where you were with keeping abreast with your professional organizations, some classroom teachers may have included forwarding information to them at their annual September parents' nights.

Have you ever thrown a pebble into a still lake? Concentric circles form from that disturbance; they roll out further and further. As with any roll out of information, those close to the center are first informed, then it spreads out further and further across the lake. New Hampshire has worked to spread out information about the Common Core State Standards implementation. It is recently that others are again becoming embroiled in public debates about the standards, and these debates threaten to squander the opportunity for systemic improvement that CCSS provides. With respect to the Common Core State Standards for Mathematics (CCSSM), below is what Diane J Briars (current NCTM President) has to say about the 'Core Truths'.*

She finds it most troubling "that much of the (CCSSM) rhetoric is based on false or incomplete knowledge about the standards and their development, or it confuses the standards with implementation activities, issues, and policies, including testing policies. Such arguments have little potential to improve mathematics education. Distinguishing CCSSM facts from fallacy is essential both for implementing the standards effectively and for engaging in thoughtful, reasoned critique of them for future refinements."

According to Briars:

> "Two important features of CCSSM that are being ignored or misrepresented are their research base and development process.
>
> **The Common Core State Standards for Mathematics are based on evidence about how students learn mathematics.**
>
> The foundation for CCSSM includes the series of National Research Council reports summarizing research about mathematics education—for example, *Adding It Up* (2001), *How Students Learn: Mathematics in the Classroom* (2005), and *Mathematics Learning in Early Childhood* (2009)—as well as the best of previous state standards and a large body of evidence taken from international comparisons. Research results incorporated into CCSSM include both general findings about how students learn mathematics and specific information about how they learn particular content. For example, in alignment with a well-established general research result, CCSSM builds procedural fluency on a foundation of conceptual understanding. Examples of research-based treatment of specific content include

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President's Message: Core Truths

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CCSSM's treatment of the meaning of operations, multi-digit computation (moving from informal strategies to generalizable methods based on place value and properties of operations to standard algorithms), and ratios and proportional relationships (building understanding and solving proportions as equivalent ratios). For topics lacking a strong research base, CCSSM progressions draw on standards of individual states or high-performing countries. The series of Progressions documents written by leading researchers in the field summarizes the standards progressions for specific CCSS domains.

Many mathematics educators contributed to the writing of the Common Core State Standards for Mathematics.

Although the Common Core State Standards were produced on an ambitious timeline, large numbers of mathematics educators had opportunities to participate in the process of developing CCSSM. In addition to the three lead authors, William McCallum, Phil Daro, and Jason Zimba, a 51-member Work Team and a 19-person Feedback Group, including teachers, mathematics education researchers, and mathematicians, participated in the development process. The lead writers also commissioned essays on mathematics education research that informed the writing of the standards.

The writing team received more than 10,000 comments through a review process that included four drafts—three sent to partner states, plus a public review draft. NCTM and other mathematics education organizations provided feedback throughout the writing process, including on the four drafts. [Diane Briars was] a member of two review teams, she can attest to the careful scrutiny that the drafts received and to the impact that the reviews had on subsequent drafts. Furthermore, project staff members were continually comparing the various drafts with high-quality state and international standards. In short, the CCSS development and review process was quite extensive, despite its relatively short timeline. FAQs that address other common CCSSM issues are available.

In addition to having accurate information about CCSSM, we need to distinguish criticism of the implementation of the CCSS from criticism of the standards themselves. **Standards specify what students should learn. Decisions about how that learning is to occur**—including those related to instructional materials, activities, lessons, units, scope and sequence, course design, homework, or assessments—**are implementation issues**. Almost all instructional resources now are advertised as "Common Core aligned," with the result that materials that are simply skill worksheets may carry this label, even though the Common Core mathematics standards emphasize conceptual understanding, problem solving, and reasoning processes as well as skill fluency. Furthermore, incomplete understanding of particular standards, such as those calling for students to use various strategies to solve computation problems, may result in inappropriate assignments—for example, homework requiring students to solve each problem by using four different methods instead of one method of their own choosing or devising. Use of inappropriate materials or assignments is not the fault of the Common Core Standards but **indicate the need for increased understanding of CCSSM and of resources that can effectively support students' learning of them**. It does not indicate that the standards themselves are flawed.

Particularly problematic is a tendency to equate CCSSM with testing and with test-related activities and practices. In response to accountability pressures to increase high-stakes test scores, schools, districts, and even states have instituted a wide range of test-prep activities, such as practice tests, frequent benchmark tests, and test practice worksheets. Much of the criticism of CCSSM, especially from parents, is about these test-prep practices and pressure on students to perform well. These practices were prevalent well before CCSS and are not part of it. To the contrary, the best preparation for the

(Continued on page 5)

President's Message

Reiterating NCTM President Diane Briar's Message regarding CCSSM

(Continued from page 4)

CCSS assessments, with their commitment to assessing all the standards, including the Standards for Mathematical Practice, is high-quality instruction—not test-question drill sheets.

Finally, despite the anti–Common Core rhetoric, overall support for CCSS is still strong. For example, according to a recent Gallup-*Education Week* poll, two-thirds of district superintendents believe that CCSS will improve the quality of education in their schools. Business Roundtable supports the full adoption and implementation of the Common Core State Standards as a way to build a more skilled, prepared workforce. And the United States Conference of Mayors recently reaffirmed its support for CCSS. Even if a handful of states replace CCSSM with their own standards, CCSS will still be the standards adopted and in place in a majority of states.

The Common Core State Standards represent too important an opportunity to squander because of rhetoric based on incorrect and incomplete information and public confusion of the Common Core State Standards themselves with shortcomings in their implementation. NCTM has developed a three-pronged approach to support the CCSSM:

1. Clearly describe and publicize the practices, policies, programs, and actions required for successful implementation of CCSSM through wide dissemination of *Principles to Actions: Ensuring Mathematical Success for All*. NCTM cannot do this alone. [As an Affiliate we consider our members as important partners in this effort.]

2. Enhance and expand your professional learning opportunities related to *Principles to Actions* and implementation of CCSSM at our conferences and institutes and in our journals, and continue to build our collection of relevant professional learning resources. [NHTM has this as a PD focus for this coming school year.]

3. Actively advocate for the Common Core State Standards for Mathematics, correcting misconceptions, clarifying confusion, and highlighting ways in which CCSSM supports students in learning more and better mathematics. Most important, we need to help parents and the broader public become aware that the conceptual understanding and habits of mind—for example, problem solving, reasoning, and perseverance—that CCSSM calls for are essential for students' preparation for their futures.

As Diane says, "…this third prong requires all of us, especially teachers and parents, to personalize CCSSM by describing its benefits for their students and children. NHTM strongly urges you to get involved in the dialogue. Correct misconceptions. Separate standards from implementation issues. And highlight the benefits and opportunities that the Common Core State Standards for Mathematics afford to increase the mathematics learning of all students." These will be core goals for our state organization this year.

Watch for information on our Fall 'Dine and Discuss' sessions, check with your regional coordinators and suggest workshops on collegial work to better understand the practices, policies, programs and actions required for successful implementation of CCSSM. Consider a book study or form discussion groups to unwrap and benefit from NCTM's *Principles to Actions: Ensuring Mathematical Success for All*. Become involved and let us know how we can best service you in your mathematics teaching endeavors this year. Have an exciting and successful teaching year!

*Reprinted with permissions granted from National Council of Teachers of Mathematics (July 2014), NCTM President Diane Briars' President's Message, "Core Truths," full context can be found at: http://www.nctm.org/about/content.aspx?id=42685

Post-Secondary Representative

STEM Task Force Update

By Rich Andrusiak

In April this year, Governor Maggie Hassan signed into action a Task Force charged with making recommendations on a globally-competitive, rigorous K-12 STEM education for New Hampshire children.

The Governor's office contacted NHTM for names of individuals who would represent the organization on the task force. I'm pleased to announce that Caroline Herold, mathematics teacher at Ross A. Lurgio Middle school, was selected. Many of you might remember Caroline as coordinator for the Presidential Awards for Excellence in Mathematics and Science Teaching program. We are fortunate to have Caroline representing the organization. Caroline has provided this update on the work of the task force.

Upon first meeting, the team determined that the three questions deserving concentrated efforts were:

1. How can we get students excited about STEM?

2. How do we empower educators?, and

3. What standards/requirements should be in place?

Thus, three subcommittees formed and are currently engaged in weekly meetings to research best practices and cutting-edge visions of STEM education across the nation and around the world.

The team researching student interest has been exploring several ideas including competitions, exposure to industry, Career and Technical Education programs and centers, career pathways, public/parent outreach, STEM within the curriculum, and magnet schools.

Caroline has been working on the area of educator empowerment. Her team is in the process of researching:

- elementary teacher preparation programs,
- opportunities and incentives for STEM professional development for current teachers,
- ways to integrate hands-on/applied STEM-focused experiences into every school day, and
- utilizing teacher, higher-ed and industry expertise as ambassadors for STEM projects.

Since the four year HS math requirement just recently passed in June 2014, discussion of the standards and requirements for the STEM initiative have focused more heavily on science. More specifically, the Next Generation Science Standards include Science and Engineering Practices, Crosscutting Concepts, and Disciplinary Core Ideas, and are aligned with both Mathematics and English Language Arts CCSS.

Each team is currently fitting their recommendations into a common framework so as to identify areas of overlap, gaps in addressing the Executive Order, and needs for further investigation or supporting research. The goal is to have recommendations ready in DRAFT form for review and vetting by the entire Task Force by the beginning of August.

Information about the Task Force is available at http://www.stemnh.org/content/taskforce, where meeting minutes, announcements, and ancillary resources will be stored. If you have specific questions, email can be directed to stemnhtf@ccsnh.edu.

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

Secondary Representative

Websites for the Mathematics Classroom

By Michelle Fox

It's that time of the year again! Gearing up for the beginning of school seems like the perfect time to share a few websites that I have found to be useful in my classroom. These resources are aligned with NCTM's Curriculum Focal Points and/or Standards for Mathematical Practices, and can help with mastery of curriculum that aligns with the Common Core State Standards. All of them have been very useful for me over the last few years in my room, in every class from Algebra to Calculus.

- www.mathbits.com is a site created by two mathematics teachers. The site covers topics in Pre-Algebra, Algebra I, Geometry, Algebra II and Trig, and Calculus. There are hundreds of worksheets and activities – most of which are aligned with the Common Core and/or are being adapted to fit the Common Core. There are also "caching" activities that can be done online that I would akin to a mathematics scavenger hunt – but students have to get the correct answers in order to advance. It is a paid site – but some resources are available without a paid subscription.
- www.coolmath.com is a free site that includes a plethora of mathematical games, tutorials, puzzles, and other reference materials for many different curricular areas spanning from Pre-Algebra to Calculus. My students have used this site to review different math topics in the "Math Lessons" section, and have found them to be useful when they are at home by themselves attempting to do homework that they have either missed a lesson on or just need a refresher. Of course, the games are fun too!
- illuminations.nctm.org is obviously a great resource for mathematics classrooms everywhere. There are hundreds of Lessons and Interactives for all grade levels – and if you haven't been on the site for a while – you will be stunned by the amount of material that is available on this site. And – this is new - if you want to search for a particular "Lesson" or "Interactive" on the right hand side of the home page, you can now choose to search for activities that align with the NCTM Standards or the Common Core Math Standards.

I wish you all luck in these last few days before the school year begins, and hope you all have a wonderful school year!

In July, NHTM held a one-week STEM Star Camp for fourth through sixth grade students at Keene State College.

Story on page 11.

Elementary Representative

Feedback That Makes a Difference

By Stephanie Wheeler

What is feedback? How do our students benefit from teacher feedback? From a research standpoint, the evidence regarding the importance of informative feedback is very clear. In his study "Visible Learning" researcher John Hattie reviewed over 7,800 studies on learning and instruction and summarized the research on feedback like this, "The most powerful single innovation that enhances student achievement is feedback. The simplest prescription for improving education must be 'dollops' of feedback." That is over 7,800 studies suggesting the same thing – informative feedback is essential to student learning.

Researcher Bob Marzano says there are conditions which must exist for student assessment to enhance student achievement: In particular, feedback from classroom assessments should provide students with a clear picture of their progress on ***learning goals*** and how they might improve. Feedback from classroom assessments should ***encourage*** students to improve. Classroom assessments should be formative in nature and formative classroom assessments should be quite frequent.

At NHTM's 2013 Fall Dine and Discuss, we focused on Formative Assessment. One of the big "take-aways" for me was that what is meant by the phrase 'Formative Assessment' may be more accurately described by the phrase 'Formative Instruction.' Marzano quotes Black and Wiliam writing, "Formative assessments are defined as any activity that can be used to provide information to be used as feedback to modify the teaching and learning activities in which students engage."

Over 20 years ago in a study regarding which types of feedback work best for student learning, Bangert-Drowns, Kulik, Kulik & Morgan presented the following:

Number of Studies	**Characteristic of Feedback from Classroom Assessment**	**Percentile Gain/Loss**
6	Right / Wrong	-3
39	Provide Correct Answers	8.5
30	Criteria understood by student vs. not understood	16
9	Explain	20
4	Student reassessed until correct	20

My interpretation of the research indicates that feedback is a vital factor in student understanding and achievement and is influenced by:

- The type, depth and frequency of feedback.
- Feedback that is tied to specific learning goals.
- Feedback that encourages and promotes the opportunity for student learning.

That is my take, but let me play on words here and say, "You do the math." There is a plethora of research available on feedback. I would love to hear your take on the impact of feedback in your classroom. As always, please feel free to email me at slwheeler3@aol.com.

Classroom Activity Submitted by Stephanie Wheeler, Elementary Representative

Close to 100

There are many variations of this game and you are likely to find some on-line if you google "Close to 100."

Close to 100

This game provides students with mental math practice and can be modified to accommodate many different levels. Remember – any game can be modified to fit the needs of your students – so be creative – or let the kids be creative. They will find many ways to modify the game!

Directions:

You need a deck of cards with the numbers 1 – 9 four times each
    You can include zeroes if you have them
You can remove face cards and tens or use them as Wild Cards
Deal 6 cards face up to each person
Each player uses 4 cards to create two 2-digit numbers that sum as close to 100 as possible
Each player's score is the difference between their sum and 100
Total your points after 5 rounds
The player with the least number of points wins

For example:

Player 1 is dealt: 1, 2, 3, 5, 6 and Wild Card
    Player 1 creates: 68 + 32 = 100
        The Wild Card is deemed an 8
    Player 1 score: 0 (the difference between 100 and 100 is 0)
Player 2 is dealt: 3, 4, 6, 7, 8 and 9
    Player 2 creates: 67 + 34 = 101
    Player 2 score: 1 (the difference between 101 and 100 is 1)
Players are dealt 4 more cards – as they still have 2 cards – and play begins again

Simple Modifications:

For younger students, play ***Close to 10***. Students are dealt 4 cards and players add two 1-digit numbers to sum as close to 10 as possible.
For older students or students that need a challenge, play ***Close to 1000***. Students are dealt 8 cards and form two 3-digit numbers that sum as close to 1000 as possible.
To focus on subtraction, play ***Close to 0***. Students form two 2-digit numbers whose difference is a close to zero as possible. Once again, ***Close to 0*** can be modified so that students are finding the difference between one digit or three digit numbers.

Middle Levels Representative

Inspiring Students with a Tin Man

By Katrina Hall

The time of year came when students were ready to study surface area. How was I going to make this interesting and real? The students in my classes were itching for geometry. The common chant heard, "I love geometry!" I had to make sure I kept this level of excitement within the students.

As I began searching through my vast amount of resources, I couldn't quite find the "best fit." This led me to Twitter. Reaching out to my PLN, a fellow math teacher had shared a lesson she did with robots. This sparked the idea of creating a "Tin Man".

The task for students was to create their own version of the *Wizard of Oz's* Tin Man. As they created groups of 4 and 5 students, they were given further direction. All groups had to use at least one sphere, one cone, one cylinder and one rectangular prism in the creation of their Tin Man. The final product had to fit on a school desk and had to stand on its own when complete. The planning began, as did the excitement for the task.

Groups brought in objects from home such as cereal boxes, wrapping paper tubes, and Styrofoam spheres. Birthday hats and unused Snowcone wrappers were used for cones, although some groups used nets to create their own cones. When the final designs were ready to be implemented, students then began to question how they were going to make it "silver." Great question!

Each Tin Man was to be covered with aluminum foil, "tin." Students had to work together to determine the amount of "tin" needed for their Tin Man by determining its surface area. This meant measuring, calculating and using formulas correctly. This also meant students had to recognize which areas needed to be covered and which did not. For instance, when a cylinder was connected to a prism the circular area would not need foil. It was great to see students then determine that this area then had to be accounted for twice. Do you know why?

Precise measurements and calculations would lead to a relatively precise amount of foil needed to cover the Tin Man. Once the total surface area was determined, students were given a roll of foil to cut the needed amount. Important to know here is that students were only allowed to cut once. Whatever they cut for foil was what they needed to use. They could not come back for more. They also could not throw away extra.

The cutting of the foil turned out to be another task. Students were allowed to use any unit of measure for their work. As they approached the roll of foil some realized that their measurements in centimeters or feet needed to be converted. The second challenge came when they realized the number which they had was in square units and they needed to determine the correct linear measurement, or length, before cutting the foil. A great deal of discussions happened around the rolls of foil.

As groups realized they needed to divide their calculated surface area by the width of the foil, the rolling of the foil began. This step proved to be telling for some groups. They knew that as soon as the foil was cut, that was what they had to use. Using estimation skills, some were quick to realize that they were going to have too much or too little foil. For some groups, this meant going back to check measurements and calculations.

When groups made the official cut of foil they were on their way to covering their Tin Men, another challenge. The piece of foil, which was cut, was rectangular in shape. Students had to determine how to cover the surface area of the Tin Man. Some areas were going to be covered with scraps of foil and not full sheets. Appearance of the Tin Man was important, as it was a part of their grade.

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Middle Levels: Tin Man Inspires Students

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The grading of the Tin Men was easy. Students were graded on calculations, precision, quality, and collaboration. Each student had to submit a calculation sheet showing the formulas and mathematics used to determine the surface area of the Tin Man. Precision was determined based on the precision of the foil. These two grades were math grades where quality and collaboration were responsibility grades. Students earned their individual grade.

The final products varied in quality and precision but they were all displayed. Students were proud of their efforts and even named their Tin Men.

As a teacher, I felt I had achieved my goals of making the lesson interesting and real. I was looking for students to work with surface area and hadn't thought of the other aspects of mathematical learning which students encountered. The best aspect was reading student reflections at the end of the year. Students loved this project despite the challenges and hard work they encountered. Students even spoke about the Tin Man Project during the school's Day of Learning, expressing how proud they were in persevering, and collaborating to complete a very challenging task.

Getting the "right answer" isn't the way to inspire students.

NHTM's STEM Star Camp

By Beverly Ferrucci

NHTM held its first STEM summer camp during the week of July 14th to July 18th for students from the Monadnock region of New Hampshire. The camp was held at Keene State College (KSC) and was named the STEM Star Camp. The camp met every day from 9:00 to 3:00, and it focused on hands-on STEM tasks for students entering grades four through six. There were a total of eighteen children registered for the camp, and it was instructed by Dr. Beverly Ferrucci, Director of the Elementary School Mathematics Specialists' Program at KSC, and Eileen Phillips, Director of KSC's Mathematics Center. Christina Anderson, Katte Gavrity, and Mary Shannon provided additional instructional support during the camp.

Dr. Dick Evans designed the curriculum from activities adapted from the Australian Tasks Project which Plymouth State University loaned to the camp as a teaching resource. Dr. Evans also provided training for the instructors of the camp.

Major funding for the camp was provided through a generous contribution from the NH Charitable Foundation. Additional support was given by the Association of Teachers of Mathematics in New England, Keene State College's Office of Diversity and Multiculturalism, Walmart, and Target.

The camp was free for the students who were provided with t-shirts to wear, snacks, and lunch every day, and all worksheets from the mathematics activities were theirs to keep at the end of the week. During the camp, students actively participated in a wide variety of mathematics activities that followed the Common Core Mathematical Practices. These activities included Close to 100, which was a favorite mentioned by the students, Close to 0, Guess My Number, the Line Up, What's in the bag?, Multo, a mathematics scavenger hunt, the Wheel of Fractions, the Growing Plant, and much more. Mathematics literacy was also included in the camp; a story involving mathematics was read every day, and activities relating to the story were presented following the reading. In addition, students grew sprouts and made qualitative and quantitative

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NHTM Sponsored Camp Fun for Students

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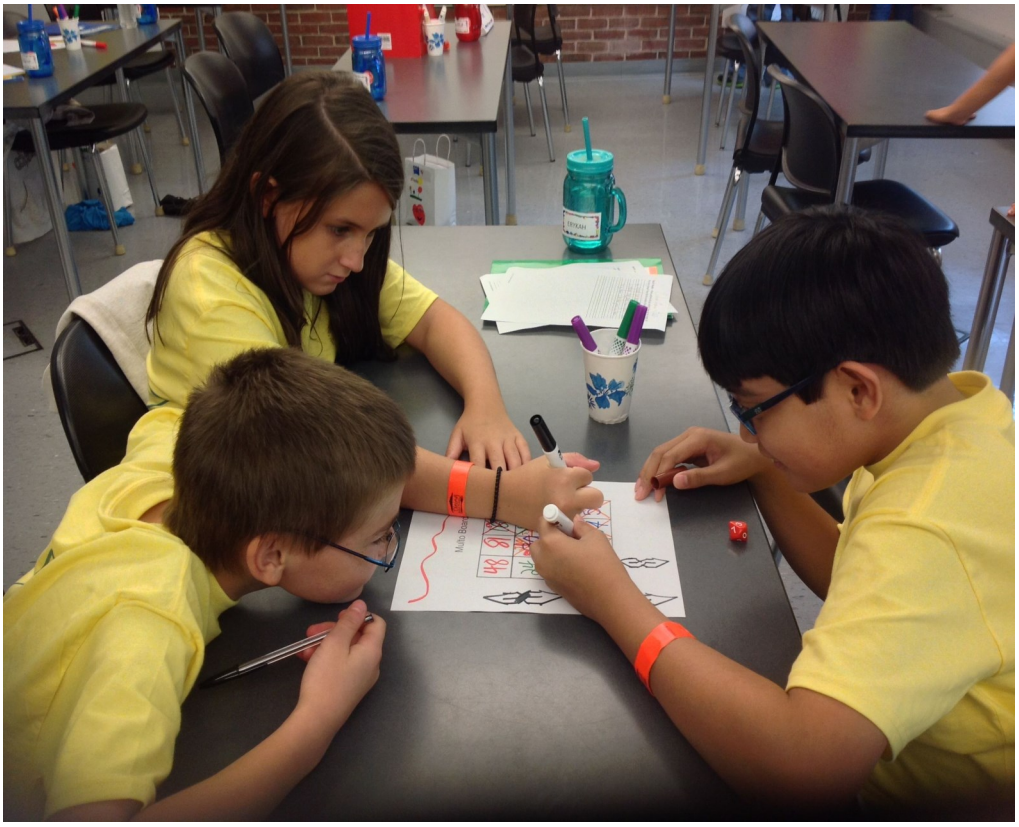
observations during the five-day period of growth.



At the conclusion of the camp, students were asked to complete a brief survey to let the instructors know more about the student experience. When asked about their favorite mathematics activities, many students wrote that they enjoyed Close to 100, a activity where students had to roll six dice and create an addition problem with two two-digit numbers to add close to but not surpass 100, and Close to 0, a similar activity where students now subtract to get closest to 0. When asked about their least favorite activities, many students wrote that they did not have any. One student said, "I did not have a least [favorite] one because they were all good." Another wrote, "I liked them all!"

In addition to the camp just being a great time for the participants, students also learned a great deal that could also carry over to their schoolwork. A student entering sixth grade commented, "I might use it to help me on a problem" in the future. A student going into fourth grade wrote that the camp "helped me with fractions." A student entering fifth grade said the activities "helped you learn."

The vast majority of students wrote that they would want to attend the camp next year if it was offered again. One student wrote, "Yes, I would attend again next year if I can because it is really fun." Most students commented on how much fun and enjoyable the camp was as a contributing factor to their desire to return. Another student said she wanted to return because she "can learn a lot and have fun." A third student said, "It helps me with math," so he would want to return. Another student enjoyed the camp so much that she wrote, "Instead of just 1 week of camp, make it 2 weeks."

Overall, as noted in particular by the students, the STEM Star Camp was a major success!

NCTM Representative: Grants, Tips, and Workshops

By Annie Wallace

A Weekly Problem (middle school level) ***Jump Like a Flea:***
A flea can jump 350 times its body length. If humans could jump like fleas, how far could you jump? ~ From Menu of Problems, April 2001. – solution at end

Did you ever want to explore an area of interest, further your coursework or do some research? NCTM offers some grants that could help you pursue any of these. The deadline for the next round of grants is 7 November 2014. The following link will take you to the grants, their requirements and application deadlines. http://www.nctm.org/resources/content.aspx?id=198#68

Whether you are new to the classroom or a veteran teacher, NCTM has a wide range of Tips for Teachers at http://www.nctm.org/resources/content.aspx?id=9584. Have a tip that you would like to share, feel free to share with them ---- link at top of page in *Send us your ideas!* Remember too that NCTM has all sorts of resources for you as a teacher of mathematics, for families and for administrators/leaders. Take the time to explore all that they have to offer at http://www.nctm.org/default.aspx . If you are a member you will have more access to the various resources, ranging from data sets, to lessons and activities, weekly problems and more, than for those who are not. Not a member, think about becoming one and enjoy the number of resources and discounts that you will have for yourself and your students!

Missed the 2014 NCTM Meeting and exposition in New Orleans? You can view some of the events through webcasts at http://www.nctm.org/conferences/content.aspx?id=41981.

The 2014 Regional Conferences provide 200 + workshops, hands-on activities. and collaboration with other math educators and leaders. These will be held in:

Indianapolis, Indiana • October 29–31, 2014
Richmond, Virginia • November 12–14, 2014
Houston, Texas • November 19–21, 2014

Save the date and join NCTM as they bring together thousands of education professionals for the nation's premier math education event, the 2015 NCTM Annual Meeting and Exposition held in Boston, Massachusetts on April 15th – 18th. Go beyond the classroom and examine the innovative ideas that can improve the quality of learning in every student and treat yourself to:

700+ sessions, workshops, and bursts
Common Core best practices
Current strategies for the classroom, pre-K–12
Expert speakers and presentations
Networking opportunities

Follow on Twitter using **Follow us on Twitter** Use #NCTMBOSTON to stay connected.

Solution to middle level weekly problem:

Answers will vary, depending on the height of the person. The average height of an 11–14-year-old male is 60 inches. The average height of a female of the same age is 62 inches, according to the National Institute of Health. A student who is 5 feet tall could jump about 1750 feet, or 583 yards. For varying answers, multiply the height by 350 and approximate that distance with a known landmark.

Nominate a NH Math Educator for a NHTM Award

NHTM encourages its members to nominate mathematics teachers for the Fernand J. Prevost Teaching Award, the Richard C. Evans Distinguished Educator Award, and the Richard H. Balomenos Memorial Award. Nomination forms and applications for each of these awards can be found on the NHTM website www.nhmathteachers.org.

The descriptions and instructions for each of these awards are described below:

Goffstown Mountain View Middle School teacher Lynn Tassi, 2014 Evans Award recipient, conducts a workshop at the 2014 NHTM Spring Conference.

The Fernand J. Prevost Mathematics Teaching Award

Nominees are being sought for the annual FERNAND J. PREVOST MATHEMATICS TEACHING AWARD. NHTM is presenting the award in recognition of the contribution that Ferd has made to the mathematics educators of New Hampshire during his thirty years as the state mathematics consultant. The award is being given to a beginning teacher in her/his first, second, third, or fourth year who meets the following criteria which exemplify the characteristics which Ferd has brought to his teaching:

* commitment to good mathematics
* confidence that children can learn
* a spirit of self reflection and professional curiosity
* caring and concern for colleagues
* a willingness to explore, to learn, and to grow as a teacher of mathematics
* a willingness to share mathematical and pedagogical activities with others

The recipient will receive a plaque of achievement, a $250 prize, and a one year membership to NHTM. The presentation of the award will be made at the NHTM Spring Conference.*

Nominations are due by December 15, 2014 and should be sent to:

Katrina Hall
katrinaleighhall@gmail.com

The 2015 Richard C. Evans Distinguished Mathematics Educator Award

In December 2006, Dr. Richard Evans retired from Plymouth State University after serving for more than 40 years as a mathematics educator. The extent of his work in the State of New Hampshire is enormous.

It is difficult to find a mathematics teacher in the State who has not been affected by his work. Dick has an unsurpassed passion for mathematics education and has dedicated his life to improving mathematics education for all in the State of New Hampshire.

The intent of this award is to highlight that passion, creativity and innovation in the teaching of mathematics to all students. The recipient of this award will represent Dr. Evans philosophy, passion and knowledge of mathematics education. Those with 5 or more years of experience teaching mathematics at any level from Pre-K to 16 may be nominated.

(Continued on page 15)

Nominations Sought for NHTM Awards

(Continued from page 14)

The award recipient will receive $500, a plaque, a one year membership to NHTM, become an honorary board member for one year, be invited to present at the spring conference, be invited to contribute articles for the quarterly newsletter, Mathesis, and will be encouraged to offer professional development opportunities for mathematics educators with the support of NHTM. The presentation of the award will be made at the NHTM Spring Conference.

Please consider nominating a Pre-K to 16 mathematics educator for the 2014 Richard C. Evans Distinguished Mathematics Educator Award given by the New Hampshire Teachers of Mathematics. Nomination forms and applications are due by December 15th can be found at www.nhmathteachers.org.

Nominations and questions should be sent to:

Michelle Fox NHTM Secondary Representative
PO BOX 171, Lancaster, NH 03584
m_fox@sau58.org
msfoxmath@yahoo.com

The Richard H. Balomenos Memorial Award

The Richard H. Balomenos Memorial Award is presented annually to a New Hampshire mathematics educator who has shown outstanding or meritorious service or leadership to the mathematics education community on a statewide basis. Established by the Executive Board of NH-ATMNE in 1987, the award remembers and honors a former colleague, educator, and friend, Richard Balomenos, and his wife, Georgia, who died tragically in an automobile accident in December 1986. As both teacher and administrator at the University of New Hampshire for almost 25 years, Richard had a profound influence on mathematics education in the state of New Hampshire.

If you would like to nominate someone for the Richard H. Balomenos Memorial Award, please send his/her name and a 1-2 page letter describing contributions to the State of New Hampshire in the field of mathematics education to:

Cecile Carlton
NHTM President
3 Wentworth St.
Nashua, NH 03060

All nominations must be received by January 1. A list of previous recipients is posted on the NHTM website www.nhmathteachers.org.

The 2014 recipient of the Richard H. Balomenos Memorial Award, Rich Andrusiak (center) of River Valley Community College, with Michael Severino and Greg Superchi at the 2014 NHTM Spring Conference.

**Due to the NCTM Annual Meeting being held in Boston in April 2015, NHTM Teacher Awards will be presented at a Spring Dinner Meeting planned for March 2015. More information to follow.*

New Hampshire Students Earn Scholarships

NHTM is happy to introduce the winners of this year's NHTM scholarships. Olivia Myers, a 2014 graduate of Lisbon Regional School, was awarded the high school scholarship. She plans to attend the University of Vermont and major in mathematics. The college scholarship went to Lauren Asmega, a senior at Rivier University. Lauren is majoring in Elementary Education with a specialization in mathematics.

Leadership: Transforming Affiliates from Good to Great

By Kellie Gabriel

The 2014 NCTM Affiliate Leaders Conference was held on July 25-27 in Chicago Illinois. Those who attend are leaders from affiliate organizations spanning the US and Canada. The goal of the conference is to network and discuss strategies to improve the organization at large and the affiliate groups. This year Cecile Carlton and I had the distinct pleasure of attending and meeting the new NCTM President, Diane Briars. She was an integral part of this 3-day conference and spoke of the 2013-2015 Strategic Priorities, NCTM's solution to CCSSM and College Ready Standards; Principles to Action and a plethora of exciting transformations within the organization.

NCTM President, Diane Biars (center) with NHTM Board members, Cecile Carlton- President (left), and Kellie Gabriel- Treasurer (right).

I had many takeaways, but the one that remains with me is the overall enthusiasm and positive energy I feel returning to the NHTM Board. Stay tuned for new and exciting ideas with the hopes to expand the support to our membership and to the mathematics teachers of New Hampshire.

Cecile and Kellie visit the unique mirrored sculpture *Cloud Gate* at Millenium Park before the conference. The beautiful reflective symmetry was a sight to see.

More Events to Come! Keep Informed!

Some NHTM and other mathematics education events are still in the planning stages. Information on the annual Dine & Discuss, social events, state math contest and professional development activities will be posted on the MathEd listserv as soon as details are confirmed. To subscribe, go to http://listserv.plymouth.edu/mailman/listinfo/nhmathed. NHTM also has a Twitter hashtag #NHTM and a facebook page NHTM-New Hampshire Teachers of Mathematics, but the listserv continues to be the most comprehensive source of information.

CRAWF'S CAUCHY CORNER

By Jim Crawford

Summer in Arizona, where cooling down means dropping to 105 degrees, gives me a real chance to do many things – all of which are inside. Last week I decided to check out an old box that has been sitting in the garage since I moved here. Much to my delight, but not really to my surprise, it had little treasures to find and savor and plain junk to enjoy. Yes, although I am not in the "pack rat" category yet, there are some things that I cling to tenaciously and relish every time I find them.

As an old fashioned math teacher I had no penchant for, or interest in, creating a bulletin board in my school office, so I had allowed seniors to post their senior pictures or other memorabilia if they so desired. The first ones went up in the seventies and continued to accumulate until my retirement. Quite frankly, if you posted your picture there in 1979 it was still there in 1999. The board did get cluttered and a few students saw Mom's or Dad's picture, but the boards weren't barren – dusty, but not barren. The pictures are all still in my possession.

That particular day two pictures really caught my eye. One was from a student who had gone to Clarkson University. With the picture was a very sincere thank you note that he had written because of the time I had given to helping him. At the time, he was sure that I made a big difference in his life. He is now an engineer with the Department of Defense.

The second was a picture of some students in my Basic Math II class counting the M & M s I had brought to school when we were working on the meanings of mean, median, and mode. The hardest part had been to stop them from eating the experiment before it was completed. On the back of the picture someone had written, "Thank you for making math so much fun. I am learning a lot."

I shuddered to think that anyone in that class would be working for the Department of Defense, but they were really a fun class and a joy to teach. It occurred to me (again) that I was lucky enough to have all sorts of students of different ability levels from quite diverse backgrounds during my career.

It is sometimes easier to recall the better students who went on to college and have joined the ranks of society as doctors, lawyers, and engineers. But, as math teachers, we should also be remembering that we influence the lives of all our students, including the next generation of auto mechanics, nurses, landscapers, and service men and women. We should work to make sure that each student receives our best as we expect the best from each of them.

As I reached the bottom of the box I found, wrapped in tissue, a belt buckle that I had received from Concord High School. It was a tribute to Christa McAuliffe and was emblazoned with her classic words

I touch the future, I teach

And that just about sums it up. I hope the new school year will be rewarding and enjoyable for you as well as your students.

Graduate Programs in Mathematics Education

University of New Hampshire offers a MST degree in Mathematics for secondary and middle school-teachers which can be earned through summer and online coursework. Go to www.unh.edu/graduate/teach for more information.

Rivier University offers an MAT degree in Mathematics for current and prospective teachers. Courses are taught in the evenings and during summers. Visit www.rivier.edu/ for more information.

From the desk of the Membership Chair:

Please RENEW & Invite Colleagues to Join NHTM: Now is the time to renew! Our membership is currently at 401 members with 200 memberships about to expire. You can expect to receive an emailed reminder when your membership is about to expire. Please renew your membership online or use the application form in this issue. Let NHTM be your state level professional conduit that extends your networking with mathematics colleagues. Enhance your effectiveness, mathematical expertise, and teaching skills. Invite a colleague to join, especially if you know a colleague that would qualify for a free one-year membership to NHTM. Contact Gretchen Scruton, Membership Chair if you have any further questions: Gretchen.Scruton@gmail.com.

NH-JEM Memberships: If you teach at the elementary grade level, the New Hampshire Joint Elementary Membership (NH-JEM), may be for you! 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). See the website www.nhmathteachers.org for more details. Note that the NH-JEM membership does not include ATMNE benefits.

School Memberships
NHTM offers all of the many benefits of an individual membership to elementary schools containing grades six and below. An elementary school may join NHTM through a school membership which will allow staff members to attend NHTM sponsored events at the membership rate. All publications will be received by a named contact person.

Individual Membership in NHTM provides you with:

Mathesis (newsletter) – includes current happenings in math education, Common Core resources, interesting articles and math activities

Reduced rates at NHTM sponsored events

Membership in ATMNE (the Association of Teachers of Mathematics in New England) including its two publications, the ATMNE Newsletter and the New England Mathematics Journal, and reduced rates at ATMNE conferences. Note that the ATMNE Newsletter has gone GREEN – be sure your email is up to date in our database.

In-Service Education Forums on current Math Ed initiatives – Regional PD offerings, networking

What Your Membership Supports:

- Scholarship programs for graduating high school seniors who will pursue mathematics related college studies and for college students enrolled in mathematics education programs
- State Mathematics Contest for high school students and MATHCOUNTS for middle school students in New Hampshire
- Student Recognition program – for students who have demonstrated creativity, interest, or talent in the study of mathematics
- **Mathematics Educator Recognition Programs:**

  - ***Richard H. Balomenos Memorial Service Award***
  - ***Presidential Awardees (PAESMT)*** at the elementary and secondary levels
  - ***Fernand J. Prevost Mathematics Teaching Award*** – for outstanding teacher of mathematics in their first, second, or third year of teaching
  - ***Richard C. Evans Distinguished Mathematics Educator Award*** – for distinguished mathematics teacher/ educator who works actively with students and/or teachers for five or more years at any level (PreK-16)
  - Recognition of math educators with 25 or more years of service
- Lifetime Honorary Memberships

Thank you for your membership. Please consider sharing the www.nhmathteachers.org website or membership application form with a colleague so that they may benefit from the many resources NHTM has to offer.

Gretchen Scruton

NHTM Membership Chair

NHTM APPLICATION/RENEWAL FORM

New memberships and Renewals are based upon school years – from Sept 1 through August 31st

Name:		__ 1st Yr Teacher
<Please Print Clearly>		
Home Address:		
City:	**State:**	ZIP:
School:		**SAU #:**
School Address:		
City:	**State:**	ZIP:
Home Phone:		**School Phone:**
E-Mail (1):		**E-Mail (2)**
__ Check here if to receive NHTM information via e-mail		**__ Yes you can share my e-mail information with ATMNE our regional Math organization**
Preferred mailing address: __ Home ___ School		
Grade Level:		**__ Teacher** **__ Intern** **__ Student** **__ Retiree**
E MS HS Post Sec __ Other:		NCTM Member? __Yes __ No

NHTM Membership			**Amount**
Individual:	**__ New**	**__ Renewal**	
1 Year @ FREE **1 Year @25.00 or** **2 Years @ $45.00**			$_____
***Full time students and retirees 1/2 price for NHTM dues <paid yearly>**			
Institutional/School	**__ New**	**___ Renewal**	
1 Year $35.00			$_____
**Must send proof of eligibility to NHTM Membership Chair for FREE 1-Year Membership [Gretchen.Scruton@gmail.com or 44 Greenough Rd. Plaistow, NH 03865]			
Additional donation for the NHTM Scholarship Fund.			$_____

Checks **must** be sent will all **Purchase Orders.** Enclose one check *payable* to **NHTM**
Return this form with check to:
Gretchen Scruton, Membership Chair
44 Greenough Road
Plaistow, NH 03865

NHTM Executive Board

Officers

President	Cecile Carlton, Mathematics Consultant	cecile.carlton@comcast.net
Secretary	Andrea Drake, Oyster River High School	adrake@orcsd.org
Treasurer	Kellie Gabriel, Nashua High School South	kgab@comcast.net

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Webmaster	Matt Treamer, NCED Services	matt@ncedservices.org

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

Professional Development and Conferences

National		
AMATYC 41st Annual Conference	Nashville TN	13-16 November 2014
Joint Mathematics Meetings	San Antonio TX	10-13 January 2015
T^3 Annual Conference	Ft. Worth TX	13-15 March 2015
ICTCM 26th Annual Conference	Las Vegas NV	12-15 March 2015
NCSM 47th Annual Conference	Boston MA	13-15 April 2015
NCTM 91st Annual Meeting & Exposition	Boston MA	15-18 April 2015
MAA Mathfest	Washington DC	5-8 August 2015
Regional		
NCTM Regional	Indianapolis IN	29-31 October 2014
NCTM Regional	Richmond VA	12-14 November 2014
NCTM Regional	Houston TX	19-21 November 2014
State		
Dine &Discuss	TBA	Fall 2014
41st annual State Mathematics Contest	Plymouth NH	March 2015
NHTM Dinner Meeting	TBA	Spring 2015

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 shall be to provide vision and leadership in improving the teaching and learning of mathematics so that each student is ensured quality mathematics education and each teacher of mathematics is ensured the opportunity to grow professionally.