NEW HAMPSHIRE TEACHERS OF MATHEMATICS NHTM

Mathesis

Volume 50, Issue 4 May 2018

President's Message
A Think About, Updates, and Thank You

By Annie Wallace

This past winter a friend drew my attention to an ad running on one of the local radio stations. It was for a walk-in health provider and had a mother discounting a math exam in taking her child to clinic. We had many ensuing conversations on how we have worked hard over the years to encourage good, equitable math learning and teaching. But once again, the idea that math learning is not important has cropped up in the media. While the health care provider was contacted and our concerns discussed, the ad still runs. We know that NCTM, NCSM, TODOS, and other professional organizations, including NHTM, along with math education leaders such as Jo Boaler, and Dan Meyer, and others such as Carol Dweck have all been fighting for equitable math education and for the education reforms to help make this possible. But how do we, as individuals, help to dismantle this deeply engrained societal notion that it is ok not to be able to do math. Why is it still so socially acceptable to be bad at math in this day and age?

I know that we all are doing what we can within the school and classroom, but then our children go home and see/hear that math is only for some or "I am not good at it," within the TV shows and ads that they watch. Or they hear the adults in their lives say it over and over again… even our former first lady, Michelle Obama, stated that she pursued being a lawyer because she was not good at math (speech at National Science Foundation Sept 2011). In recounting my conversations with my friend, my husband has begun noticing more and more the number of times being bad at math or not being able to do the math is okay in television shows and movies and letting me know what he has seen. While he knew that this attitude existed, he did not notice how prevalent it was in our media. I have no easy answers and a lot of wonderings and can only ask that we continue to speak up and discuss this as we hear and see things; hopefully

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making more and more people aware of the attitude as it crops up in tv shows, movies, and ads. Hopefully, this will help add to the critical mass, reaching the tipping point sooner rather than later, making it no longer socially acceptable to be bad a math.

We, the New Hampshire Teachers of Mathematics, are a community of professionals working to ensure that each student is provided with a quality and equitable mathematics education and that each teacher of mathematics is ensured the opportunity to grow professionally. Our board serves to help and support you in all you do. I would like to thank all of the members of the NHTM board and the regional coordinators for their service over that past year. These volunteers make our work and service possible. I would especially like to thank Jeanine King (treasurer) and Stefan Fritz (Media and Public Relations representative) for all of their service over the past years and to Michelle Mortin-Curit and Nathan Bracy who willingly stepped up to fill their shoes. As we move into a new year, I would like to give recognition and thank Amy Gregoire for serving as our Elementary Representative. She has provided many good lessons and information to us through her articles in the Mathesis, presented workshops, and in helping to begin work in building a coach's network and resource area within NHTM (this is still in an early development stage). We welcome Ann Elise Record as she steps into Amy's shoes on the board. I would especially like to thank Mollie Wolff and Jessica Jaques for running for open positions on the board this past winter. Both are talented people who contribute much in supporting mathematics teaching and learning in their districts and within the state. Thank you both.

During this last year NHTM, in conjunction with other organizations and volunteers has accomplished much. Here are some examples:

- Continue to send members to the NCTM Summer Leadership Conference
- Continuing former president Greg Superchi's Initiative of offering free memberships to first year and new to New Hampshire math teachers
- Helped to support two representatives attend the annual meeting and conference in Washington DC in April
- Became an affiliate of the National Council of Supervisors of Mathematics (NCSM)
- Had a representative for the first time at the NCSM affiliates' meeting in Washington DC in April.
- Fall Dine and Discuss Oct. 2017 Focus on Equity with Robert Q Berry, NCTM President-Elect (now President of NCTM).
- Continue to develop our regional structure
- Had Regional meetings and book studies

President's Message

A Think About, Updates, and Thank You

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- NHTM and NHSTA Joint Spring Conference at Pinkerton Academy (April 2018) We were able to support bringing in Diana M. Fisher as our keynote to share her expertise in systems modeling and how it can be used from the elementary grades up.
- Support NH State Mathematics Contest, MathCounts, and ARMLE
- Provide support, encouragement, and review for PAESMT applications
- Provide Scholarships for High School Seniors and Pre-Service Math teachers
- Renaming our High School student scholarship in memory and honor of David Kent, our past historian and math team contributor, along with many other roles of service to NHTM and the students of NH.
- Serve on a committee to support the development of a master teachers in math and science program
- Provided input by serving on the Professional Standard Board's subcommittee in rulemaking process of initial certification in Middle & Secondary Mathematics
- Serve on a committee for the establishment of a PreK – 3 Professional Development community w/ focus on math instruction

Finally, I would like to thank Stefan Fritz, Jeanine King and Amy Gregoire for their service to NHTM over the past years and wish them well as they move on in various ventures. And thank you to all – it has been a great honor to serve you as president of NHTM for the past two years. In my service to you, I have been able to meet many of our members along with others throughout the state and nation, to work on innovative projects focused on encouraging and providing opportunities for students and educators to grow and expand their learnings, and to share our work and organization within New Hampshire as well as regionally and nationally. I have grown in my own learnings, have encountered many people that I admire in what they are doing each and every day in serving students and their colleagues, and have become more aware of the complexities of education – particularly in mathematics. And as I gratefully hand over the NHTM presidency and leadership to the very capable hands of Rob Lukasiak, I wish to thank you all for giving me this gift in my own learnings and understandings as well as to serve you all and math education in NH.

Stay Informed!

"like" us on facebook - NHTM New Hampshire Teachers of Mathematics

follow us on twitter - @NHTM1964

Thank you to NHSTA!

We would like to extend our thanks and appreciation to our science colleagues at NH Science Teachers Association for all they did (and it was a lot!) in co-planning and co-hosting our joint Mathematics-Science Conference this past April at Pinkerton Academy. It was very enjoyable getting to know and work with the science people in our joint venture. We hope that we will be able to offer future joint conferences together and/ or some other PD offerings. (For our elementary teachers, NHSTA has a summer science institute in Bow --- check it out!) A good time was had along with all of the learning and sharing around the concept of modeling! And as always it is good to meet up with friends and to meet new ones.

Governor Sununu also proclaimed the day of our joint conference, April 7, 2018, as a day of Science and Mathematics Education. The proclamation is now hanging in the NH Department of Education in Concord.

The State of New Hampshire
By His Excellency
Christopher T. Sununu, Governor

A Proclamation

- Whereas the importance of science and mathematics competence is critically important to decisions our citizens are making on a daily basis; and
- Whereas advances in technology and engineering depend upon the strong knowledge and skills of science and mathematics professionals; and
- Whereas New Hampshire's citizens stand to benefit socially and economically from the fundamental skills and knowledge our science and mathematics students embrace; and
- Whereas the teaching of science and mathematics in an integrated manner involves the development of knowledge through the science, mathematics, and engineering practices and cross cutting concepts in order to create a thoughtful and reflective society; and
- Whereas giving students the opportunities to participate in challenging interdisciplinary experiences will help them become more informed and productive citizens; and
- Whereas all students can benefit from a strong science, technology, engineering and mathematics (STEM) education;
- Now, Therefore, I, Christopher T. Sununu, Governor of the State of New Hampshire, do hereby proclaim April 7th, 2018, to be,

Science & Mathematics Education Day

And urge all the teachers, parents, businesses, and citizens to take cognizance of this event and participate fittingly in its observance.

Thank you to NHSTA!

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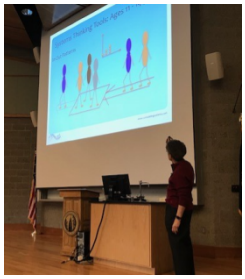

Dr. Diana Fisher, our keynote speaker, shared the modeling of systems and how they can be used to analyze, and problem solve a wide variety of problems –ranging from bullying and friendship in the elementary schools up through the middle, high school and college levels and beyond into solving problems within the health care and infrastructure problems communities are face with today. For those who attended the keynote address and Dr. Fisher's workshop and for others interested in learning more about how to build simulation models of DYNAMIC FEEDBACK SYSTEMS and then teach them, a summer online PD offering by Dr. Fisher is available and more information can be found in the PDF flyer on the CC Modeling Systems website.

Again, thank you to all of our colleagues at NHSTA who helped us in making our Joint Conference possible!

NHTM Award Recipients

The Richard Evans Distinguished Mathematics Educator
Since 2008, the Richard Evans Distinguished Mathematics Educator Award has been given to an experienced mathematics educator who displays all of the qualities demonstrated by Dr. Evans throughout his career. The intent of the award is to highlight creativity and passion in the teaching of mathematics to all students.

The award includes $500, a plaque, and a one-year membership to NHTM. In addition, the recipient will become an honorary board member for one year and invited to contribute articles for the quarterly newsletter. The recipient will also be encouraged to offer professional development opportunities for mathematics educators with the support of NHTM.

Although her resume speaks to her knowledgeable approach to teaching, nothing speaks more highly of her passion for teaching than the words of her former students. One student says that she "taught me to find the fun in everything" …and that "as long as I tried in that class and wanted to learn as much as she wanted to teach, I would be successful." One parent added that "her ability to teach math is far superior to any other teachers my son has had." Her principal remarks that she has created "learning environments where students construct their knowledge of mathematical concepts" and that she "excels at encouraging her students to take their

NHTM Award Recipients

(CONTINUED FROM PAGE 5)

learning to a higher level." A former colleague describes her as "the paradigm of skilled communication, compassion with children, and a motivation expert."

This year's Evans Award recipient has Master's Degrees in General Education and Mathematics for Educators as well as a doctorate from Northcentral University in General Education. Since 2005, she has worked at Ross A Lurgio Middle School in Bedford as a special education teacher, a pod support teacher and currently as an eighth grade mathematics teacher. She is also an adjunct faculty member at Southern New Hampshire University teaching a variety of courses including Mathematics for Elementary Education. In addition, she has presented at several conferences, including presentations for the New Hampshire Society for Technology in Education. The recipient has served as a textbook reviewer for Pearson's 12th edition of *Problem Solving Approach to Mathematics for Elementary School Teachers.* This is just a glimpse into the professional life of our 2018 recipient of the Richard C. Evans Distinguished Mathematics Educator Award, Dr. Rachel Fairhurst.

<u>The Fernand J. Prevost Mathematics Teaching Award</u>
The award is given to a beginning teacher in her/his first through fifth year of teaching who demonstrates the following characteristics:
* commitment to good mathematics;
* confidence that all 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.

This year's Prevost award winner is Dominick Torro of Pinkerton Academy, Derry, NH.All members of the Prevost Award committee were impressed with the Creativity, Professionalism, Leadership, and Care for All Students that Dominick has demonstrated after only 2 years as a teacher of mathematics. To sum it up, one of his colleagues wrote: Dominick's "years in teaching may be few, but his accomplishments so far have shown that he truly has a gift… he is the vision of what we want all of our mathematics teachers to be."

CONGRATULATIONS, DOMINICK!

HONORABLE MENTION for the Prevost Award goes to Subhadra Srinivasan or Hanover High School.

Post-Secondary Representative

STEM Updates from UNH: Teachers' Collaborative, Professional Development, and 100Kin10

By Sharon McCrone

If you don't already know about the UNH STEM Teachers' Collaborative, check it out at: https://www.unh.edu/stem/stem-teachers-collaborative

The STEM TC is an interdisciplinary effort across the University to coordinate and enhance our capacity to strengthen the STEM pipeline, with the primary goal of increasing K-12 teachers' expertise in mathematics, computing, engineering and technology and extending the impact of excellent STEM teachers to more students throughout the state. By registering for the STEM TC you will receive 2 to 3 e-mails each month with updates on happenings around the state such as workshops for teachers (primarily those held at UNH), events at the STEM Discovery Lab @ UNH-Manchester, among other news and events.

As part of the **100K in 10** national initiative to prepare 100,000 top-notch STEM teachers by 2021, EK Cho and KiKi Donis-Wahl from the UNH Education Department have been working on the NH Early Elementary Mathematics Collaborative (NHEEMC). They have just started their second course of the year, and their website has just come online for teachers to join – future iterations of the course will occur starting Fall 2018. We (the STEM Teachers' Collaborative and the NHEEMC) are planning a joint STEM summit in the fall with a special strand for teachers of early elementary mathematics. Stay tuned for upcoming news about that event!

Elementary Representative

Summer Professional Development Opportunities

By Amy Gregoire

As this is my last column as NHTM's elementary representative, I wanted to take this opportunity to express my gratitude for letting me serve on the board for the past three years. This has been a wonderful experience. I have had the good fortune to participate in many professional development opportunities and have gotten to know so many mathematics education leaders along the way. I highly encourage becoming actively involved with NHTM, whether that is running for a position on the board, helping at a conference, or nominating someone for one of the many mathematics awards that NHTM offers.

May is such a busy time of year for teachers, from state testing to a bevy of spring field trips; this time of year seems to fly by. Summer is soon approaching and with that comes not only an opportunity to recharge, but also a chance to grow professionally. I have included some math professional opportunities, which are available in the area.

Elementary Rep

Summer Professional Development Opportunities

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June 24-29, 2018
Anja S. Greer Conference on Mathematics and Technology

https://exeter.edu/programs-educators/summer-conference-general-information/anja-s-greer-conference-mathematics-and

Mathematics Leadership Programs - Summer Institutes

July 9 – 13, 2018
Developing Mathematical Ideas: Building a System of Tens: Calculating with Whole Numbers and Decimals

July 16 – 20, 2018
Developing Mathematical Ideas: Making Meaning for Operations: In the Domains of Whole Numbers and Fractions

Professional Development for Mathematics Coaching
Educational Leadership II: Facilitating Professional Learning
http://mathleadership.org

July 30-31. 2018

Do you have students who struggle with math facts or lack number sense? Do you have advanced learners who need to be challenged? Do you have students in the middle who are capable of so much more? If you are ready to take your teaching and students to the next level, then join Greg Tang; 2 incredible days of learning in Boston.

http://gregtangmath.com/newengland

August 6-10, 2018
Diagnosis & Remediation of Learning Problems in Mathematics
with Professor Mahesh Sharma
Kimball-Jenkins Estate, Concord, NH

2019 Annual Meeting & Exposition
San Diego, California
April 3-6, 2019

Submit a Proposal

Deadline Extended To: May 15, 2018
11:59PM (Pacific)

Reprinted from NCTM's journal *Mathematics Teaching in the Middle School*.
To see full article-- https://www.nctm.org/Publications/Mathematics-Teaching-in-Middle-School/2018/Vol23/Issue7/Flipped-Learning_-Embedding-Questions-in-Videos/

FLIPPED LEARNING:

EMBEDDING QUESTIONS IN VIDEOS

Use math videos and different types of inquiries to increase students' intellectual engagement.

Kien H. Lim and
Ashley D. Wilson

More teachers are trying out the flipped classroom model in which content is delivered outside of class time, typically through online videos and "homework," and follow-up activities are done in class. This model frees up more class time for inquiry and discussion. Survey results show that the percentage of teachers who indicated that they had flipped a lesson during the school year increased from 48 percent in 2012 to 78 percent in 2014 (cited in Yarbro et al. 2014).

Articles on flipped instruction suggest such benefits as (1) freeing up class time for meaningful

Secondary Representative

Collaboration-Takeaways from NHSTA/NHTM Joint Spring Conference

By Lesley Fallu

The last session at the NHSTA/NHTM Joint Spring Conference was a panel discussion on Modeling in Mathematics and Science Education. The panel consisted of the keynote speaker Dr. Diana Fisher, Stem specialist Lisa Marshall, and Barbara Hopkins, Director of Science Education for the NHDOE. Although the discussion topics varied from competency grading systems to the amount of money that the state spends on standardized testing each year – three million dollars! – one common theme was collaboration among teachers: math teachers with math teachers, science teachers with science teachers and most importantly math teachers with science teachers. We all know that the last is the most difficult to achieve, and that some restructuring within our schools may need to occur in order to achieve this goal. However, everyone agreed that students learn so much more by modeling, and what better way than to explore than to solve STEM related problems.

To put this in context, earlier in the day, Nicole Bridge of Math Solutions (Houghton Mifflin Harcourt) presented "It All Stacks Up." Although this particular activity is copyrighted, a Google search brings up several similar activities available online. The premise of the activity was to discover the meaning of the slope and y-intercept within the context of a problem involving stacking empty cups of the same size. No two groups were given the same-sized cups. Within each group, the task was to measure, graph the data, and write the equation representing the height of the stack of cups. Graphs and equations were posted from each group. Then all groups were asked to match the graphs with the equations. Groups were comprised of math teachers, science teachers, or a mix. Both math and science standards were addressed. The activity produced discussions surrounding:

- Expected outcomes and connections: domain, discrete vs. continuous graphs, scales on the graphs, the meaning of the slope in the context of the stacks of cups, and the meaning of the extrapolated y-intercept.
- Instructional strategies: differentiation for various levels, group selection, adapting materials needed for the lesson, and block or no block timeframe, and extensions such as stacking full or partially-full cups.

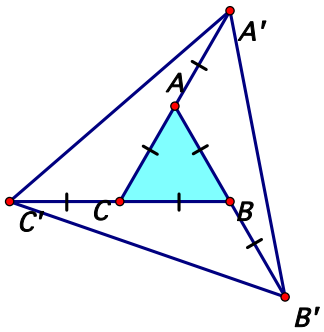
Spending time actually doing the investigation was time well spent, but the collaboration with science teachers and other math teachers was invaluable. Some of the feedback from science teachers focused on different graphing methods, while math teachers tended to work from the equations back to the graphs. Science teachers raised issues involving error analysis while math teachers focused on domain issues. By the end of the workshop, each of us had a much richer activity to use. Just imagine the results of daily common prep time, especially time for cross-curricular collaboration.

Activity

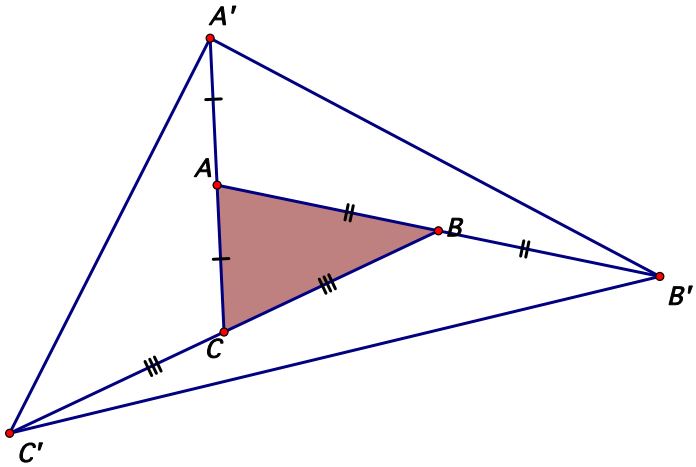
(Appropriate for middle or high school students)

Start with ΔABC and create a new triangle ΔA'B'C' in the following way:

1. Extend side AB in the direction of vertex B so that the new segment AB' is twice as long as AB. In other words, segment AB and segment BB' are the same length.
2. Extend side BC in the direction of vertex C so that the new segment BC' is twice as long as BC. Thus, BC and CC' are the same length.
3. Extend side CA in the direction of vertex A so that the new segment CA' is twice as long as CA. Thus, CA and AA' are the same length.
4. Draw ΔA'B'C' (see diagram below).



Question: **How does the area of ΔA'B'C' compare to the area of ΔABC?**



In order to investigate the relationship here, a dynamic geometry program such as Geogebra or Geometer's Sketchpad might be helpful. However, carefully constructed drawings with pencil and paper can also be used.

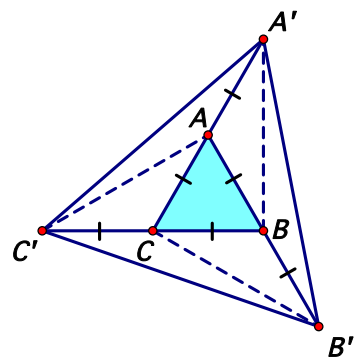
It's fairly easy to discover the relationship between the two triangles' areas. The larger triangle has an area 7 times greater than the smaller triangle.

The challenge is to ***develop a justification*** that shows why this is the case. Starting with an equilateral or isosceles triangle is often easiest. Justifications for the equilateral triangle and a general triangle are provided below.

Justification that Area of ΔA'B'C' is 7 times greater than Area of ΔABC.

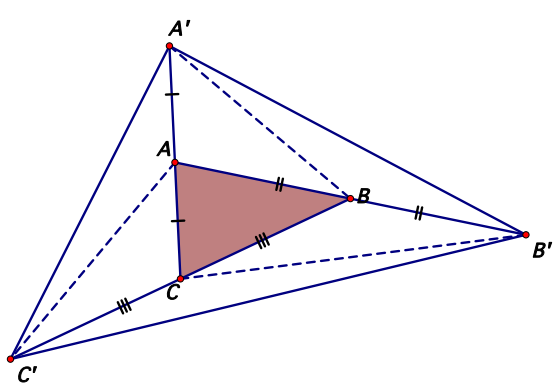
Suppose ΔABC is equilateral.

1. Then AB=BC=AC.
2. Also, since CA = AA', BC = CC' and AB = BB', then AB=BB'=BC=CC'=CA=AA'.
3. Draw segments BA', CB' and AC' and consider the following pairs of triangles:
   a. ΔABC and ΔBB'C
   b. ΔACB and ΔAA'B
   c. ΔBCA and ΔCC'A
4. Notice that each triangle pair listed above has a congruent base and a common vertex. For example, ΔABC and ΔBB'C share vertex C and have congruent bases, AB and BB'. Thus, the triangles have a common height leading to the claim that their areas must be equal.
5. The same is true for all of the triangle pairs listed above, so all the triangles have a same area (equal to the area of ΔABC).
6. In a similar way, we can form three more triangle pairs:
   a. ΔABA' and ΔB'BA'
   b. ΔBCB' and ΔC'CB'
   c. ΔACC' and ΔAA'C'
7. Again, in each triangle pair listed in #6, the bases of the triangles are congruent and the triangle pair shares a common vertex (either C', A' or B'). Thus, the triangle pairs have the same area. And since at least one triangle in each pair was listed in the sets of triangles in #3, all the triangles must have area equal to ΔABC. For example, ΔABA' was shown to have area equal to ΔACB (#3b) and now we can claim that ΔABA' has area equal to ΔB'BA'. Thus, by transitivity, ΔB'BA' and ΔABC have the same area.



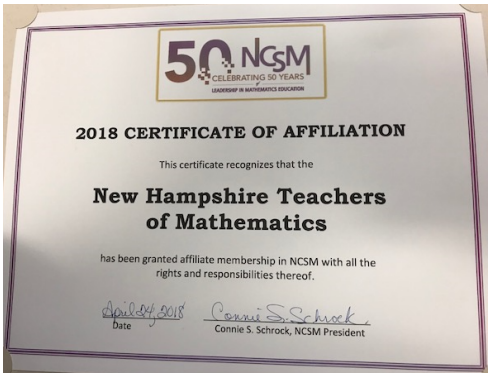
8. We have now established that all of the smaller triangles have area equal to the area of ΔABC. Thus, the entire area of ΔA'B'C' is the sum of all seven triangles or 7 times the area of ΔABC.

A similar approach can be used to show the same result for any triangle ABC.



NHTM and NCSM

by Annie Wallace



NHTM has become an affiliate of the National Council of Supervisors of Mathematics! This was made official at the 50th NCSM Conference held just prior the NCTM Annual Exposition and Meeting this year in Washington, DC. I had the honor of attending my first NCSM conference and was able to accept our certificate of affiliation in person.

I have heard for several years from colleagues that I should try to attend this conference in conjunction with the NCTM conference. While smaller than the NCTM conference, the NCSM conference focuses on those supporting mathematics teachers be it in an administrative, coaching, or other role. The conference this year focused on 5 strands with more than 400 speakers and 300 sessions – the strands were: Equity in Practice, Cultivating a Mathematics Coaching Practice, Evidence and Experiences from the Field, Developing Mathematical Knowledge for Teaching, and Leading Mathematics into the Future. I focused on the Coaching and Mathematics Knowledge Strands while there and learned more about the NCSM affiliate structure so that NHTM can expand our service and resources for you.

Last summer, I was able to attend the NCSM Leadership Academy and began learning more about the role of coaching and building my own background, so that I could better serve the teachers I work with. The academy was up in Bangor, Maine and was wonderful and well worth it. This year's Leadership Academy is in Colorado --- feel free to explore and consider going. I found it was very worthwhile for myself.

NCSM, as with NCTM has several position papers, scholarships, grants and multiple resources –explore their website and as the year progresses we hope to keep you updated on NCSM offerings and opportunities.

46th Annual State Mathematics Contest

By Steve Latvis

Our 46th annual State Mathematics Contest has come and gone. Thankfully the weather was perfect (even though the weather forecasted looked grim the week prior) and the trip to Plymouth was smooth sailing for most teams. Thanks to NHTM for their continued support of the event as well as to Plymouth State University for being such gracious hosts once again. Fifty-three schools registered with 51 teams competing – this was an awesome turnout once again and we want to thank everyone for participating.

We extend our congratulations to our outstanding performers, to our winning teams and advisors in each division. High praise goes to Kellie Gabriel and her Nashua High School **South** team (from the Large School Division) for their performance in achieving a score of 310 points out of a possible 432 points. Rounding out the first place schools by division: Hanover High School in the Intermediate School Division earned a score of 258 points, Plymouth High School in the Medium School Division earned a score of 180, and Bishop Brady in the Small School Division earned a score of 205. Bravo!

As for individual top performances, three students achieved a perfect score of 36 – Rubin Zou (from Nashua SOUTH), Owen Long (from Nashua SOUTH), and Walter Cook (from Keene); three students achieved a near perfect score of 32 – Rhys Harris (from Plymouth Regional), James Harkins (from Bishop Guertin), and Kunaal Sundara (from Nashua SOUTH); and six students achieved scores of 28 – Austin Wu (from Windham), Ruixuan Xiao (from Bishop Brady), Emma Tysinger (from Hanover), Calvin Ang (from Bedford), Ankita Devasia (from Nashua SOUTH), and Amol Khanna (from Nashua SOUTH).

Name plates for all plaques will be engraved shortly. Once the engravings are completed, teams will be contacted as to arrange the best mode of delivery.

Our sincere thanks for the contributions all of you made to the contest by performing your duties so well. Many of you did other tasks before, during, and after the contest that assisted in getting the details accomplished. Our special thanks to those who were able to accommodate our needs at the site – Professor Shawn Hackshaw of the PSU Math Department and Mary Hill, Coordinator of Facilities & Activities at PSU; to Donna Kelley and her team of question writers; to Annie Wallace for heading up registration; to the chairpersons of all the various duties on contest day – Jim Brizard, Ellen Berchtold, Lorainne Mascioli, Sue Mooers, Stacey Plummer and Michelle Morton-Curit; to “team refreshments” for helping me with the food for the coaches; and to any others I may have missed who assisted myself and others attending to the small details on the day itself.

46th Annual State Mathematics Contest

(CONTINUED FROM PAGE 14)

The final stats are still available online at **http://tinyurl.com/46statecontest**; a separate analysis like this has been done in the past and will be sent via e-mail at a later date. Again, our sincere congratulations and thanks to all of you. We hope you are now planning to be present for our 47th contest next spring.

2018 Final Results

SMALL	Score	rank
Bishop Brady	205	**1**
Epping	108	5
Hopkinton	102	6
Inter-Lakes	113	4
Lisbon	50	10
Moultonborough	57	8
Portsmouth Christian	164	**2**
Trinity	119	**3**
Wilton-Lyndeborough	58	7
Woodsville	51	9

MEDIUM	Score	rank
Belmont	107	6
Bow	127	**3**
Campbell	92	8
Hillsboro-Deering	39	14
John Stark Regional	80	11
Kearsarge Regional	90	9
Laconia	86	10
Lebanon	116	5
Newfound Regional	117	4
Plymouth Regional	180	**1**
Raymond	102	7
Sanborn Regional	78	12
St. Thomas Aquinas	133	**2**
Winnisquam Regional	63	13

INTERMEDIATE	Score	rank
Bishop Guertin	232	**2**
Coe Brown Northwood	130	7
ConVal	87	tie-11
Hanover	258	**1**
Hollis Brookline	194	4
Kingswood	87	tie-11
Merrimack Valley	120	10
Milford	123	9
Oyster River	128	8
Pembroke	184	5
Souhegan	174	6
Windham	204	**3**

LARGE	Score	rank
Bedford	187	**2**
Concord	42	15
Dover	138	8
Exeter	127	10
Keene	106	11
Londonderry	163	4
Manchester Central	86	13
Merrimack	91	12
Nashua NORTH	152	6
Nashua SOUTH	310	**1**
Pinkerton	157	5
Portsmouth	180	**3**
Salem	70	14
Timberlane	143	7
Winnacunnet	138	8

NCTM Representative
Advocating Change in Mathematics Education

By Terri Magnus

There was a lot of energy at the National Council of Teachers of Mathematics Annual Meeting in Washington, DC, last month: legislative visits, equity talks, teaching ideas, a new membership structure, and the release of the *Catalyzing Change in High School Mathematics* publication. Although I didn't arrive early enough, I was pleased to hear that 75 conference attendees visited their congressional representatives on the first day of the conference to advocate for mathematics education and to support funding for Title II of ESSA (Every Student Succeeds Act).

I had the honor of representing NHTM at the Eastern Regional Caucus and the NCTM Delegate Assembly and Michelle Morton-Curit served as NHTM alternate. There were no items to be voted on, but we offered suggestions on how NCTM can help affiliates like NHTM increase participation of our state's mathematics teachers.

New Membership Structure: At both the Opening Session and the Delegate Assembly, outgoing NCTM President, Matt Larson, explained the new NCTM membership structure, designed to be simpler and more affordable. Essential membership is designed around a classroom teacher's needs, providing one free grade-band specific journal in both print and digital forms, unlimited access to the online community MyNCTM, Problems of the Week, Illuminations, and more for an annual fee of $89. This Essential Membership also includes a 20% discount to the NCTM store and meeting registrations. If you have never been a member of NCTM, you can join as an essential member for an introductory rate of $59 for your first two years of membership. For those of us who would like access to multiple grade-band specific journals, the $139 premium membership gives us access to all three of these journals as well as the Journal for Research in Mathematics Education, 30% discount to the NCTM store and meeting registrations, a free e-book per year, and unlimited access to the NCTM online community and resources. Emeritus members and student members receive Premium membership for $49. For more information, visit www.nctm.org or contact NCTM at (800) 235-7566 or nctm@nctm.org. There is also a PreK-8 School Membership option and an Institutional Membership option. I just upgraded to a premium membership so that I can get the greatest discount on my summer reading, namely ...

Catalyzing Change in High School Mathematics: Initiating Critical Conversations; This new publication was released at the annual meeting and many presentations were devoted to it. The publication is "a call to action to all individuals with a stake in high school mathematics, inviting and urging them to embrace and participate in the serious conversations that must take place to bring about and give support to necessary changes in high school mathematics." It outlines the critical mathematical concepts and skills that students need not only to learn, but retain and use, throughout their lives. Catalyzing Change is directed not just to high school mathematics teachers, but to

NCTM Rep

Advocating Change in Mathematics Education

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school, district, and state administrators, higher education administration and faculty, policymakers, and others. Implementation of the recommendations will have implications for middle school and elementary mathematics instruction as well. The practices of tracking students and tracking teachers are criticized while research-informed instruction that empowers students is encouraged. The publication recommends revising the high school mathematics curriculum so that all students take four years of mathematics with at least two years of common study of the essential mathematics needed for life. For more details, tune into the webinar https://www.nctm.org/webinars/authortalks/ at 7 p.m. on May 16 to hear Matt Larson talk about Catalyzing Change or view his conference presentation https://www.nctm.org/Conferences-and-Professional-Development/Annual-Meeting-and-Exposition/ . (Note that the sound is bad at the beginning of this recording but does get fixed about 3 ½ minutes into the talk).

Equity, Access, and Empowerment continued to be a focus at this year's NCTM Annual Meeting. The Opening Address was presented by Christopher Emdin, creator of the #HipHopEd social media movement and author of the book, *Urban Science Education for the Hip-hop Generation and For White Folks Who Teach in the Hood and the Rest of Y'all Too*. Unfortunately, I don't see his presentation on the NCTM website yet, but he challenged us to acknowledge and appreciate the culture of our students and to recognize their inherent mathematical ability (which may not align directly with our traditional mathematics culture). Francis Su, Past President of the Mathematical Association of America and Professor of Mathematics at Harvey Mudd closed the Annual Meeting with "Mathematics for Human Flourishing" calling us to change our view of who should be doing mathematics and how we should teach it. I encourage you to take the time to view this emotionally moving talk on the Annual Meeting webpage. In between these two talks, conference attendees could partake in many other sessions and workshops, explore the exhibit hall, and network with others.

Future Conferences and Professional Development: Make plans now to attend the next NCTM Annual Meeting will be held in San Diego, CA, April 3-6, 2019. Regional conferences this fall will take place in Hartford (October 4-6), Kansas City (November 1-3), and Seattle (November 28-30). A list of Webinars and Twitter Talks can be found on at www.nctm.org. Check out the social media network MyNCTM to connect with other teachers.

Art's Attic
Marie Crous

By Art Johnson

You may have seen the movie *Hidden Figures* last year. It related the efforts of black women mathematicians who supported the early NASA program by crunching all the involved calculations required to put rockets into space. The mathematicians in the movie were not the first human calculators, they were preceded by several other women who expanded the field of astronomy.

An even earlier human calculator was Marie Crous who lived in 17th century France. In 1641 she published a book that introduced the decimal system to France. Crous was a teacher at Charlotte Rose de Caumopont La Force, a finishing school and secondary school for daughters of noble families. She also developed what she termed *denominational division*, which has a variety of practical uses for mental calculations. She wrote in the preface of *Abrege Researhe* (Research Abstract) why she wrote the book: "To give solace to such young women who practice this science (calculation) as much for the necessity of their business as for the contentment of their spirit." She dedicated the book to her patron Madam de Combalet, Duchess d'Aiguillon, a niece of Cardinal Richelieu, the most powerful man in France.

The Duchesse d'Aiguillon, who was the patron of Marie Crous and sponsored her research.

Crous was not only an accomplished mathematician, she was also a talented writer and teacher. Crous knew Marin Mersenne, but was never invited to the salon meetings he hosted for French mathematicians such as Pascal and Descartes. In fact, she was never cited by any of the eminent members of the salon. As a result, she was never acknowledged as woman of mathematics learning. This biography is rather brief because so little else is known about her. We do not even know when or where she was born or when she died, not even the year. Did she marry, have children, write further texts? We do now know that either, but at least we can honor her as the first woman mathematician since Hypatia some twelve hundred years earlier.

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.

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http://www.nhmathteachers.org/page-1715832

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Professional Development & Conferences

National		
NCSM Leadership Academy	July 30- August 1, 2018	Greenwood, CO
NCSM Annual Conference	April 1-3, 2019	San Diego, CA
NCTM Annual Meeting & Exposition	April 3-6, 2019	San Diego, CA
Regional		
Texas Instruments Northeast Conference	June 28-29, 2018	Worcester, MA
Mount Holyoke College Summer Math Institutes	July 9-13, 2018 July 16-20, 2018 July 30-31, 2018 (Coaching)	South Hadley, MA
Metamorphosis Teaching and Learning Communities & Lesley University's Center for Mathematics Achievement- The Mathematics Content Coaching Institute	July 10-12, 2018	Cambridge, MA
Greg Tang, New England	July 20-31, 2018	Boston, MA
NCTM Regional Conferences & Expositions	October 4-6, 2018 November 1-3, 2018 November 28-30, 2018	Hartford, CT Kansas City, KS Seattle, WA
ATMNE Fall Conference	December 6-7, 2018	Warwick, RI
State		
Phillips Exeter Academy Anja S. Greer Conference on Mathematics and Technology	June 24-29, 2018	Exeter, NH
NHSTA 2018 Summer Science Institute for Elementary School Teachers	June 27-29, 2018	Bow, NH
Mahesh Sharma Diagnosis and Remediation of Learning Problems in Mathematics	August 6-10, 2018	Concord, NH
Summer PD- Math with Tech (Stefan Fritz & Craig Sheil)	August 16, 2018	Bedford, NH
Dine & Discuss- Keynote Laurie Boswell	October 16, 2018	TBD