



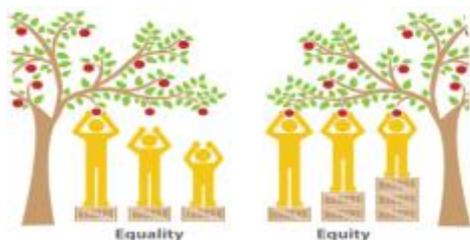
# Mathesis

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February 2017

## *President's Message* **Equality and Equity**

By Annie Wallace  
NHTM President



In mid-January the temperature in my area of the state went from being below zero for two days, then hovering in the low 50s for the next two days and then back down to near zero for the fifth. There seemed to be no balance or equality of temperature within the week--- but rather that of one extreme or the other for a NH January. As I was outside doing my morning duty of directing traffic as parents were dropping off students, it got me to thinking about equity vs. equality. When we hear one of the terms, many often jump to thinking

that the words are synonymous – meaning the same thing, when in fact they are not.

Over the past year I have heard much in conferences, workshops, on the news and in papers and journals on equality/equity in education. Like the temperature in that week this January, there are often differences offered across a district or state--- either schools offer high quality/rigorous courses in math and sciences for most students (as measured by the US Department of Education, Office for Civil Rights <https://ed.gov/about/offices/list/ocr/data.html?src=rt>) or there is an inequality in what is offered between schools within a district and/or within the state as well as nation-wide. This is what Matt Larson, President of NCTM, referred to this past summer at the

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## *President's Message* **Equality and Equity**

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2016 Affiliate Leadership conference and at the ATMNE Conference this past October in Manchester as the past work and focus of NCTM ---

- gaining greater equality for students in the offerings they have in math education –
- working towards all students attending schools offering high quality and rigorous math curriculum with good instructional practices and assessments ----

was getting the pipe-line to the students. However, as the pipeline has reached more schools with the offerings and quality offered to students growing, it has been realized that this equality was not enough. More schools now have the courses, instructional quality and better assessments being offered (the equality), but not all students have or are given access to what is now within their school or district, thereby causing inequity within the equality. Matt Larson then stated that the refocus of efforts of NCTM in its advocacy role is to go beyond the “technical solutions” of equality to focusing on the providing access and equity of math education – the focus now being on the students and in the how and what they need (the equity)

to access and learn the mathematics.

According to the US Department of Education, Office for Civil Rights (2014) and the ED Week 2017 Quality Counts States Report Cards (<http://www.edweek.org/ew/qc/2017/2/017-state-education-grades-map.html>), NH does fairly well overall. While NH's equality may be better than in many other states, we still have pockets where work needs to be done to ensure that all schools are connected to the “pipeline”. We, as educators, must also do all that we can to ensure equity for all of our students while doing what we can to further the equality. So what can we do to provide equity and access for our students and what are some things that we might want to be aware of?

NCTM's Principles to Actions: Ensuring Mathematical Success for All (2014) states “An excellent mathematics program requires that all students have access to a high-quality mathematics curriculum, effective teaching and learning, high expectations, and the support and resources needed to maximize their learning potential” (p. 5). While the first part of the statement addresses the equality of mathematics education, it is the second half that looks at how equity can be achieved. We should have high expectations for all. We need to take the student from where they are at and expect them to go as far as they can. On the surface

## *President's Message*

### **Equality and Equity**

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it is easy to say that we have high expectations for all, but reality is that we are often affected by cultural, societal and personal biases that may get in our way. Cultural and societal biases may be more easily recognized and worked on; creating change over time in the way our schools and communities offer and deliver math education. These biases are often seen in race, gender, ethnicity, socio-economic class, and ability. The implicit biases that we personally have may be harder to overcome as we may not even recognize that we have them ---- it is not that we purposefully developed them, but rather they are a part of our being as we have experienced life on our way into adulthood and now. These may change how we treat students and others to the extent that there are advantages and disadvantages that they experience from us.

There have been experiences in my own life that have made me very aware that we can have biases that we are not aware of and that these can affect how we react to things. Sometimes it is just seeing someone do something (like seeing them smoke or in how they reacted in a certain situation), hearing something (they voted for a particular person or that they attended a classical

orchestra performance or a heavy metal concert), or an association of something with someone (they belong to a low or high socio-economic group or a boy has long hair or in the way a student dresses). When I as a 7th or 8th grader in the senior band, I saw a senior in the band whom I admired greatly smoke a cigarette and with that, although nothing else had changed, my feelings turned negative towards her. It wasn't that I meant for that to happen, but based on an implicit bias, my actions/reactions towards her changed.

A more recent experience that I have encountered, that made me aware of implicit biases, was having a college representative not believe that one of my sons, who at the time of the meeting had long hair and wore black jeans and t-shirts (usually of various bands), could be a National Merit Semi-Finalist and eligible for an excellent scholarship offer from that college and therefore did not want to discuss the opportunity further with him. Another was one of my students telling me in his math autobiography at the beginning of the year that since he was of Asian heritage everyone had assumed that he would be good at math. When in fact he struggled immensely with understanding it. And that this assumption from adults and other students made him dislike math even more. Our reactions to someone based on their looks or other factors may get in our way and change our expectations for how we work

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with that person. It is something that I remind myself of to be aware of...that I may have reactions that I do not expect from myself and that what someone does (or is) should not affect what I can do for that person or to let it affect me in my actions towards them. With reflection and awareness of ourselves, we can pick up on these implicit biases and reactions that we may have and counter them with moving forward in having high expectations for and in how we work with and provide for others. (Dr. Anthony Greenwald is one of the researchers in implicit biases if you wish to look into this further).

“Equity does not mean that every student should receive identical instruction; instead, it demands that reasonable and appropriate accommodations be made as needed to promote access and attainment for all students. (Principles and Standards for School Mathematics, NCTM, 2000, p. 12).” (To see NCTM’s position statement of Access and Equity please go to <http://www.nctm.org/Standards-and-Positions/Position-Statements/Access-and-Equity-in-Mathematics-Education/>). NCTM’s 2014 book, *Principles to Actions: Ensuring Mathematical Success for All* is an excellent starting place to

guide us in recognizing some of obstacles in providing equity for our the students. Pages 63 and 64 summarize some of the unproductive and productive beliefs in access and equity in mathematics. So along with our high expectations for all students and the recognition of implicit biases that may impact this, what supports and resources can we find and put in place to help our students work towards maximizing their learning? These may be the things we may more typically think of like hearing aids, structure of buildings for ease of access, audio texts/books or those with larger print, standing desks, or providing more time for students to work with the math through a peer tutoring or math lab/workshop time. But it could also be in the little things, such as making pencil grips or a fidget ball available, turning on the closed captioning when showing a video clip so that students can “see” and hear the dialogue, working with a special education specialist to see how to restructure a worksheet or exam (allowing for things such as larger print, boxed in work spaces, or in rephrasing the instructions or a problem) and even something a little as greeting and checking in with each student so that they feel that they belong and matter to you.

And if a resource is not available, what can we do? How creative and outside of the box can we go in our own thinking to help that student? Do not have a standing desk --- would an

## *President's Message* **Equality and Equity**

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old AV cart work? Do not have a fidget ball --- would some silly putty or flannel strips work? As we get to know our students, our school community and the community in which our school is in, we can enlarge resources and talents that exist to

help us. In the end, equality and equity in math education really does come down to us, whether we work at a local, state, or national level with others in furthering or putting something in place or in the small things we can do to help lower and remove the barriers to help our students' access what we have to offer more fully.

### *Elementary Representative* **Developing Number Sense**

By Amy Gregoire

The other day I was administering Marilyn Burn's math reasoning inventory to a student. If you have never seen this inventory, it is fabulous! It gives you great information about a student's number sense. This inventory is free and can be found at <https://mathreasoninginventory.com>. When I asked this student to tell me what  $1,000 - 998$  was, this student asked if he could use a piece of paper. When I said no, he began to use his finger to draw out imaginary numbers on the desk and I could see how he was crossing out his imaginary zeros to turn them into 9's. The student did not end up getting this difference correct. The same process happened for several other questions. When asked  $15 + \underline{\hspace{2cm}} = 200$ , he was completely stumped and said he had no idea how to figure this out.

It was clear that this student needed more experiences in developing number sense. As much as skills are important, developing a strong sense of number is critical throughout a student's math education.

Developing a sense of number begins even before a child enters school. When a child knows they would prefer the handful of 6 candies versus the handful of three candies or when they are told they have two hours until bedtime; they are developing their sense of number. When a child enters school, it is important for us as teachers to show students how the math we are doing in the classroom can be helpful in solving real world problems. Marilyn Burns lists seven ways teachers can directly impact a developing sense of numbers.

## *Elementary Representative* **Developing Number Sense**

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1. Link school math to real world experiences.
2. Model different computing methods to help students become flexible thinkers.
3. Have students solve problems mentally to develop their ability to move numbers in their heads and discuss their strategies.
4. Students should explain their reasoning, which will help them to reevaluate their ideas.
5. Estimation should be embedded in problem solving, not textbook rounding, but where students make sense of a problem and use anchor numbers to base their reasoning.
6. Teachers should question students about reasoning strategies, all the time, not just when a mistake is made. Continuous questioning sends several important messages: your ideas are valued, math is about reasoning, and there are always alternative ways to look at a problem.
7. Measurement activities should be at the forefront, verifying their estimates through hands on experiences.

In addition with many schools having access to iPads or computers, there are many great apps or computer games that students can play to help them develop a sense of number.

Deep Sea Duel- Great for mental math.

<http://illuminations.nctm.org/Activity.aspx?id=3508>

NRICH has great activities, which focus in on multiple ways of arriving at an answer.

<http://nrich.maths.org/frontpage>

Guess It- A great game to help students develop their estimation skills.

<http://www.theproblemsite.com/games/guess-it>

K5chalkbox.com provides lesson ideas for teaching measurement.

<http://www.k5chalkbox.com/teaching-measurement.html>



## *Middle Level Representative* **Working Hard & Exhaustion in the Mathematics Classroom**

By Katrina Hall

Working hard and exhaustion are two terms that many can quickly relate to when it comes to math class. There are many a day when a math teacher leaves the classroom exhausted. All teachers have been there; a day full of planning, making copies, assessing, grading, and teaching; to name just a portion of a teacher's day. Reflecting from a student's perspective, there are just as many days of exhaustion from math class. The question that arises is what causes the exhaustion for the teacher and what causes the exhaustion for the student? Should exhaustion from math class be a cause for alarm?

A sample day in a classroom may be students entering the classroom, writing down homework in their agendas, working on a warm-up, taking notes from the teacher's lecture, answering questions from the teacher, completing practice problems and maybe even completing a formative assessment exit ticket to end the class. From the outsider's view this appears as an ideally planned day in the classroom; everyone leaving the classroom exhausted from a hard day's work.

In another middle school classroom, students and teachers have also been working hard. Students are assigned the task of planning, designing and creating a piñata using a minimum of a one cylinder, one cone, and one sphere; going above and beyond this minimum is an option and actually encouraged. The final

presentation should include a portfolio of classroom reflections, planning, mathematical calculations and the total volume of piñata. Each day students enter the classroom, they immediately begin working in collaborative groups without direction from the teacher. The teacher is not the "sage on the stage" but instead a facilitator and supporter of each student led group. The teacher rotates throughout the classroom having one-on-one discussions with each group asking students about challenges, progress and goals. The role of the teacher is not to provide whole-class lectures but to instead provide each group with the individualized instruction needed to support each group's goal. Students receive individualized homework and assessments based on their readiness from their group work. In other words, as a group encounters a need, the teacher works with that particular group and suggests practice problems. As students feel prepared to assess, they do so when ready. Leaving the school for the day, this teacher and group of students are also exhausted from a "hard day's work."

The differences between the examples are apparent. The level of student engagement and learning as well as the role of the teacher make a difference in terms of the type of exhaustion that both leave the classroom with. Reflect on your math classroom. What is causing student exhaustion? What is causing your exhaustion as the teacher?

There is a difference between exhaustion from boredom, repetition and rote skills and exhaustion from 21<sup>st</sup> century skills. Students and teachers who are leaving exhausted from collaboration, creativity, problem solving and communication are leaving the classroom with the ideal type

## *Middle Level Representative* **Working Hard & Exhaustion in the Mathematics Classroom**

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of exhaustion, exhaustion from the application of 21<sup>st</sup> century skills.

Consider ways in which you can increase creativity, collaboration, critical thinking and communication in the math classroom that moves the focus from the teacher as

the “sage on the stage” to the “guide on the side.” Start with one unit or lesson. Move the focus of the day from traditional teaching and learning to one that applies 21<sup>st</sup> century skills.

Teachers and students should be working hard. It is perfectly fine for students and teachers to leave math class exhausted. The way in which both reach the level of exhaustion is key. What changes can you make in the math classroom to achieve a successful level of exhaustion after a hard days work?

### *Art's Attic* **Mary Fairfax Somerville**

By Art Johnson

You may have missed this. Scottish mathematician Mary Fairfax Somerville will be pictured on the new Scottish £10 note. She was the top vote getter in a poll organized by the Bank of Scotland. Who was Mary Fairfax Somerville?



**Mary Fairfax Somerville (1780-1872)**

Mary Fairfax Somerville was born to a well off family in Scotland. They were not Downton Abbey rich, but her father was a vice admiral in the British navy so the family was comfortable. As was the custom, the boys in the family were educated in private schools with an eye on a career, while the girls were schooled in domestic arts.

Mary's only formal learning was at Miss Primrose's boarding school for girls, where she did learn to read, but more importantly practiced needlepoint and the social graces. She

## *Art's Attic*

### **Mary Fairfax Somerville**

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spent only one year there and when she returned home, she felt "...like a wild animal escaped out of a cage." Once at home she read everything she could find in the home, but met with family resistance. Only an uncle encouraged her readings.

Her life would have been no different than many other girls in her social circle. A fateful tea party was to change all that. The party was at a neighbor's house, organized so the young men and women in the society could meet, mingle, and eventually marry off. As Mary recalls, at this tea party she was leafing thru a fashion magazine.

At the end of the magazine I read what appeared to be simply an arithmetical question but on turning the page, I was surprised to see strange looking lines mixed with letters. "What is that?"

"Oh," said a friend. "It's a kind of arithmetic; they call it algebra; but I can tell you nothing about it."

The friend was one of the young men at the party, and his comment was along the line of most men's thinking, that teenaged Mary could not hope to understand anything so complex as algebra. Was he ever wrong.

Following the party she threw herself into the task of finding out more about this algebra, and found a number of books in the family library, including Euclid's *Elements*. She also sought help from her younger brother's tutor. Consequently Mary devoted herself to learning more about mathematics, to the point that her father complained to Mary's mother, "Peg, we must put a stop to this or we shall have Mary in a straight-jacket one of these days." The prevailing thought of the day was that 'the strain of abstract thought would injure the tender female frame.'

During these years, Mary's life in Edinburgh was a series of parties, visits, balls, teas, concerts, and innocent flirtations. She eventually married in 1804 at age 24. Her husband was a career navy man, and had no interest in her pursuit of mathematics. According to Mary, "He had a very low opinion of the capacity of my sex, and had neither knowledge of, nor interest in, science of any kind." During this time an aunt told Mary that she "should give up her foolish manner of life and make a respectable and useful wife". Her husband died after 3 years of marriage, and Mary returned to Scotland from London.

By this time she had a circle of friends who strongly encouraged her interest in mathematics and science. She married again in 1812, this time to William Somerville, who enthusiastically encouraged her study of mathematics and joined in her widening circle of mathematicians and scientists. In 1816, William was elected to the Royal Society and they moved back to London, where Mary met William Herschel, Charles

## *Art's Attic* **Mary Fairfax Somerville**

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Babbage, and French mathematicians Poisson, Laplace, and Poinsot.

In 1826 Mary published her first paper on the solar light spectrum. In 1827 she was asked to translate Laplace's *Mecanique Celeste*. She did more than translate it; she smoothed over some of his mathematics and explained difficult concepts that were unfamiliar to most British readers. The book, *The Mechanism of the Heavens*, appeared in 1831 and was an immediate success. A new book published in 1834 suggested another planet beyond Uranus and was instrumental in the eventual discovery of Neptune. Honors and widespread recognition of her talents now flowed freely. It was during this time that she encouraged Ada Lovelace in her study of mathematics and served as her patron.

Her later life with her husband was spent in Europe, mostly Italy, where she continued to publish books and articles, and to support women's education and suffrage movements. When John Stuart Mill organized a massive petition to Parliament for the right of women to vote, he asked Mary to be the first to sign. Eventually she outlived her husband and all her children, but continued to press for women's rights and to advance mathematics. She died in Naples in 1872.

What if the magazine that day at the tea party had been a different magazine, one with no X's and Y's? Would Mary have become a leading mathematician? The answer is difficult to be sure but based on this last quote from her, Mary Fairfax Somerville was destined to do great things in mathematics. "Sometimes I find [mathematics problems] difficult, but my old obstinacy remains. If I do not succeed today, I attack them on the morrow."

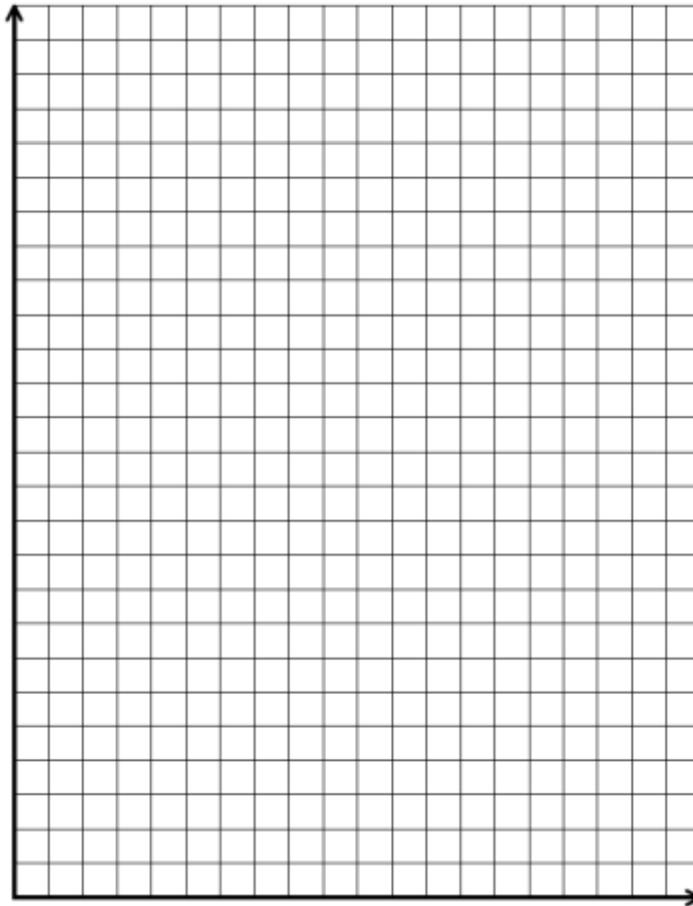




4.) Which is the **independent** variable (mice or days)? \_\_\_\_\_

Which is the **dependent** variable (mice or days)? \_\_\_\_\_

5.) On the provided grid, plot your data. Clearly label your axes with the appropriate variables. Connect the dots to make a smooth curve.



6.) What kind of **function** does this look like? (**Be specific.**) \_\_\_\_\_



**Part II**

7.) **Theoretically**, what is the **probability** (chance) of getting an M&M “m” side up?

\_\_\_\_\_

What is the probability of getting an M&M “m” side **down**? \_\_\_\_\_

8.) Using your probability from #7, form an equation that would model the **theoretical** number of mice,  $m$ , which would be left after  $t$  days. \_\_\_\_\_

9.) Fill in the chart below using your formula from #8. **Round to the nearest “mouse”**, if necessary.

<b># of Trials (day #)</b>	0	1	2	3	4	5	6	7
<b># of M&amp;Ms (Mice) Remaining</b>	100							

10.) How different were your experimental results of mice remaining (from the table on #3) and theoretical results of mice remaining (from the table on #9)?

Why do you think that these differences occurred?



11.) If the number of M&M’s (mice) **increased to 200**, how many **more days** would it take to eliminate all of them? Explain your reasoning.



### Part III

12.) If another experiment was performed, and the resulting equation was  $m = 100(.75)^t$ , where  $m$  stands for the number of mice remaining and  $t$  is the number of days that have passed, is this an exponential **growth** or **decay** model?  
\_\_\_\_\_

13.) What is the **rate of change** (percentage of change) for this problem? \_\_\_\_\_

14.) Fill in the table below using this new equation  $m = 100(.75)^t$ .

<b># of Trials (day #)</b>	0	1	2	3	4	5	6	7
<b># of m&amp;ms (Mice) Remaining</b>	100							

15.) Do the mice “die” faster or slower using this model? Why? Explain.

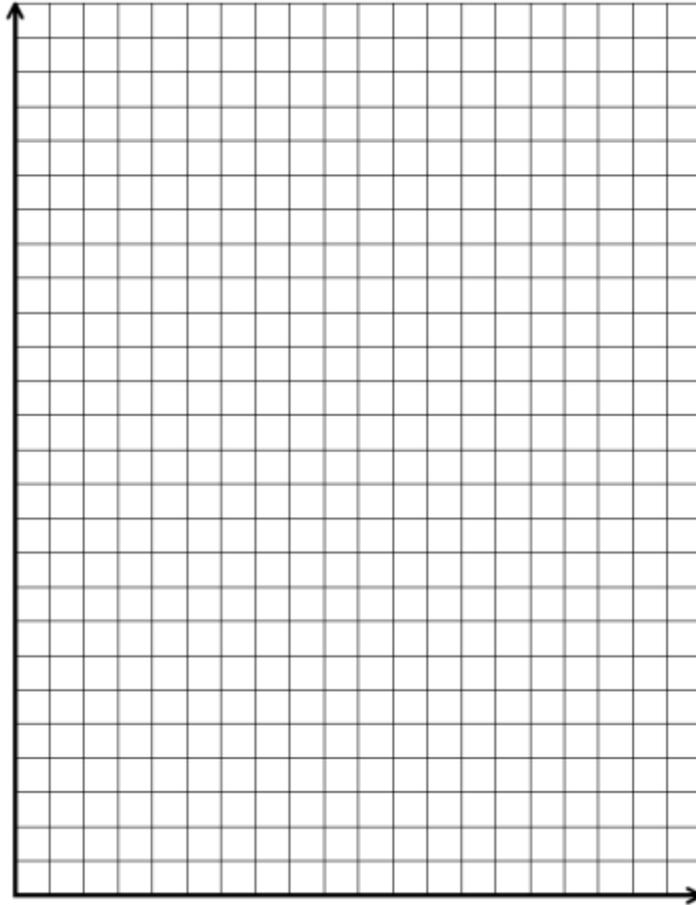


#### Part IV

16.) Now, let's pretend that instead of “**dying**”, the mice are **reproducing**. Fill in the table below using  $m = 100(1.3)^t$  where  $m$  = number of mice now living in the barn and  $t$  = number of days that have passed. Round to the nearest “mouse”, if necessary.

<b>Day</b>	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<b>Number of mice in barn</b>	100														

17.) Plot these points on the provided grid. Be sure to label your axes carefully.



18.) What type of **model** does this seem to be? (**Be specific**) \_\_\_\_\_

19.) What is the **rate of change** for this particular equation? \_\_\_\_\_

20.) What is different about this particular mouse situation than any of the others?

Explain why this occurred.



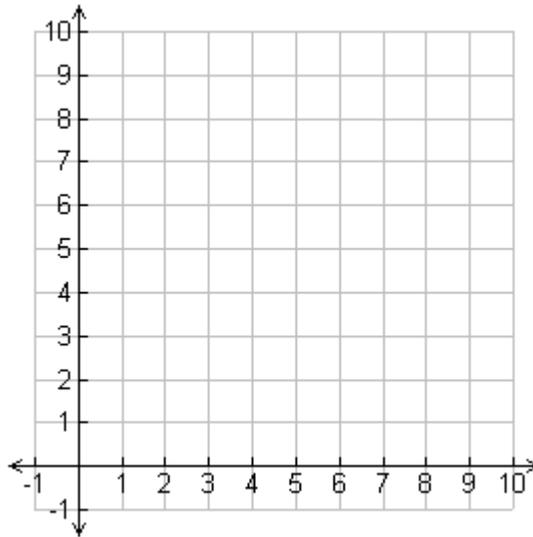
### Part V

21.) For this last part, let's assume that exactly 10 mice die per day. Write a model for this situation, where  $m$  = number of mice now living in the barn and  $t$  = number of days that have passed.

22.) Fill in the table below using your model from above.

Day	0	1	2	3	4	5	6	7	8	9	10
Number of mice in barn	100										

23.) Plot these points on the provided grid. Be sure to label your axes carefully.



24.) What type of **model** does this seem to be? (**Be specific**) \_\_\_\_\_

25.) What is the **rate of change** for this particular equation? \_\_\_\_\_

26.) What is different about this particular mouse situation than any of the others?  
Explain.



## *Post Secondary Representative* **NHTM Mathematics Major and Mathematics Education Scholarships: High School and College Students**

By Sharon McCrone

It's scholarship season! And we need your help to get the word out about The New Hampshire Teachers of Mathematics College Scholarships.

NHTM provides two \$1000 scholarships each year, (1) a \$1000 scholarship for a graduating high school senior who is interested in pursuing a major in mathematics or education, and (2) a \$1000 scholarship for a college student currently majoring in mathematics or education who will obtain junior or senior status in the 2017-2018 academic year. More specific scholarship criteria are provided below.

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

The **college scholarship** will be awarded to a student preparing for certification to teach middle school or secondary mathematics, or elementary education. Eligible candidates will be enrolled in a middle or secondary mathematics certification program or elementary education certification program.

Preference will be given to students attending a New Hampshire institution of higher education. The selection team will consider academic achievement, financial need, and will look for evidence of promise of a teacher of mathematics.

Information about these scholarships will be e-mailed to high schools and institutes of higher education across NH in the next few weeks. Additional information, along with the on-line application, can be found at <http://www.nhmathteachers.org/> by following the resources drop-down menu. **The application deadline is May 1, 2017.**

If you have any questions, please contact me at [Sharon.mccrone@unh.edu](mailto:Sharon.mccrone@unh.edu)

Stay Informed!



- NHTM New Hampshire  
Teachers of Mathematics

- @NHTM1964

## Biographical Information about the Candidates: 2017 NHTM Election Approaching!

Biographical information on the candidates running for positions of **President-Elect, Treasurer, ATMNE Representative, Middle School Representative and Secondary Representative** positions are given below. Keep in mind that you will be able to 'write-in' names for candidates.

Voting ballots will again be cast online via the Internet. NHTM Ballot and Election information will be emailed to current NHTM members on February 15, 2017. Voting will close at **Noon on March 16, 2017**, the day of the NHTM Spring Dine and Discuss featuring Greg Tang at NHTM's Dinner and Awards Recognition Meeting. Results will be announced at the business meeting at the end of this event.

Remember you can now log into your NHTM account to check that NHTM has your preferred email address and check on your membership status. **Your vote is important!** If for some reason you do not receive an email with a link to the online voting ballot and know that your membership is current, please contact Matt Tremer at [webmaster@nhmathteachers.org](mailto:webmaster@nhmathteachers.org) directly after the last week of February 2017. We wish to give a huge thank you to the following candidates for their willingness to serve you by running in this year's election.

### Candidate for President-Elect:



**Rob Lukasiak** is a graduate of St. Anselm College and the University of NH. He has been teaching (and learning!) mathematics in one form or another for well over 35 years, 22 of which were at Goffstown High School. He also has been adjunct instructor at the college level – having taught courses for Notre Dame College, New England College, Plymouth State University, Endicott College, Granite State College and UNH where he received the 1994-95 NH Teaching Fellowship.

Since leaving the classroom in 2004, Rob has been involved in a variety of projects that have included work such as; assisting teachers to obtain alternative certification, HQT and Praxis preparation, competency development, standards based grading and assessment, ELO's, Charter Schools and performance assessments. Currently Rob has been working as an independent consultant primarily as a "math coach" and has worked with over 20 school districts and organizations in NH, Maine, and Massachusetts.

Rob has served two terms on the Board (2010 to present) as the ATMNE Representative and serves on the ATMNE Board as well as the Policy and Procedures Committee. He has also served NHTM at conferences in several capacities including: program chair, technology chair, presenter, and delivering the keynote at the 2014 Fall Dine and Discuss.

## Candidates for Treasurer:



**Jeanine King** teaches mathematics at Hanover High School. This is her 19<sup>th</sup> year teaching at Hanover and earlier in her career she taught at Kearsarge Regional High School for 12 years. In 1999, she received the *Presidential Award for Excellence in Mathematics and Science Teaching*.

She is particularly interested in teaching students who struggle with learning mathematics and has sought out professional development opportunities in that area to enhance her teaching. She has participated in the INTEL Mathematics Program, and was a member of the NH State Task Force on Mathematics Instruction. In 2010, she participated in the NECAP Item Review Committee. She has served as Treasurer for the NHTM Board for the past two years and looks forward to the opportunity to continue serving.



**Bernadette Kuhn** is a candidate for NHTM Treasurer. She graduated from RI College with a Bachelor's Degree in Elementary Education/Mathematics and began her teaching career in a Catholic elementary school in Fall River, Massachusetts teaching 7th and 8th grade

mathematics primarily, along with some other classes. Upon moving to New Hampshire in 1979 she was hired at the Chesterfield Central School to teach mathematics to 6th, 7th, and 8th graders. After 6 years there, she continued her professional practice by teaching at Monadnock Regional Middle/High School as a 7th and 8th grade mathematics teacher for 18 years, then moving up to teach high school courses for 13 years. During that time, she also taught some courses at River Valley Community College at the Keene Academic Center as well as a Running Start course at Monadnock. She has a Master's Degree from Antioch University New England in Curriculum and Instruction. Throughout her professional career in New Hampshire, she has remained a member of NHTM and NCTM, has attended many conferences and workshops offered at the state and national level, and is currently enjoying her recent committee work as Exhibits Co-chair for the recent regional conference in New Hampshire. Bernadette retired from full-time education in June of 2016, but is currently the 7th and 8th grade mathematics teacher part-time at a local Catholic elementary school. She is also very involved in her church community and with the local Delta Kappa Gamma society.

Bernadette continually looks for ways in which she can give back to her profession. After being a member of NHTM for many years, serving on the Executive Board would allow her to continue to have conversations with her peers who are also involved in improving mathematics education in the state of New Hampshire.

## **Candidates for ATMNE Representative:**



**Joseph W. Spadano** currently has a dual appointment as Associate Professor at Rivier University serving the Division of Education and the Department of Mathematics. Previously, Dr. Spadano taught all levels of mathematics during his 35-year career at Westford Academy. Joe earned his Doctorate in Mathematics Education at the University of Massachusetts Lowell. He was the 2001 recipient of the Presidential Award for Excellence in Teaching Mathematics, the 2002 recipient of the University of Massachusetts Lowell's Distinguished Alumni Award, and has achieved National Board Teaching Certification. Dr. Spadano would be an asset to the NHTM Executive Board and qualified to serve as an ATMNE Representative based on his career networking experiences and well-established professional relationships as well as his recognized experiences in education.

Dr. Spadano has published and presented on many topics in mathematics and mathematics education. Joe has recently published the book, *Problem Solving Without Figures*, and has recently received the Center For Scholastic Inquiry Best Paper Award for his publication of, *Embedding Assessment into Instruction: The Reasons, Reactions, and Results*. His most recent speaking experiences include presenting "Understanding What Students Know by Measuring How They Learn" at the 2016 ATMNE Fall Conference, "Embedding Assessment into Instruction: The Reasons, Reactions, and Results" at the 2016 Center For Scholastic Inquiry International Conference, "Problems Without Figures" at the 2016 CCSNH/NHDOE Mathematics Learning Communities Summer Institute V, "The Purposes, Objectives, and Outcomes of Assessment in the Teaching and Learning of Mathematics" at the 2016 NHTM Spring Conference, "Embedding Assessment into Instruction: Advancing Mathematics Learning and Teaching" at the October, 2015 NCTM Regional Conference & Exposition in Atlantic City, as well as, serving as Keynote Speaker addressing the topic "Advancing Mathematical Power through Problem Solving" at the June, 2015 CCSNH/NHDOE Mathematics Learning Communities event hosted by New Hampshire Technical Institute. Joe is a long-time member of the National Council of Teachers of Mathematics (NCTM) and the Council of Presidential Awardees in Mathematics (CPAM). Dr. Spadano embodies excellence in teaching, is devoted to the learning needs of all students, and upholds the high standards that exemplify American education at its finest.



**Dr. Natalya Vinogradova** graduated from Leningrad State University (Russia), and earned a PhD in Mathematics Education at SUNY Buffalo (USA). She currently works as an associate professor at the Mathematics Department at Plymouth State University in New Hampshire. In addition to teaching mathematics to prospective teachers, she is interested in working with in-service teachers, and frequently offers workshops and courses of professional development. The main goal of her work is to promote the view of mathematics as a harmonious world of logically connected ideas.

## **Candidates for Middle School Representative:**



**Dr. Katrina Hall** is a middle school math teacher at Hollis-Brookline Middle School where she has worked with both 7<sup>th</sup> and 8<sup>th</sup> graders for over 16 years. Katrina earned her BA in Secondary Mathematics Education from Rivier University (formerly Rivier College), her MS in Education with a Concentration in Middle Level Mathematics from Walden University and her Doctorate in Educational Leadership from the University of New England. Katrina has an additional certification in Online Teaching and Learning.

In addition to her primary role as a middle school teacher, Katrina is an adjunct mathematics professor at Rivier University, an online facilitator for OpenNH and an online mentor/facilitator for The New Teacher Center (eMSS). Beyond direct work with teachers/learners, Katrina consults with various educational companies by writing textbooks, assessments and other educational materials.

Dr. Hall values educational and mathematical networking. She has served on the Rivier University Mathematics Advisory Board, NECAP Mathematics Test Item Review Committee, and the ETS Praxis Standard Setting Committee. She currently serves on the New Hampshire Professional Standards Board, is an active member of NCTM (since 1997) and is active in various social media communities. She has been a member of NHTM for nearly 20 years and has served on the NHTM board as the South Central Regional Coordinator, the Regional Coordinator and Middle Level Representative. Through these leadership opportunities, Katrina has presented at various venues and written numerous articles for the Mathesis to share her love of teaching and learning mathematics. Her most recent writing includes her doctoral thesis, *The Mathematical Disposition of Middle School Students: An Examination of Students' Self-Concept of Ability in Mathematics*.

Katrina's passion for mathematics lies in the teaching and learning. She has a strong belief that all individuals can learn mathematics through the development of an individual's positive self-concept in mathematics. For Katrina, this means inspiring students in the classroom with learning that directly impacts their mathematical disposition and the sharing of educational practices that supports all learners of mathematics. As a result, Katrina has a peaked interest in ensuring the connection of mathematics with science, technology, and the arts (STEAM) as well as educational reform.

Dr. Katrina Hall believes that teaching mathematics should not be done in isolation. As a board member, Katrina feels she can work in collaboration to grow the educational and mathematical fields in a positive direction for both teachers and learners through shared best practices.



**Kristi Upschulte** has been teaching mathematics for the past ten years. She has taught middle school for four years and six years high school. Her teaching experiences have been in Nashua, Londonderry, Newport, and Goffstown. Her experiences range from teaching a special education life skills math course to AP Calculus AB.

Outside of the math classroom, Kristi has worked as the NEASC co-chair and summer PD District Coordinator in Newport. This has allowed her to see educational systems from a different vantage rather than just from a classroom teacher's perspective. She is currently working on her Master's degree in Curriculum and Instruction at SNHU where she aspires to find a position as a Curriculum Coordinator. Her goal is to help teachers better prepare their students for their future.

Kristi believes that she would be an asset to the NHTM Executive Board since she has worked in multiple school districts and at multiple grade levels. She has experience with systematic programs and she is looking to keep mathematics in NH on the 'innovative' edge for all NH students.

### **Candidate for Secondary Representative:**



#### **Lesley Fallu**

Manchester High School Central has been Lesley's "second home" for the last thirty-eight years where she teaches mathematics and has served as the department coordinator since 2002. Currently she teaches AP Calculus, Algebra I, and Math Lab, and over the years Lesley has had the opportunity to teach a variety of courses across many learning levels. At the state level, she was a member of the Math Advisory Panel, making recommendations on the graduation requirement for the fourth year of math. Lesley Fallu also served on the Work Study Practice Committee to develop a set of four expectations to ensure that New Hampshire students are college and career ready. Last fall, she served as Student Host Chair at ATMNE 2016, and accompanied her students to the Math conference held in Manchester. At the district level, Lesley serves on the Math Curriculum Committee, which recently developed the Manchester Academic Standards for Mathematics. Her professional memberships include NHTM, ATMNE, and NCTM.

**ATMNE 2017**

November 2-3, 2017  
Marlborough, MA



**Spring Dine and Discuss**

SAVE THE DATE



Featuring Guest Speaker  
**GREG TANG**

*Author of The Grapes of Math and  
Gold Medal eBook Math Appeal*

**Dinner Meeting  
March 16, 2017  
4:30 - 7:30 PM  
Holiday Inn  
Concord, NH**

Check out the NHTM website  
for registration and details  
[nhmathteachers.org](http://nhmathteachers.org)

**Join us for the NHTM Spring Dinner Meeting Featuring Guest Speaker  
Greg Tang.**

**Best Practices & Best Ways to Practice!**

Join us as we use visual models to make sense of place value, operations, algorithms, word problems, and fractions. But fluency doesn't come from great strategies alone. We will also explore best ways to practice, including clever puzzles and games that develop both fluency and reasoning skills. Math – and you – will never be the same!

**When:** March 16, 2017 from 4:30 - 7:30pm

**Location:** [Holiday Inn, Concord NH](#)

[Register Here for the NHTM Spring Dinner Meeting with Guest Speaker Greg Tang](#)

**Seating is limited!**

## 45th Annual NH State High School Mathematics Contest

**NHTM (New Hampshire Teachers of Mathematics), and the Plymouth State University Mathematics Department** invite you to form one 10-member mathematics team (with no more than four seniors and a maximum of eight juniors and seniors combined) to join us for our 45th annual competition this year on **Tuesday, March 21, 2017 at Plymouth State University** (with a snow date of Wednesday, March 22 - still at Plymouth State University). Your team will have the opportunity to meet with other students from throughout the state in a day of exciting, challenging, competitive mathematics exercises in six different categories.

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

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

Any non-laptop type calculator allowed in the mathematics sections of the SATs and the College Board AP exams may be used in the contest. It is assumed that every participant will have a graphing calculator available to use in the contest. Please use the following link for reference: <http://sat.collegeboard.org/register/calculator-policy>

There will be four divisions of competition. See the registration page for division requirements. Use October 3rd, 2016 as the official date for school enrollment figures. Please check this figure with school officials to avoid problems of being registered in an incorrect division. **ALSO PLEASE NOTE – the division enrollment figures have been updated AGAIN this year to align with NHIAA divisions, so please check carefully!**

**Don't delay! Register today for our 45th annual contest!  
Registration deadline: Friday, February 24, 2017**

**Fees** will be accepted after February 24th if it is not possible for a school to make the payment in time. However, the **registration form** must be postmarked or e-mailed as an attachment by February 24, 2017. Any registration forms received after that date will be assessed an extra \$10.00 fee.

If you have any questions about the contest, please feel free to e-mail the NHTM State Mathematics Coordinator, **Stephen Latvis**, at the following e-mail address:  
[slatvis@windhamsd.org](mailto:slatvis@windhamsd.org)

**45<sup>th</sup> Annual NHTM-USNH**  
**State High School Mathematics Contest**  
**Tuesday, March 21, 2017**  
(~~space~~ date: Wednesday, March 22)

Register your team now to compete with other New Hampshire teams on **Tuesday, March 21, 2017** at Plymouth State University! Four divisions of schools will participate this year in our 45th annual state mathematics contest. **Note that the enrollment data below has been UPDATED to reflect the division enrollments of the NHIAA**

<b>School Division</b>	<b>School (Grades 9-12)</b>
Small	less than or equal to 300 students
Medium	301 through 550 students
Intermediate	551 through 1150 students
Large	1151 or more students

**Registration fee: \$50.00**  
 Late registration fee (for postmark after February 24, 2017): \$60.00)

Make checks payable to: **\*\*\* NHTM \*\*\*** (Check must accompany POs, please.)

**ONCE AGAIN FOR 2017 – You may also fill out this registration form, scan it, and e-mail your registration! E-mail your registration as an attachment to: [slatvis@windhamsd.org](mailto:slatvis@windhamsd.org)**

Registration Form

**45<sup>th</sup> annual State Mathematics Contest**  
**Tuesday, March 21, 2017**  
(~~space~~ date: Wednesday, March 22)

School Name \_\_\_\_\_

League affiliation \_\_\_\_\_  
(if applicable)

Address \_\_\_\_\_

City \_\_\_\_\_ NH Zip \_\_\_\_\_

School Phone \_\_\_\_\_

Advisor(s) \_\_\_\_\_ # of advisors accompanying team:

How late can you stay? \_\_\_\_\_

**\*\*\*Official\*\*\* school enrollment, grades 9-12, as of October 3, 2016 \_\_\_\_\_**

School Division (please circle):      Small      Medium      Intermediate      Large

Registration deadline: February 24, 2017  
 Checks payable to: **\*\*\* NHTM \*\*\***

Mail form and \$50.00 fee (late fee: \$60.00) to:  
 NHTM c/o Jeanine King, NHTM Treasurer  
 104 Choate Road  
 Enfield NH 03748-3403

email: [nhtmtreasurer@nhmathteachers.org](mailto:nhtmtreasurer@nhmathteachers.org)

Join us for

# ATMNE 2017

Marlborough, MA - November 2-3



**Keynote Addresses by  
Steve Leinwand and Tracy Zager**

**Come learn with us on the theme of  
Common Sense Mathematics. Explore  
thoughts and ideas related to curriculum  
and instruction in your classroom.**

Speaker Proposals Due February 1, 2017  
Check [www.atmne.net](http://www.atmne.net) or your local  
affiliate's website for more information.

## NHTM Executive Board

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

<b>President</b> Annie Wallace Hampstead Middle School	<b>Secretary</b> Natalie LaFlamme Fairgrounds Middle School	<b>Treasurer</b> Jeanine King Hanover High School	<b>Elementary School Rep</b> Amy Gregoire Bow Memorial School
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<b>Past President</b> Cecile Carlton Mathematics Consultant	<b>ATMNE Rep</b> Rob Lukasiak Mathematics Consulting Services	<b>NCTM Rep</b> Teresa Magnus Dept of Math & Computer Science Rivier University	<b>NHTM Membership Chair</b> Gretchen Scruton Timberlane Middle School
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<b>Webmaster</b> Matt Treamer NCES			

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

## Professional Development & Conferences

### National

ICTCM 28th Annual Conference	Chicago, IL	March 9-12, 2017
T3 Annual Conference	Chicago, IL	March 10-12, 2017
2017 NCSM Annual Conference	San Antonio, TX	April 3-5, 2017
NCTM Annual Meeting & Exposition	San Antonio, TX	April 5-8, 2017

### State

NHTM Spring Dine & Discuss Featuring Greg Tang	Concord, NH	March 16, 2017
43 <sup>rd</sup> Annual State Mathematics Contest	Plymouth, NH	March 21, 2017 (Snow date- March 22, 2017)

*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.



### Upcoming Deadlines

- Information for May Mathesis- April 19<sup>th</sup>