President's Message
Lynn Prentiss

Welcome Back!

I hope you all had a chance to sharpen your axe and are ready to tackle another school year! The summer goes by so fast; sometimes it is hard to imagine there ever was one!

I would like to begin this September’s letter by highlighting RIMTA’s PD offerings you can look forward to in the coming school year. Check out more information throughout the newsletter on all of our offerings!

In addition to our Fall PD offerings, we will also be asking our members to vote on the revised By-Laws and Constitution the Board worked on this past year. You can expect to see this in your inbox on Monday, September 25th in preparation for this vote. A few highlights from the document include an NCTM/NCSM rep position, a revised mission, and clarity and acknowledgement of positions on the Board.

Reflection and Thinking Ahead

This past summer, I made a pact with myself - to experience a chunk of summer without working, without checking my computer daily and without guilt. The goal was to fill my days with self-care, friends, family and new interests. I found myself searching for... Joy. Clear, beautiful, merciful Joy. In preparation for the school year ahead, I have been thinking about how I might continue to incorporate this idea of Joy into my weekly personal and professional life. It has taken intentional planning and organizing, but I know in time, the benefits will be important to my students, my colleagues and in my personal life.

The reason I bring this up is because I also believe that we as educators need to be intentional about bringing Joy to learning - not just for our students, but for ourselves. This might mean something completely different to each person and begin in your personal life - a midday walk, yoga, Saturday mornings in the garden, planning a camping trip, running after your child at the park, attending a football game or going to two kickboxing classes a week. Either way, Joy must enter our school life, our mathematics classrooms and our collegial conversations. This year, focus on whether Joy is present in your teaching and learning. I cannot say exactly what that looks like, but you will when you experience it! Take your Joy back!

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RIMTA FALL MEETING

The RIMTA Fall Meeting is fast approaching. Scheduled for Thursday, October 19, from 4:00-8:00 at the New England Institute of Technology in East Greenwich, this conference is not to be missed. The planning team has put together a wonderful schedule that will benefit teachers of all grade levels.

Rhode Island’s Elementary Mathematics Leaders Group (EMLG) will present on some of the amazing work they have been doing around Visual Models and S.U.M (Steps for Understanding Mathematics). Teachers from the New England Institute of Technology will facilitate professional learning geared towards secondary educators on math-related fields, as addressed in the Governor’s Workforce Board Priority Industry Sectors. Those fields include the RI Builders Association, Engineering Technology, and Information Technologies, as well as EmployRI and SkillsUSA will be presenting this evening!

Our middle school session will be led by John SanGiovanni, a mathematics supervisor for the Howard County (MD) Public School System. He is an adjunct instructor and a frequent speaker at both regional and national conferences, and a member of the NCTM Board of Directors. John is well-known for Eliminate It! activities (also known as “Which One Doesn’t Belong?”). He has also co-authored several books, including Putting the Practices into Action - Implementing the Common Core State Standards for Mathematical Practice, Grades K-8, Mine the Gap for Mathematics, Math in Practice - A Guide for Administrators, and the Mastering the Basic Math Facts series.

A sample of John’s work can be found at https://www.youtube.com/watch?v=RKLNd4ikxjA. Noted educator and speaker Graham Fletcher says, "Whenever I attend a session facilitated by John, I walk away with an increased knowledge of how students engage in mathematics and how I can make that interaction more meaningful. He continues to push my thinking and challenges me to find innovative ways to increase accessibility in my practice."

Food will be available after the sessions, and there will be plenty of door prizes available. To register for the Fall Meeting, please go to www.rimta.net or http://0bc.xyz/5Ym.

"John SanGiovanni is worth the trip to come learn with and from! He has a ton of knowledge and experience working with teachers to make wise instructional choices based on knowledge of tasks, content, and students, and he engages teachers with energy and lots of (kinda dry) humor."

Max Ray-Riek
Math Forum at NCTM
Recap of the NCTM Affiliate Leaders Conference
by Steve Levesque

Over the past few years, I have heard wonderful things about the NCTM Affiliate Leaders Conference. This year, I had the opportunity to attend the conference for the first time from July 22-24 in Baltimore, along with Lynn Prentiss and Cathy Boutin. I was excited to attend and did not leave disappointed.

The Saturday session began with a presentation by David Barnes from NCTM on the Every Student Succeeds Act (ESSA). While I knew extremely little about the act going in, I felt more knowledgeable about the topic afterwards. I also realized that we all need to remain informed and vigilant about how our states’ education dollars are spent. The rest of our evening featured our first full-group meeting engaging in icebreaker activities in which we got to meet outstanding educators from around the nation.

On Sunday and Monday, we were treated to eye-opening and thought-provoking presentations by Dr. Marilyn Strutchens from Auburn University. She helped me reflect on micro-messages that may result from implicit biases on our part and how those biases affect student learning. Were the conversations a little uncomfortable? For me it was, but in a good way. It helped me reflect and will make me a better teacher.

We also heard from NCTM President Matt Larson on Sunday. He was scheduled to join us, but travel complications forced him to connect with us via video chat. He gave us some information about new NCTM plans and initiatives, as well as some honest discussion about the state of the Council. We will have to do more to ensure the long-term viability of this organization.

Meanwhile, we were asked to work on an action plan to bring back to our affiliates that reflected the conference’s theme of Addressing Access, Equity, and Advocacy. RIMTA identified an issue and hopes to address it by establishing communication with other education organizations in our state. Somehow, our delegates did all of this, worked on our growth plan for the next two years, and managed to have a few laughs over those two-and-a-half days. Yeah...I’m tired.

The Affiliate Leaders Conference is a great chance to learn from brilliant, dedicated educators, build relationships with math educators from around the country (some of whom I had only read about), and complete some much-needed work for our affiliate. I am already looking forward to attending next year’s conference. Kudos to everyone who helped organize the event (including our own Gina Kilday).
PRESIDENTIAL AWARD FINALISTS FOR EXCELLENCE

The Rhode Island Department of Education has announced the state finalists who are candidates for selection as national award winners. David Upegui from Central Falls High School and John Labriola from Charleho Middle School have been selected as the 2017 PAEMST Rhode Island state finalists for science teaching. Kristina Sparfven from Charleho Middle School has been selected as the 2017 PAEMST Rhode Island state finalist for mathematics teaching. The Presidential Award for Excellence in Mathematics and Science Teaching (PAEMST) is the highest recognition that a kindergarten through 12th-grade mathematics or science teacher may receive for outstanding teaching in the United States. Enacted by Congress in 1983, this program authorizes the President to bestow up to 108 awards each year. The National Science Foundation administers PAEMST on behalf of the White House Office of Science and Technology Policy.

The teachers are recognized for their contributions to teaching and learning and their ability to help students make progress in mathematics and science. RIMTA wishes to congratulate these finalists; we are so proud that they teach here in our great state!

Elementary Math Leaders Group

RIMTA's Elementary Math Leaders Group met Friday, September 15, at Warwick Public Library on Sandy Lane. The group discussed professional literature for elementary math educators and chose to have a year-long book study of Becoming the Math Teacher You Wished You'd Had by Tracy Zager. The group put finishing touches on our Visual Models across the Common Core resources that we will be sharing at the RIMTA Fall Meeting, and received an update from RIDE regarding RICAS and from RIMTA regarding upcoming opportunities.

The next meeting will be November 20th and will be focused on RICAS expectations and the use of PARCC data to drive instruction. RIMTA's Elementary Math Leaders Group is a network of elementary mathematics leaders from throughout Rhode Island who share resources and collaborate to solve the problems being faced in supporting math instruction. The group meets periodically and shares resources through an electronic repository. Any elementary mathematics teachers, coaches or administrators are welcomed to participate in person or electronically. We currently have over 50 members representing over 25 districts and we always welcome new members.

Please contact Meredith Astrologo at meredith_astrologo@nksd.net to get more information or to join the group.
AN EXCLUSIVE INTERVIEW WITH
JOHN SANGIOVANNI

John SanGiovanni, one of our featured speakers at RIMTA’s Fall Meeting on October 19, has also co-authored several books, including Putting the Practices Into Action-Implementing the Common Core State Standards for Mathematical Practice, Grades K-8; Mine the Gap for Mathematics; Math in Practice-A Guide for Administrators; and the Mastering Basic Math Facts series. A sample of his presentations can be found at http://0bc.xyz/5Mh.

John was kind enough to answer some questions we asked about his current work and what we can expect to see at the Fall Meeting.

RIMTA: What new projects have you been working on?
JS: I’m excited to be working on a few different new projects. One of those projects is Mine the Gap for Mathematical Understanding, 6-8. In that book, we provide teachers with more than 150 quality tasks for the big ideas in middle school. We also offer student work to uncover perspective and misunderstanding of students relative to 45 of those big ideas. I’m also in the middle of a project for developing number sense and reasoning in middle school (a bit more information below). I continue to design new professional learning workshops that are systematically rolling out. In my district, we’re focused on rethinking how we plan mathematics, developing administrators’ understanding of exemplary mathematics, and providing an exceptional open-source digital curriculum.

RIMTA: Your work is primarily connected with elementary education; however, Eliminate It! activities are really applicable to classes from K-12. What would you say to middle school educators to inform them of the relevance of your presentation in October?
JS: If you like ideas like Eliminate It then this session will be for you regardless of the grade(s) you teach. It will present practical activities or protocols designed to provoke the SMPs. Many of the activities will be published in my upcoming middle school book about reasoning and number sense. We’ll work with diverse concepts including fraction sense, decimal sense, percent, ratio/proportion, expressions, and equations.

RIMTA: Where do you see math education heading over the next ten years?
JS: I think we’ll continue to see emphasis on understanding mathematics deeply. I also think we’ll see a greater emphasis on open-ended real-world problems that ask students to apply their understanding. I believe the Standards for Mathematical Practice or a similar list of process behaviors will be even more desirable.

RIMTA: What was the best advice about teaching you ever received?
JS: Love your kids. Love what you do. Find something else to do the day you don’t.

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**INTERVIEW WITH JOHN SANGIOVANNI**

(Continued from Page 5)

**RIMTA: What do you think are some misconceptions about the Standards for Mathematical Practice?**

JS: I encounter a few misconceptions. The first is that the SMPs don’t really matter or aren’t as important because they aren’t tested in the ways that content standards are. Another is that the SMPs are new. They aren’t. They’re built on the ideas of other standards such as NCTM’s Process Standards. I think there is also the notion that one can plan a lesson and then look back at it to identify the SMPs in it but that (to me) isn’t the intention.

**RIMTA: Which Standards(s) for Mathematical Practice stand out to you and why?**

JS: Obviously, they’re each unique in their own way. I think I am most passionate about SMP 2. The idea of contextualizing and decontextualizing mathematics seems straightforward but we know that it is not. What most interests me about the standard is the idea of number sense and reasoning which is embedded in the sentence or so. To me, this is one of the most important pursuits in all of mathematics education.

**RIMTA: What challenges do teachers face when implementing the CCSS SMP? How can teachers attack that most productively?**

Again, I think the misstep is planning a lesson and then looking back to cite which standards were present. To me, the intent is to design lessons that intentionally elicit the practices. I think one thing we can do as teachers is to be sure that we know and understand the SMPs deeply ourselves. I think it’s also important for us to bake student reflection of these standards into our lessons – especially closure of a lesson.

**RIMTA: There has been a lot of pushback from the general public about the CCSS in general. What do you say to those people who are resistant?**

JS: I often ask which standards don’t they like. It usually ends the conversation quickly. There are other instances (presentations, etc) in which we do math and discuss it.

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**President's Message**

(Continued from Page 1)

Just for fun and because I love her so much, check out Lucinda Williams' Joy at the following link [https://www.youtube.com/watch?v=p1B4Q0hugY8](https://www.youtube.com/watch?v=p1B4Q0hugY8). This song pumps me up, pulls my shoulders back and makes me smile just a bit more than the moment before!

I have also attached an article from 2015 that touches on the author’s belief that there is a lack of Joy in schools today. [https://www.theatlantic.com/education/archive/2015/01/joy-the-subject-schools-lack/384800/](https://www.theatlantic.com/education/archive/2015/01/joy-the-subject-schools-lack/384800/)

Here is a quote that struck me from the article.

“T’i’m a mother of three, a teacher, and a developmental psychologist. So I’ve watched a lot of children—talking, playing, arguing, eating, studying, and being, well, young. Here’s what I’ve come to understand. The thing that sets children apart from adults is not their ignorance, nor their lack of skills. It’s their enormous capacity for joy.”

SUSAN ENGEL is a senior lecturer in Psychology and the director of the Program in Teaching at Williams College. She is the author of The End of the Rainbow and The Hungry Mind.

Have an incredible and Joyful year! You and your students deserve to find daily Joy, especially in the mathematics classroom.

Lynn Prentiss
RIMTA President
AMERICAN MATHEMATICS SOCIETY'S WHO WANTS TO BE A MATHEMATICIAN? COMPETITION

Qualifying for the 2018 Who Wants to Be a Mathematician championship, which will take place at the 2018 Joint Mathematics Meetings in San Diego, begins September 11. The first round of qualifying ends September 25. High school students from the U.S., Canada, and the U.K. are eligible to compete. For more information, email the AMS Public Awareness Office: paoffice@ams.org, subject line: WWTBAM Championship. Teachers administer the qualifying tests, so students who would like to participate either should have their math teacher email AMS or email AMS directly with their teacher's name, school, and email address.

The 2017 ATMNE Fall Conference will be held on November 2-3 at the Best Western Royal Plaza Hotel in Marlborough, MA. This year's theme is Common Sense Mathematics. The keynote addresses will be given by Steve Leinwand, Tracy Zager, and Eric Milou. There will be over 100 workshops and sessions, including ones given by Matthew Beyranevand, Linda Dacey, Anne Collins, Mike Flynn, Stuart J. Murphy, and Laurie Boswell. Come learn and explore thoughts and ideas related to curriculum and instruction in your classroom. Register at atmim.net for a conference not to be missed.

EDUCATOR EXCELLENCE NIGHT AT WATERFIRE

Who doesn't love Waterfire, with its festive atmosphere and haunting beauty in the midst of downtown Providence? On September 23, you will have another reason to attend one of Providence's signature events. The Rhode Island Department of Education is organizing its Educator Excellence Night. Award winning educators from around the state will be recognized at the event, including RIMTA's 2017 awardees, Kayla Brimlow, Cathy Boutin, and Anne Barbour. Do come out for a fun evening, bump into some old friends, and support our state's amazing teachers!
In the spring, we announced that we would be adopting a new system of assessments, with the Rhode Island Comprehensive Assessment System (RICAS) for grades 3 through 8, and the PSAT and SAT at the high school level. This shift, which goes into effect for the 2017-2018 school year, will allow us to continue to measure student progress while cutting overall testing time, providing continuity in the classroom, and giving Rhode Island a sustainable path forward.

The most important thing to keep in mind is that our learning standards and grade-level expectations for students will remain the same, meaning that teachers will not have to change their approach to classroom instruction. The test administration experience will likewise be very similar for students and educators. The online test platform for RICAS is the same as PARCC, making for a seamless transition. Additionally, we hosted informational sessions in August with school and district administrators to bring them up to speed on all of our assessments, providing them with materials to bring back to share with educators and parents. In the fall, we plan to host another workshop that will include a discussion of test items and how they can inform instruction.

Throughout the decision-making process, and during the rollout, we have continued to put public input at the forefront. For those who have argued that current testing schedules are overly stressful for students, we heard those concerns. This shift is responsive to feedback we have received from educators, students, and families. The RICAS and PSAT/SAT will be less time intensive, meaning we will still get important information about student progress, but at the same time lightening the burden on students and teachers alike, and meeting a common college application requirement. It's a win-win.

The short-term impacts of this move will be minimal, but the long-term benefits have the potential to be significant. Adopting RICAS and College Board tests will ensure long-term sustainability with reliable partners that have proven track records of excellence, and we are confident that this transition will help RIDE and educators statewide better serve all students.

Ken Wagner, Ph.D.
Commissioner of Elementary and Secondary Education
Rhode Island Department of Education
RIMTA Trivia Night

Do you know how many prime numbers exist between 1 and 100? The name of the principal on “Welcome Back, Kotter”? The name of the U.S. Secretary of Education? If you do (or even if you don’t), then you should visit Doherty’s Ale House in Warwick on November 9 for RIMTA’s third Trivia Night. It’s free to play, and you can come alone or bring a team of friends. No pre-registration is required. Participants do not need to be RIMTA members or even teachers. Just come by, catch up with old friends, have some great food and beverages, and compete for bragging rights (and gift cards for the winning team). The fun starts at 6:30; see you then!

NCSM REPORT

The National Council of Supervisors of Mathematics (NCSM) offers a number of grants and awards. Some of these opportunities are shown below. For more information, please visit www.mathedleadership.org.

Kay Gilliland Equity Lecture Award

Kay Gilliland gave her time, energy, services and skills to work for equity in mathematics education for all students, especially low-income, black, Latino, and indigenous peoples. Each year NCSM honors her legacy by presenting a person of like mind and work ethic with the Kay Gilliland Equity Lecture Award. The awardee will be invited to present their lecture at the 2018 Annual NCSM conference in Washington, DC in April. Nominations are open through October 1, 2017.

Ross Taylor/Glenn Gilbert National Leadership Award

Colleagues across the nation are engaging in significant work to further ideas and passion regarding mathematics leadership and education. Please consider nominating a person you know who has made significant and describable contributions to the field through a dedication and concern for his/her fellow mathematics educators. This person should demonstrate a clear knowledge of mathematics education as well as contributing to the furthering of the stated purposes of NCSM: the interchange of ideas, cooperation with other professional organizations, and leadership in attacking current problems in mathematics curriculum and supervision. The deadline is November 1, 2017.

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NCTM INNOV8 CONFERENCE

by Gina Kilday

Have you considered attending this year's Innov8 Conference in Las Vegas, November 15-17 with a group from your school or district? The theme is Breaking Barriers: Actionable Approaches to Reach Each and Every Learner in Mathematics. Bring a team and engage in an innovative learning experience for mathematics education. With a focus on access, equity, and empowerment, and designed specifically for teams, you can experience the conference through three different themes:

Reflecting on mathematics instruction in terms of access, equity, and empowerment Developing equitable mathematical teaching practices that empower students Learning new strategies to identify and remove barriers to access to high-quality mathematics.

NCTM introduced the Innov8 conference experience last year with wonderful feedback. Innov8 conferences are designed to support mathematics teachers and teams in identifying, analyzing, and planning for instruction and intervention around a self-identified problem of practice related to access, equity, and empowerment. This conference is a working conference and this means you will not just be listening to speakers. Instead, you will work as a team to develop a plan to address a challenge you are facing in your school. Conference sessions are designed to support you in the design of your plan and experts will be available to assist teams in creating their action plan and developing implementation of their ideas back in their school setting.

Having attended the first Innov8 conference last year with a team from my school, I highly recommend you consider this unique professional development opportunity. Check out this tweet from one of our team members.
Teacher-Leader Professional Learning Grant (PreK-12)

This grant provides professional learning assistance for mathematics teachers and mathematics teacher-leaders. For 2017-2018, a grant of a maximum of $4000 will be awarded to an elementary, middle or secondary school. The professional learning is for mathematics teacher-leaders and/or mathematics teachers within a school or district. Professional learning must focus on one of NCSM’s signature initiatives: Formative Assessment, Digital Learning or Access-Equity-Empowerment. The deadline is November 6, 2017.

Iris Carl Travel Grants

Do you serve in a mathematics education leadership role? The 50th Annual NCSM Conference will take place in Washington, DC in April 2018. If you are a current NCSM member (as of Sept. 1, 2017), and have not had the opportunity to attend this outstanding conference focused on cutting edge topics in mathematics education in the past three years. The deadline is December 1, 2017.

On September 27 at 7:00 p.m., NCTM President Matt Larson wil host a webinar, "President's Message, Special Edition: Positioning NCTM for a Second Century." To register or get more information, please visit www.nctm.org/webinars.

The NCTM Innov8 Conference, scheduled for November 15-17 on Las Vegas, offers a unique professional development opportunity, allowing teachers or school teams to work on issues facing them. A more complete description can be found on Page 10.

NCTM Twitter Chats take place on the 2nd, 3rd, and 4th Wednesday evenings of most months, with a week of the month dedicated for topics from each of our grade-band focused school journals. Chat participants discuss a recent article or blog post from the corresponding journal. The chats begin at 9:00 p.m. ET and last about an hour, centering around six open-ended questions every 10 minutes. For more information, please check www.nctm.org/onlineevents.

NCTM Regional Conferences & Expositions are an opportunity to share knowledge and learn with leaders in the field of mathematics education. Gain new strategies to unleash the mathematical mind of every student when you join NCTM in Orlando this fall on October 18-20.
RECAP OF NEW CUBED CONFERENCE
by Lynn Rakatansky

The Second New Cubed Math Conference, held at Siena College near Albany on July 9-12, 2017, was a great success. The workshops were set up with narrow grade bands for grades PreK-K, 1-2, 3-4, 5-6, 7-8, and high school topics including but not limited to Algebra, Geometry, Statistics, and Calculus, in order to focus in on topics specific to one's teaching. The presentations were excellent. There were some speakers who gave three talks, which allowed for extended and continuous learning. By holding this conference in the summer, no substitutes were needed and no instructional time with one's students was lost. A STEM Camp was available for the children of participants. It was affordable since it was held on a college campus. Some of the featured speakers were Jim Rubillo, Steve Yurek, Nancy Anderson, and Rob Gerver. Some of the speakers who gave three workshops were Scott Vandenberg, Robin Flatland, Kit Norris, Judy Curran Buck, Shawn Towle, and Jean McKenny. AMTNYS, AMTNJ, and ATMNE came together to create this conference for learning, teaching, and students. Please consider joining us next summer!

RECAP OF TEACHERFEST RHODE ISLAND
by Gina Kilday

Teachers from all around the state took time from their summer fun in early August to attend RI TeacherFest, a two-day cross-collaboration across disciplines and K-12 grade spans. Topics included math, science, technology, mindfulness and restorative justice practices with more than 100 programs over the two days.

RIMTA was well-represented with a table in the exhibit area promoting RIMTA membership and several presentations by RIMTA members, including "Diagnosing Math Deficiencies" - a session highlighting a RIDE/RIMTA partnership to provide a no-cost option for districts to access materials and professional learning in diagnosing mathematics deficiencies.

This first-time event was a huge success and we are hoping that the Narragansett Education Foundation and its collaborators will plan a repeat performance next summer! If they do, you won't want to miss it!
SECONDARY LESSON PLAN

Submitted by Steve Levesque

Teachers are looking for ways to re-imagine their classrooms. Among these ways are improving the communication of mathematical ideas and the use of classroom space (having students do more than just sit at their desks). The idea of carousel activities or scavenger hunts is not new, but they can be incredibly useful for fostering student communication and reviewing skills quickly, while teachers can gauge student progress. This scavenger hunt reviews analysis of graphs of functions.

When students arrive in the classroom, the twenty-one graphs are displayed on the walls of the classroom (I actually use the hallway). Give each student a scavenger hunt sheet with all prompts and allow them to work in groups of two or three. Students then mill about the learning space, searching for graphs that match each condition. In this activity, there are multiple correct solutions to many of the prompts, and one graph may satisfy more than one prompt. Students have completed the activity when they have found at least one graph that satisfies each prompt. A few of the prompts for the function activity are listed below.

Has a range of all real numbers greater than or equal to 3.
Is a discrete function.
Has a domain of all real numbers.
Is increasing from x = -2 to x = 2.
Is positive from x = -1 to x = 2 and when x > 5.
Has a range of all real numbers.
Is not a function.
Has a range of {-2, -1, 0, 1, 2}

The concept of this activity can be easily adapted to particular families of functions and geometric figures, and can be used to formatively assess many other topics (equations, inequalities, polynomials, etc.). Students enjoy having the opportunity to move about for a few minutes (this activity typically takes 10-15 minutes to complete), and students are usually highly engaged in it. For the complete activity, including all prompts, please visit http://0bc.xyz/61I.

If you come up with your own scavenger hunt, I’d love to see it and possibly use it myself; with your permission, we may be able to share it in the next newsletter. Please email SLevesque314@gmail.com with any ideas you may have.

Best of luck this school year!! You got this!
This engaging activity will use transformations to help students understand the concepts of video game design by analyzing the movements of Ms. Pac-Man. This activity was originally created by Robert Kaplinsky.

Begin by showing students the video [https://youtu.be/wgd9rSsWt2Y](https://youtu.be/wgd9rSsWt2Y). Students will need to be able to describe the character’s movements. These questions may be useful in helping students navigate the problem solving path:

- What movement did Ms. Pac-Man make?
- What was the very first thing Ms. Pac-Man did?
- Does anyone have the same answer but a different way to explain it?
- How did you reach that conclusion?
- How can you demonstrate what you are saying is correct?
- What assumptions are you making?

This lesson provides a real-life context for transformations which are the foundation for how the Common Core State Standards require students to understand congruence and similarity. The goal is to let students initially describe the movements in their own words and then work towards a mathematically precise definition. Examples about what students would say when asked, “What movement did Ms. Pac-Man make?” might be “Ms. Pac-Man first moved to the right, then up, then right, then …” Students need to use clear definitions in discussion with others and in their reasoning by saying that “those types of movements are translations.”

Then watch the video: [https://youtu.be/oxVI3mXuNYU](https://youtu.be/oxVI3mXuNYU)

You may need to switch back and forth between the original video and this new video to compare the two sets of movements. You should realize that while it is true that Ms. Pac-Man translated across the screen (we will discuss this in more precise terms later), that was not the only movement Ms. Pac-Man made. Ask them “What was the next thing Ms. Pac-Man did?” and expect to hear answers like “She looked the other way” or “She turned to the right.” Students should be saying “Mathematicians call those types of movements reflections.” Then watch the video below (NOTE: YouTube cut off the first second so it may look like Ms. Pac-Man begins reflected even though she doesn’t):

[https://youtu.be/PD_gv5zOv30](https://youtu.be/PD_gv5zOv30)

Again, you may need to switch back and forth between the original video and this new video to compare the two sets of movements. Something important to note is that when Ms. Pac-Man gets to the top right of the screen, she starts doing both rotations and reflections where as in the beginning she is only doing one transformation at a time. In the video below I am only showing translations and reflections (no rotations) so she does one reflection at the very beginning and another towards the top right of the screen.

At this point you will most likely realize that Ms. Pac-Man turns in addition to the other movements. Mathematicians call those types of movements rotations. Then watch the video below:

[https://youtu.be/lIY2U9C18u](https://youtu.be/lIY2U9C18u)

Students will realize that Ms. Pac-Man is making a series of translations, reflections, and rotations but we need to increase our mathematical precision and list them out. To help, students answer questions which should illustrate the movements:

- How far did she translate?
- What unit are we measuring this in?
- Which way did she reflect?
- How much did she rotate?

Hopefully students will realize that to answer these questions (and at least the first one) we will need a common unit of measure. When students realize they need some structure to have a meaningful conversation, show them the video below:


Students need to create a list of these movements on a sheet of paper. You will likely have to play the clip above many times. Supplying a grid and two Ms. Pac-Man pictures will be very helpful in demonstrating the rotation/reflection combinations:

Once students have come up with their list of transformations, choose a partner and have a conversation about them. Students may have incorrect answers, a different right answer, or multiple ways to explain it. These questions may be especially useful.

- Does anyone have the same answer but a different way to explain it?
- How did you reach that conclusion?
- How can you demonstrate what you are saying is correct?
- What assumptions are you making?
ELEMENTARY LESSON PLAN

by Meredith Astrologo

While this isn’t a lesson in the formal sense, it is a way to engage students in problem solving with a real world connection. Dan Meyer describes Three-Act Math Tasks as the three acts of a mathematical story.

Act I: Introduces a mathematical challenge in the form of a conflict
Act II: Engages students in overcoming obstacles, looking for resources, and developing new tools to address the conflict or challenge
Act III: Is the reveal. It involves students resolving the conflict and possibly creating an extension

To learn more about three-act tasks:
https://mikewiernicki.com/2014/05/13/why-use-3-act-tasks/

"If we continue to use textbook type problems that are too helpful, uninteresting, and let’s face it, perplexing in all the wrong ways, we’re not doing what’s best for kids; we’re training them to not be curious, not think, and worst of all . . . dislike math.”

Mike Wiernicki
on www.mikewiernicki.com

Although Dan Meyer is a secondary educator, many others have embraced three-act math tasks and wealth of information is available at all grade levels:
https://gfletchy.com/3-act-lessons/
http://robertkaplinsky.com/lessons/ (1-12)
https://mascillomath.wordpress.com/3-act-tasks-by-me/ (1-5)
https://learningfromchildren.org/3-act-tasks/ (K-2)
https://whenmathhappens.com/3-act-math/ (3-12)
**CHALLENGE PROBLEMS**

**Grades 1 & 2**

**Tangrams**

The tangram is the dissection of a square into seven pieces. Can you make a square using some, but not all, of the pieces? Can you make five different squares? What is the smallest square you can make? The largest?

This can be found in the original format at [https://nrich.maths.org/1](https://nrich.maths.org/1). For a printable tangram sheet, go to http://0bc.xyz/5Yo.

**Grades 3-5**

**Andy’s Marbles**

Andy and his friend Sam were walking along the road together. Andy had a big bag of marbles. Unfortunately the bottom of the bag split and all the marbles spilled out. Poor Andy!

One third (1/3) of the marbles rolled down the slope too quickly for Andy to pick them up. One sixth (1/6) of all the marbles disappeared into the rain-water drain.

Andy and Sam picked up all they could but half (1/2) of the marbles that remained nearby were picked up by other children who ran off with them. Andy counted all the marbles he and Sam had rescued.

He gave one third (1/3) of these to Sam for helping him pick them up. Andy put his remaining marbles into his pocket. There were 14 of them.

How many marbles were there in Andy’s bag before the bottom split?

What fraction of the total number that had been in the bag had he lost or given away?

This can be found in the original format at [https://nrich.maths.org/2421](https://nrich.maths.org/2421).

**Middle School Challenge Problems (From NCTM's MTMS Palette of Problems):**

Suppose that, when divided by 4, the number \( a \) has a remainder of 2 and the number \( b \) has a remainder of 3. What will be the remainder of the product \( ab \) when divided by 4?

*Solution:* 2

Your sock drawer contains 6 socks, all of which are either blue or red. Without looking, you take 2 socks out of the drawer. If your probability of drawing a pair of blue socks is 2/3, how many blue socks are in the drawer?

*Solution:* 5

How long would it take to count to 1 billion? What assumptions must you make before proceeding? Do you think it would take 1 hour? One day? Perhaps 1 week? Maybe longer?

*Solution:* About 32 years
HIGH SCHOOL CHALLENGE PROBLEMS
from Past Rhode Island Math League Meets

A store decides to increase the price on a $45 shirt by 20%. A week later they decide to double the new price of the shirt. What is the total percent increase from the original price of the shirt?

Solution: 140%

The legs of a right triangle are \((x + 8)\) inches and \((2x + 1)\) inches. If the hypotenuse is \((3x + 3)\) inches, find the numerical value of the perimeter of the triangle, in inches (as a number, NOT in terms of \(x\)).

Solution: 36

If \(x + 1/y = 3\) and \(y + 1/x = 5\) (where \(x\) and \(y\) do not equal \(0\)), compute the value of \(x/y\).

Solution: 3/5

"WHAT IS ESSA AND WHY SHOULD I CARE?"

by Susan Pagliaro

The federal legislation known as ESSA, the Every Student Succeeds Act, became law in December of 2015 and replaced No Child Left Behind (NCLB). The law gives an opportunity for us to further develop our work and our resourcing plan for Rhode Island’s Strategic Plan for PK-12 Education, completed in 2015, using ESSA as a lever to achieve our state-developed vision. While the basic testing framework of NCLB remains the same, states now have greater decision-making ability in determining policy for things like accountability, school improvement, teacher quality, academic standards, and use of federal education funds. As such, each state is required to submit an ESSA implementation plan to the United States Department of Education (USDOE). Rhode Island drafted a plan that incorporates public feedback and is currently awaiting additional feedback from Governor Raimondo before being submitted to the USDOE in September.

RIDE’s draft ESSA plan is directly linked to the 2020 Vision for Education in Rhode Island: Rhode Island’s Strategic Plan for PK-12 Education, which was developed in conjunction with stakeholder groups throughout the state. The ESSA plan was designed to ensure that every student can be supported to meet high expectations through personalized, student-centered learning. Some essential highlights of RIDE’s ESSA plan that are of note to mathematics educators are:

- Curriculum, instruction, and assessment will still be driven by the Common Core State Standards for Mathematics.
- Rhode Island has partnered with Massachusetts in creating the RICAS (Rhode Island Comprehensive Assessment System) which will be administered to students in grades 3 – 8 beginning in the spring of 2018.
- For purposes of accountability, Grade 10 students will take the PSAT TM10, and Grade 11 students will take the SAT during the School Day in the spring of 2018.
- The school accountability index will be revised to include a small number of metrics that are easily understood by communities (for example: Student Growth Index, Exceeds Expectations Indicators, and High School Graduation Rate).

As previously mentioned, RIDE will be submitting its draft ESSA plan to the USDOE in September. Once the plan has been reviewed, revised, and accepted, RIDE will develop guidance for plan implementation. Through that guidance, educators will gain a better sense of how the legislation will impact them and their practice. To view updates on RIDE’s ESSA plan, visit RIDE’s website at http://www.ride.ri.gov.
SAVE THE DATES

September 23: Waterfire Recognizing Educator Excellence
September 25: Who Wants to Be a Mathematician? qualifying ends
October 18-20: NCTM Regional Conference, Orlando, Florida
October 19: RIMTA Fall Meeting
November 2-3: 2017 ATMNE Fall Conference, Marlborough, MA
November 9: RIMTA Trivia Night
November 15-17: NCTM Innov8 Conference, Las Vegas
November 29 - December 1: NCTM Regional Conference,

Chicago, Illinois
April 2018: RIMTA Award Nominations Due
April 25-28, 2018: NCTM Annual Meeting, Washington, DC
May 17, 2018: RIMTA Spring Meeting
December 6-7, 2018: ATMNE Fall Conference, Warwick, RI