Celebrate 100 Years
Looking Back and Moving Forward

NCTM turns 100 in 2020. Join your peers in Chicago as we celebrate our 100th anniversary at NCTM’s Centennial Annual Meeting & Exposition. In addition to compelling sessions, networking opportunities, and enriching content, we’re planning some special events and surprises to mark the occasion. Connect with thousands of math education professionals in Chicago as NCTM embarks on its second century.

“The premium event of our 100th anniversary is the NCTM Centennial Annual Meeting & Exposition, which will celebrate NCTM’s rich history and promising future.”

— Robert Q. Berry III
NCTM President, 2018–2020

TOPICS

• Implement the effective teaching practices
• Experience the depth and excitement of mathematics
• Look Back and Move Forward: A Centennial View
• Create positive change
• Build student agency, foster student identity, and promote social change

Register Now!

Learn more at nctm.org/100 and follow us on #NCTM100
HOST
The Association of Teachers of Mathematics in Massachusetts

All Regional Conference presentations will be held at the Hynes Convention Center & Boston Sheraton. See pages 67–71 for floor plans.

REGISTRATION
Wednesday 4:00 p.m. – 7:00 p.m.
Thursday 7:00 a.m. – 5:00 p.m.
Friday 7:00 a.m. – 2:00 p.m.

EXHIBITS & NCTM CENTRAL
Wednesday 4:00 p.m. – 6:00 p.m.
Thursday 9:00 a.m. – 5:00 p.m.
Friday 9:00 a.m. – 2:00 p.m.

nctm.org/boston2019

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Some speakers on this program have elected to print their e-mail addresses as a means for individual correspondence with conference attendees. Unsolicited commercial e-mail or unsolicited bulk e-mail, whether or not that e-mail is commercial in nature, is expressly prohibited. Any use of e-mail addresses beyond personal correspondence is not authorized by NCTM.

National Council of Teachers of Mathematics, 1906 Association Drive, Reston, VA 20191-1502; Telephone (703) 620-9840; Fax (703) 476-2970; E-mail nctm@nctm.org; Web nctm.org

Printed in the U.S.A.
Welcome to the NCTM Regional Conference and Exposition in Boston, Massachusetts. The program committee has worked for almost two years to develop a conference experience that is both meaningful and engaging. We have presenters from across the country and around the world who will share new and innovative ideas to support our goal of advancing the teaching and learning of mathematics. As you attend sessions, workshops, and bursts, we encourage you to connect with colleagues, both new and familiar, to push each other’s thinking to learn and grow together.

Our overarching theme for this conference is increasing access to high-quality mathematical experiences for each and every student. The inspiring Erica Jordan-Thomas will kick off this theme with her opening session and help set the tone for the conference. We also included connections to this theme in the description of each of our seven strands:

- Empowering Students through Equitable Teaching and Learning
- Revolutionizing Mathematics Curriculum
- Advancing Students’ Thinking: Thoughtful and Intentional Integration of Technology
- Assessment: A Window into Student Thinking
- Self, Structural, and Systemic Change for Access and Equity
- Connecting Learning beyond the Classroom Walls
- Professionalism: Educators as Learners and Agents of Change

We invite you to keep this theme in mind throughout your time in Boston and to make it a central reflection point with your learning.

Don’t forget to check out the Exhibit Hall where you’ll find publishers, vendors, and other professionals dedicated to providing educators with the latest tools and resources to support student learning. This is also where you will find our Infinity Bar, a place to connect with some of our featured speakers to take a deeper dive into their work.

After days jam-packed with engaging sessions and deep learning, you can unwind by exploring all that Boston has to offer. It is an amazing city with award-winning restaurants, plenty of historical sights, and lots of wicked-awesome things to do in the evening. Grab some brochures and start making your evening plans. If you’re a baseball fan, the Sox have a home game on Friday night if you’re still around.

On behalf of the NCTM Board of Directors, the Program Committee, the Volunteer Committee, the NCTM staff, and the many volunteers who have worked countless hours to develop this program, we thank you for joining us and hope you have an engaging and transformative conference experience.

Mike Flynn  
Program Committee Chair  
Mount Holyoke College

Steve Yurek  
Volunteer Committee Chair  
Lesley University
The NCTM 2019 Regional Conference & Exposition officially begins on Wednesday with the Opening Session at 5:30 p.m. Presentations on Thursday and Friday begin at 8:00 a.m. and are scheduled concurrently throughout the day.

We have made every attempt to provide adequate seating for attendees. The room capacity for each presentation is listed on all meeting room signs. For your safety and due to fire regulations, only those with seats will be allowed to stay in meeting rooms.

Please remember:

• All meeting rooms will be cleared between presentations.
• All seats are available on a first-come, first-served basis.
• Reserving spaces in line or saving seats is not permitted.
• In compliance with fire codes, sitting on the floor or standing is not permitted.
• As a courtesy to the speakers and your colleagues, please silence your cell phone during all presentations.

New and Preservice Teachers Workshop

Wondering how to manage your classroom, work with parents, find engaging lessons, and handle homework—all while keeping your sanity? You’re not alone! A must for every new teacher, this interactive workshop is your chance to ask questions on topics of your choice. Plus, you will connect with other new and early-career teachers. If you are in the first five years of teaching or are seeking certification, come get resources, materials, and fun prizes to encourage you and give you insight along your journey.

Thursday and Friday, Presentations 50 and 195
9:45 a.m.–11:00 a.m.
Hynes Convention Center, 313

Overview & Orientation

Whether you’re new to NCTM or a seasoned veteran, there is something new at the conference for everyone! Hosted by members of the Board of Directors, this session will show you how to maximize your overall conference experience. Learn all the new, innovative aspects this year’s meeting is showcasing or discover something you’ve missed in the past. Find out how to navigate presentations, learn how to use the conference app, and network with other attendees.

Thursday and Friday, Presentations 2 and 147
7:15 a.m.–7:45 a.m.
Boston Sheraton, Back Bay Ballroom D

Types of Presentations

All presentations are open to all conference participants. Admission is on a first-come, first-served basis. Reserving spaces in line or saving seats is not permitted.

Sessions (60 minutes) represent a common format where the speaker relates his or her ideas to an audience. Rooms are either theater style or classroom style and vary in size.

Workshops (75 minutes) are rooms set with round tables for hands-on work.

Bursts (30 minutes) are presentations that focus on a specific topic or idea. Rooms are set with round tables. The goal is information sharing, conveyed quickly and succinctly.

Exhibitor Workshops (60 minutes) are opportunities for exhibitors to showcase their products and services away from the Exhibit Hall. Look for the symbol indicating exhibitor workshops in the program book.

Grade Bands

To help you find appropriate presentations to attend, each presentation lists the presentation’s target grade band audience:

• Pre-K–2
• Grades 3–5
• Grades 6–8
• Grades 8–10
• Grades 10–12
• Higher Education—university- and college-level issues including both two-year and four-year institutions
• Research
• Coaches/Leaders/Teacher Educators
• General Interest—issues of interest to multiple grades and audiences

ASA/NCTM Joint Committee Statistics Sessions

Statistics and data analysis play an important role in the middle and high school mathematics curriculum. The presentations in this series are designed for teachers looking to strengthen their statistics teaching practice, either by broadening their statistics content knowledge or through the use of graphical displays from the media. Presentations in the series are marked with a ⭐.
Focus Strands

EMPOWERING STUDENTS THROUGH EQUITABLE TEACHING AND LEARNING

The focus of teaching and learning is centered on empowering each and every student as sense makers and doers of mathematics as they develop their mathematical identities and become agents of their own learning. Presentations will focus on exploring equitable teaching practices to increase the potential for engaging students in meaningful mathematical experiences.

REVOLUTIONIZING MATHEMATICS CURRICULUM

Curriculum is the means to creating transformative, accessible, and authentic learning experiences for each and every student. Presentations will engage participants as critical consumers of curricula as they build connections of mathematical ideas to develop coherence across grade levels, disciplines, and contexts.

ADVANCING STUDENTS’ THINKING: THOUGHTFUL AND INTENTIONAL INTEGRATION OF TECHNOLOGY

The use of tools and technology in mathematics classrooms can be a powerful way to enhance student learning when used with intent and not just for the sake of using technology. Presentations will highlight how to advance students’ accessibility to key mathematical ideas and support the development of each and every students’ conceptual understanding through the use of mathematical tools and/or technology.

ASSESSMENT: A WINDOW INTO STUDENT THINKING

The focus of assessment should be on capturing students’ thinking so we can gauge progress toward mathematical understanding and adjust instruction to support and extend learning. Presentations will focus on assessment as the vehicle to gain insights into students’ thinking, to empower students to use feedback to continue their own learning, and as a resource for planning next steps in instruction to strategically meet the needs of each and every student.

SELF, STRUCTURAL, AND SYSTEMIC CHANGE FOR ACCESS AND EQUITY

Access and Equity in school mathematics outcomes is often conflated with equality of inputs such as providing all students the same curricular materials, the same course offerings, the same teaching methods, the same amount of instructional time, and the same school-based supports for learning. This is different, however, from ensuring that all students, regardless of background characteristics, have the same likelihood of achieving meaningful outcomes. Presentations in this strand may focus on eliminating systemic inequities and structures, developing effective accountability measures, strategies to humanize mathematics, creating access to mathematics for all students, and teaching for equity and social justice.

CONNECTING LEARNING BEYOND THE CLASSROOM WALLS

To encourage mathematical connections outside of students’ classrooms, teachers must leverage relationships with stakeholders to impact students’ families and communities. Presentations in the strand can include, but are not limited to, ways in which we broaden the mathematical community to involve families in students’ learning, ways to connect students’ home communities to their learning in school, and ways to empower each and every student to extend their learning beyond the classroom walls to make revolutionary change.

PROFESSIONALISM: EDUCATORS AS LEARNERS AND AGENTS OF CHANGE

Empowerment of educators happens when we open our doors to professional learning. Presentations in this strand will focus on strategies for developing both individual and collaborative professional learning that will empower educators to engage in improving and enhancing mathematical knowledge and pedagogy, and understanding of students’ mathematical thinking. There will be time to reflect on the development of teachers as leaders and agents of change as well as supporting a sense of collective efficacy.

Visit NCTM Central—connect with peers in the Networking Lounge, renew your membership, and shop the latest titles at the Bookstore.
Insightful Education Sessions, Dynamic Exhibits

NCTM Regional Conferences & Expositions are an opportunity to share knowledge and learn with leaders in mathematics education. Gain new strategies to unleash the mathematical mind of each and every student.

- **Improve** your knowledge and skills with high-quality professional development and hands-on activities
- **Connect** and share with peers from throughout the region
- **Collect** free activities to engage and excite your students
- **Explore** an exhibit hall packed with exciting learning and giveaways
- **Learn** from education leaders and test the latest educational resources

What you’ll walk away with:

- Innovative ideas you can immediately use
- Updates on classroom best practices from recognized innovators
- In-depth discussions about the latest education resources
- Knowledge-sharing with like-minded peers
- Interaction with the latest tools and products in the Exhibit Hall

Tips for a Rewarding Regional Conference & Exposition

- Access the conference app for program and speaker information, to connect with other attendees, and to share your feedback. Visit nctm.org/confapp.
- Get available speaker handouts at nctm.org/planBoston.
- Keep the conversations going, connect with other attendees and speakers, access and share session resources, ask questions, and more in the MyNCTM online community at my.nctm.org/Boston2019.
- If you’re experiencing the conference with your colleagues, attend different presentations and share your learnings with one another after the conference.
- Silence your cell phone during presentations.
- Be safe! Remove your name badge when you leave the conference facilities.

For Your Child’s Safety

Due to the size and professional nature of the conference, and for your child’s safety, children under the age of 16 are not permitted in the Exhibit Hall during show hours. Exceptions to this rule will be made for nursing mothers and their infants.

Information Booth

The Information Booth will be in the Hynes Convention Center. Staff can answer your questions about Boston and assist you with directions and local information, from transportation and historical sites to shopping and entertainment. In addition, you may retrieve or turn in lost-and-found items at the Information Booth. Unclaimed items will be turned over to Hynes Convention Center Security.

First-Aid Station

There will be a first-aid station at the Hynes Convention Center during the conference. If you need medical services while in Boston, please check with the hotel concierge for the closest medical facilities. For any medical emergency, call 911 without hesitation.

Presentation Handouts

Attendees can access available electronic presentation handouts through the conference app and online planner at nctm.org/planBoston. Handouts will be available for one month after the conference.

Exhibits

Make time to visit the Exhibit Hall. The hours allow ample opportunity to explore, test, and purchase resources for your classroom. You’ll also be able to meet product specialists, get fresh ideas, and watch demonstrations on how products will help you in your classroom. We’ve provided dedicated time to visit the exhibits; no presentations will take place from 12:00 p.m. to 1:00 p.m. on Thursday and Friday. Check out the map of the Exhibit Hall on page 71 and the list of exhibits on pages 72–74.

Exhibitor Workshops

Do you want more in-depth, personal interaction with exhibitors? If so, plan to attend the Exhibitor Workshops. These workshops are held on Thursday and Friday and offer a wide variety of topics. For exhibitor workshop offerings, look for presentations in this program marked with the icon or see the Program Updates.

Registration and Access to Presentations

You must wear your badge to attend all presentations and to enter the NCTM Exhibit Hall. Please be aware that the fee for a replacement badge is $10 and you will need to present a photo ID.

*By registering and attending an NCTM conference, meeting, or other activity, participants grant NCTM the right to use their likeness or voice as recorded on, or transferred to, video, social media, photographs, websites, electronic reproductions, audio files, and/or other media of such events and activities.*
General Information

NCTM App
Download NCTM's new year-round app, “NCTM Central,” which syncs with the Online Conference Planner. Whether you have an iPhone, iPad, Android, or tablet, the app is your onsite sidekick! Get the app and select your event to access these features and more.

- **Notifications**—View event alerts and up-to-the-minute information
- **Schedule**—Search sessions and speakers, create your own itinerary, download handouts, take notes, and make personal appointments
- **Timeline**—View and swap ideas, photos, and lessons with other attendees
- **Exhibitors**—Search, filter, take notes, and contact and mark exhibitors to visit
- **Directory**—Create your own profile and search for and message other attendees
- **Maps**—View floor plans and maps
- **Social Media**—Follow all the activity in the event stream

Visit [nctm.org/confapp](http://nctm.org/confapp) for more information.

Online Conference Planner
The Online Conference Planner is a great way for you to search the conference program book, set up your personal schedule, and download available presentation handouts. The Online Conference Planner is continually updated with the latest presentation changes and information. Visit [nctm.org/planBoston](http://nctm.org/planBoston) to check it out.

Wi-Fi
There will be complimentary wi-fi for NCTM Regional Conference & Exposition attendees.

Infinity Bar
Experts will be available to talk to individuals or groups of teachers about issues related to mathematics education. You will be able to sign up in advance to speak to an expert at a designated time.

Program Updates
Visit [nctm.org/Boston2019](http://nctm.org/Boston2019) for program updates including all the latest changes, cancellations, and additions. You can also follow along with the conference app to view event alerts and up-to-the-minute information.

Bookstore
View firsthand all the publications that NCTM has to offer. You will also find a variety of specialty products that you can use as gifts, prizes, and incentives to spread the word about the importance of mathematics. Start your wish list today by previewing NCTM’s wealth of resources at [nctm.org/store](http://nctm.org/store). The Bookstore is not equipped to handle shipping; the business center can assist you with your shipping needs.

**Note on sales tax exemptions:** To be considered exempt from sales tax in the NCTM Bookstore, you must provide a copy of a Massachusetts tax exemption certificate at the time of purchase. NCTM is required by law to keep a copy of the certificate; we cannot return it to you. To qualify, you must pay with a purchase order, check, or credit card from the school to which the Massachusetts exemption certificate is issued. NCTM cannot accept personal checks, personal credit cards, or cash in conjunction with tax exemption certificates. Tax exemption certificates for states other than Massachusetts are not valid for this Regional Conference.

NCTM Central
Make your meeting experience complete with a visit to NCTM Central in the Exhibit Hall during exhibit hours.

<table>
<thead>
<tr>
<th>Day</th>
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<tr>
<td>Wednesday</td>
<td>4:00 p.m.–6:00 p.m.</td>
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<tr>
<td>Thursday</td>
<td>9:00 a.m.–5:00 p.m.</td>
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<tr>
<td>Friday</td>
<td>9:00 a.m.–2:00 p.m</td>
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Learn how NCTM supports you and the field of mathematics education:

- Get free take-home activities, sample journals, and more at Member Services. Take the opportunity to update your membership information and learn about your benefits.
- Discover available funding and resources to support you in your career and professional development through the Mathematics Education Trust (MET).
- Check out Classroom Resources and learn about NCTM's collection of lesson plans, problems, and more.
- The Networking Lounge is a prime location to meet up with colleagues between presentations! Whether you want to make connections with fellow conference goers, exchange teaching tips, or catch up with friends, you’ll find a comfortable spot in the Networking Lounge. Relax and Recharge—make use of charging stations while you reflect with colleagues.
- Learn about NCTM's Professional Development offerings. Information will be available about NCTM's new Professional Learning Services and upcoming Regional Conferences and Annual Meetings.
GET SOCIAL
Stay informed and get connected with attendees by using #NCTMBoston19 on social media.

 Conference App
nctm.org/confapp

 Twitter
@NCTM

 Instagram
@NCTM.math

 Facebook
facebook.com/TeachersofMathematics

HIGHLIGHTS
Opening Session: Leading for Equity and Access, 1

REGISTRATION HOURS
4:00 p.m.–7:00 p.m.

EXHIBIT & NCTM CENTRAL HOURS
4:00 p.m.–6:00 p.m.

FIRE CODES
We have made every attempt to provide adequate seating for participants at the conference, but for your safety and because of fire regulations, only those with seats will be allowed in meeting rooms. To comply with fire codes, we will have to ask persons sitting on the floor or standing to leave the room.
Opening Session: Leading for Equity and Access
General Interest Session
The word equity is becoming a frequent term in education, but what is equity? What is an equitable education? How do we, as educators, fight for equity and ensure access for all children in our classrooms, schools, and communities? To discover the answers for our present and future, we must look to our past.

Erica Jordan-Thomas
Harvard Graduate School of Education, Cambridge, Massachusetts

Hynes Convention Center, Hynes Auditorium

Download Speaker Handouts!
View sessions in the mobile app or visit nctm.org/planboston to access available presentation handouts.
REGISTRATION HOURS
7:00 a.m.–5:00 p.m.

EXHIBIT & NCTM CENTRAL HOURS
9:00 a.m.–5:00 p.m.

FIRE CODES
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### 7:15 A.M.—7:45 A.M.

<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Description</th>
<th>Speaker(s)</th>
<th>Location</th>
</tr>
</thead>
</table>
| 2       | Regional Conference Overview & Orientation                           | General Interest Session Whether you’re new to NCTM or a seasoned veteran, there is something for you at the conference! Hosted by members of the Board of Directors, this session will show you how to maximize your overall conference experience. Learn all the new, innovative aspects this meeting is showcasing or discover something you’ve missed in the past. Find out how to navigate presentations, learn how to use the Conference App, and network with other attendees. | Jason Slowbe  
Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; Great Oak High School, Temecula, California | Boston Sheraton, Back Bay Ballroom D                                                                |

### 8:00 A.M.—9:00 A.M.

<table>
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<tr>
<th>Session</th>
<th>Title</th>
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<th>Speaker(s)</th>
<th>Location</th>
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| 3       | LT-Squared—Learning and Teaching with Learning Trajectories Tool: Support for Professional Learning | Pre-K–2 Session [LT]2 (LT-Squared), the Learning and Teaching with Learning Trajectories tool, is a research-based scalable professional development resource for trainers and teachers in diverse settings. Teachers delve deeply into understanding their children’s thinking with sequences of videos along the trajectories and use videos and pdfs of effective activities. | Douglas Clements  
Twitter: DHClements  
University of Denver, Colorado  
Julie Sarama  
University of Denver, Colorado | Boston Sheraton, Republic Ballroom AB                                                                      |
| 4       | Using Tape Diagrams to Solve Word Problems                          | Pre-K–2 Session This session will focus on using the model of a tape diagram to solve word problems. This model gives all students an entry point to solve a variety of word problem. The tape diagram supports all math operations which makes it a vital tool/model for students to have in their tool kits. | Andi Misemer  
Great Minds, Washington, D.C.                                                                 | Hynes Convention Center, 209                                                                        |
| 5       | Examining the Power of Grouping in Students’ Development of Mathematical Properties | 3–5 Session We will examine students’ development of mathematical properties through their grouping strategies within whole number and fraction multiplication and division problems. By analyzing student work and videos, we will look at the implicit, to the explicit, to purposeful use of properties within student strategies and the important role grouping plays. | Brandon McMillan  
Twitter: @Brandon__McMill  
University of California, Los Angeles | Hynes Convention Center, 312                                                                        |
| 6       | Part-Whole Relationships Provide Access to Solving Complex Word Problems Using Tape Diagrams | 3–5 Session We will explore the coherence of part/whole relationships using the tape diagram. We will learn how this model supports students in solving increasingly complex problems and to make sense of mathematics thus building confidence. Participants will gain a better understanding of how tape diagrams represent numerical relationships. | Lori Sponenburgh  
Twitter: lorispon  
Great Minds, Washington, D.C. | Hynes Convention Center, 306                                                                        |
| 7       | Engaging Activities That Emphasize the FUN in FUNctions             | 8–10 Session Participants will be provided with classroom-ready hands-on lessons using handheld technology that enables students to examine functional behavior and discover FUN ways to make sense of transformations. Emphasis will be placed on connecting multiple mathematical representations to help students develop conceptual understanding. | Thomas Beatini  
Twitter: @BeatiniTom  
Union City Board of Education, New Jersey | Hynes Convention Center, 311                                                                        |
8:00 A.M.–9:00 A.M.

8 A&E
Our Algebra 1 Gradebooks Hold the Key to Equity & Access: Assessing Proficiency without Percentages
8–10 Session
Grading policies are overlooked as a leading cause of inequity because the ways they disadvantage students are unintentional and hard to detect. Learn principles for creating assessment systems that set high standards and empower all students to reach them. Hear how teachers developed new practices that improved achievement and differentiation.
Tim Hudson
Twitter: @DocHudsonMath
DreamBox Learning, Bellevue, Washington

Hynes Convention Center, 204

9 ★
ASA: Beyond AP Statistics 1: Multiple Regression
10–12 Session
This Beyond AP Statistics (BAPS) workshop is for AP Statistics teachers and consists of enrichment material just beyond the AP syllabus. This session will introduce multiple regression models that incorporate more than one predictor variables as an extension of the regression methods that are a part of the AP Statistics course.
Roxy Peck
Cal Poly, San Luis Obispo, California
Allan Rossman
Cal Poly, San Luis Obispo, California

Hynes Convention Center, 304

10 TECH
Cold, Warmer, HOT: A Dynamic Digital Lesson Strategy for Precalculus and Calculus
10–12 Session
Graphs programmed with adaptive “Cold, Warmer, HOT” hints allow students to play hide-and-seek in precalculus and calculus. These dynamic interactive graphs, created with Desmos, purposefully guide students as they visualize mathematical ideas and develop conceptual understanding. Stop by to experience them yourself—you’re getting warmer!
Dave Cesa
Twitter: @davecesa
Charlotte Latin School, North Carolina

Boston Sheraton, Back Bay Ballroom BC

11 REVOL
The Status Quo in High School Mathematics Is Unacceptable
10–12 Session
Hundreds of thousands of students fail higher education math courses every year and many more students pass courses that do not prepare them for their future. NCTM and the Mathematical Association of America (MAA) call the status quo in mathematics as unacceptable and that significant changes are needed to high school mathematics. This session will discuss such necessary changes.
Eric Milou
Twitter: @drMi
Rowan University, Glassboro, New Jersey

Hynes Convention Center, Ballroom B

12 A&E
Changing the Narrative by Shifting Data Discussions
General Interest Session
How might we shift practices of static deficit labeling of students and schools to develop a culture that cultivates a positive mathematics identity and affect in students as doers of mathematics? During the session, participants will engage in conversations about the use of data and strategies to shift the conversations.
John Staley
Twitter: @jstaley06
Baltimore County Public Schools, Towson, Maryland

Hynes Convention Center, Ballroom A

13 A&E
Maximizing Learning Opportunities to Awaken the Potential in Each and Every Learner
General Interest Session
Every learner has potential! It is through their experiences that their potential is realized and fueled. Maximizing learning opportunities in mathematics class is key to engaging each and every learner. Come hear a teacher’s journey to make use of mathematics teaching practices that not only engage, but also empower and emancipate ALL learners.
Tashana Howse
Twitter: @thowse_math
Georgia Gwinnett College, Atlanta

Hynes Convention Center, Ballroom C

Shop and save at the NCTM Bookstore in NCTM Central!
8:00 A.M.—9:00 A.M.

**14 TECH**

**Using Technology to Support Grade-Level Instruction**

General Interest Session

Technology offers the opportunity to support student learning by providing on-ramps to grade-level content, personalized and adaptive remediation support, and precise feedback at the moment of misconception. This session will explore specific ways technology can help all students learn—and love—grade-level mathematics.

**Shalinee Sharma**
Twitter: @Shalinee_Sharma
Zearn, New York, New York

**Stephanie Ely**
Zearn, Whitefish Bay, Wisconsin

*Hynes Convention Center, 302*

14.1 **CW**

**Bridges Intervention: Delivering Clear and Systematic Instruction**

3–5 Exhibitor Workshop

Searching for an effective K–5 intervention resource with built-in assessments and frequent progress monitoring? Discover how Bridges Intervention uses the power of visual models to reach struggling students. Organized by content rather than grade, each session includes warm-ups, lessons, and practice pages focused on key standards.

**The Math Learning Center**
Salem, Oregon

*Hynes Convention Center, 201*

8:00 A.M.—9:15 A.M.

**15 REVOL**

**Using a Conceptual Approach to Build Addition and Subtraction Fact Fluency with Understanding!**

Pre-K–2 Workshop

Fluency is more than memorization of isolated basic facts. Students need to see connections between facts. They need visual models to help form a “mind picture” that connects to a thinking strategy. This session will utilise easy-to-make visual aids and games that help students master the basic addition and subtraction facts—with understanding!

**James Burnett**
Twitter: @jamesburnett69
ORIGO Education, Brendale, Queensland, Australia

*Hynes Convention Center, 206*

16 **EMPOW**

**When My 2 + 3 Isn’t the Same as Your 2 + 3**

Pre-K–2 Workshop

“I don’t get what they want me to do!” is a refrain we often hear from students about word problems. Many times they don’t know which operation to choose when making sense of a problem. Learn to recognize features of different problem situations and practical strategies to support students as they make sense of the different categories.

**Sara Delano Moore**
Twitter: @saradelanomoore
ORIGO Education, Kent, Ohio

**Kimberly Morrow Leong**
George Mason University, Fairfax, Virginia

**Linda Gojak**
Past President, National Council of Teachers of Mathematics, Reston, Virginia; ORIGO Education, Kent, Ohio; George Mason University, Fairfax, Virginia

*Hynes Convention Center, 310*

17 **EMPOW**

**Launch, Facilitate, and Close Your Lessons: A Blueprint for Success in Your Mathematics Classroom**

3–5 Workshop

Are you looking for techniques to actively engage your students in mathematical thinking and reasoning at every phase of your lesson? This session will provide strategic lesson launch, facilitation, and closure strategies that can be applied to a variety of mathematics topics and curriculum to build success for each and every student.

**Beth Kobett**
Twitter: @bkobett
Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; Stevenson University, Baltimore, Maryland

*Hynes Convention Center, 200*

18 **EMPOW**

**Use of Rangolee Art in Elementary Mathematics Education**

3–5 Workshop

In this workshop, participants will be introduced to worksheets based on folk art called rangolee from India. Using household materials such as thread, beans, pocket mirror; they will get hands-on experience of learning concepts of math facts such as addition, multiplication, fractions, geometry, reflective and rotational symmetry, and graphing.

**Madhuri Bapat**
Retired, Thatcher, Arizona

*Boston Sheraton, Back Bay Ballroom A*
8:00 A.M.—9:15 A.M.

19  **REVOL**

**A Number-Line Journey through Middle School:**
Tracing Concepts through an Open-Source Curriculum

6–8 Workshop
Number lines are a powerful tool to develop conceptual understanding and number sense: ratios, percentages, operations and inequalities with rational numbers, scientific notation, decimals, and connections to the coordinate plane. We explore examples from the Illustrative Math open education resource curriculum to trace a coherent story for grades 6 to 8.

**Katherine Morris**
Sonoma State University (retired), Rohnert Park, California

**Brigitte Lahme**
Sonoma State University, Rohnert Park, California

_Hynes Convention Center, 313_

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20  **EMPOW**

**Graphical Representations Make Abstract Concepts Understandable**

6–8 Workshop
Graph paper will be used to model how to determine square roots, represent ratios, find equivalent ratios, find equivalent percents for a given ratio, operate on fractions, and make and use tape diagrams to solve rigorous, nonroutine problems involving comparisons.

**Anne Collins**
Twitter: @DramC
Retired, Plymouth, Massachusetts

**Tracy Poulin**
Easthampton Public Schools, Massachusetts

_Hynes Convention Center, 207_

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21  **BEYOND**

**Learning Mathematics beyond the Classroom Walls through a Math Walk**

8–10 Workshop
Imagine if students went out for a walk to make measurements, to collect data, to observe how things change, and to notice the little things that we miss all the time. Imagine a world where students do not wonder why they are studying mathematics—they know because they have seen where mathematics lives beyond the classroom walls.

**Ron Lancaster**
University of Toronto, Ontario, Canada

_Hynes Convention Center, 210_

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22  **EMPOW**

**Math Mindfulness: Easing Math Anxiety and Developing Mathematical Fluidity**

8–10 Workshop
Use mindfulness to ease your students’ math anxiety and enable them to uncover their mathematical potential. Consider how to get all of your students to embrace a growth mindset and to believe they have the capacity to be great mathematicians. Learn to model a calm and open approach that invites curiosity while nurturing confidence.

**Nina Otterson**
Twitter: nseaotter
Deerfield Academy, Massachusetts

_Hynes Convention Center, 208_

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23  **ASSESS**

**Creating and Using a Field Guide for Learning Mathematics**

10–12 Workshop
Construction of a field guide of mathematics is a powerful process for constructing, organizing, and assessing learning. Varying content, organization, grading rubric, and independence can shape learning while superseding grade and ability differences. The metacognitive process is emphasized and illustrated, with examples from various grade bands.

**Mary Martin**
Middle Tennessee State University, Murfreesboro

**Tammy Jones**
TLJ Consulting Group, Lebanon, Tennessee

_Hynes Convention Center, 203_

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24  **REVOL**

**What Does It Mean to Be Quadratic?**

10–12 Workshop
Engage in rich tasks that surface key concepts about what it means for a function to be quadratic. The low-threshold and high-ceiling tasks shared promote access and equity through the use of multiple representations. Student work and classroom video will illustrate the nature of student engagement and learning task-based learning progressions.

**Travis Lemon**
Twitter: @TravisLemon
Mathematics Vision Project, Lehi, Utah

_Boston Sheraton, Back Bay Ballroom D_
8:00 A.M.–9:15 A.M.

25  REVOL
Arts Integrated Curriculum Design Intro
Coaches/Leaders/Teacher Educators Workshop
Arts Integrated Curriculum Design Workshops will provide a foundation of understanding regarding this approach to teaching and learning. Participants will leave equipped to analyze and evaluate current curriculum practices and changes to increase opportunities for creative thinking, rigor, growth mindset, and deeper understanding of content standards.

Heather Dean
Twitter: @hvonesiaedean
Creative Across the Curriculum, LLC, Madison, Wisconsin

Hynes Convention Center, 202

9:30 A.M.–10:30 A.M.

27  ASSESS
Just-Right Games: Developing Fluency for All Learners
Pre-K–2 Session
If we are to meet the needs of all learners, differentiation is essential. An enduring question is this: If I pull a small group of students, what is everyone else doing, and how do I manage their learning behaviors? In this session, we will share specific structures we have developed to help teachers differentiate student learning and maintain sanity.

Jennifer Costanzo
Metamorphosis Teaching Learning Communities, New York, New York
Antonia Cameron
Metamorphosis Teaching Learning Communities, New York, New York

Hynes Convention Center, 204
9:30 A.M.—10:30 A.M.

29  EMPOW
Using “Stuck Points” to Build Productive Dispositions in Young Learners
Pre-K–2 Session
How do young students feel when they get “stuck” in math? Do they still see themselves as authors of mathematics when they encounter challenges? With the support of classroom video footage, participants will learn strategies for empowering young learners to see “stuck points” as an opportunity for celebration and learning.
Annie Roesler
Curriculum Associates, Allston, Massachusetts
Boston Sheraton, Republic Ballroom AB

30  A&E
Building a Comprehensive, Coherent OER Curriculum K–12
3–5 Session
Illustrative Mathematics is building a comprehensive, coherent K–12 curriculum that will be an Open Educational Resource (OER) and freely available under an open license. The curriculum for 6–8 was released in 2017, high school in 2019, and K–5 will be released in 2021. We describe building the curriculum in a collaborative and iterative process involving educators and mathematicians.
William McCallum
Twitter: @wgmccallum
Illustrative Mathematics, Tucson, Arizona
Hynes Convention Center, Ballroom B

31  REVOL
Customizing Math Lessons for Students with Multigrade Learning Gaps in Grades 6–8
6–8 Session
Are you a special ed teacher using Eureka Math with a group of students who are multiple grade levels behind? Attend this session to experience an innovative lesson plan design to help these students access grade level work. We will begin by identifying a target problem and use a planning strategy to help students achieve grade-level success.
Jana Stockstill
Great Minds, Washington, D.C.
Hynes Convention Center, 209

32  A&E
Infuse Social Justice into Algebra using PBL: Empower Students as They Learn and Apply Math Concepts
8–10 Session
Good projects combine 21st-century skills and rich mathematics, but they can also explore ideas of social justice. Learn how to explore history, inequality, and current events while kids make mathematical models, think critically, and develop mathematical practices. Bring your ideas and we’ll start creating new projects that will serve your population.
Carl Oliver
Twitter: @carloyiwitter
City-As-School, Brooklyn, New York
Hynes Convention Center, Ballroom A

33  ASA
ASA: Beyond AP Statistics 2: Bootstrap Confidence Intervals
10–12 Session
This Beyond AP Statistics (BAPS) workshop is for AP Statistics teachers and consists of enrichment material just beyond the AP syllabus. Bootstrap confidence intervals are an alternative to confidence intervals covered in the AP course. Bootstrap intervals can be used when the conditions for the traditional confidence intervals are not met.
Robin Lock
St. Lawrence University, Canton, New York
Patti Lock
St. Lawrence University, Canton, New York
Hynes Convention Center, 304

34  TECH
Now That You Flipped Your Class, What Comes Next?
10–12 Session
Making videos and taping lectures is the easy part. What comes next is where the real learning occurs. In this session, we will discuss how to maximize the potential of the flipped classroom model. Activities for a wide range of classes (including calculus, AP Statistics, precalculus, and algebra 2) will be shared.
Joel Evans
Twitter: @joelevanshhhs
Hatboro Horsham High School, Pennsylvania
Hynes Convention Center, 302

Membership questions? We’ve got answers! Visit Member Services in NCTM Central.
9:30 A.M.—10:30 A.M.

35 PRO Reflecting on Questioning Practices to Understand and Promote Student Thinking about Functions
10–12 Session
Questioning provides teachers opportunities to understand and advance student thinking. In this session, we will reflect on and analyze different types of questions and collaboratively engage in writing questions that promote student thinking during whole class and small group discussion of tasks related to functions.
Jessica Nuzzi
Montclair State University, New Jersey
Madhavi Vishnubhotla
Montclair State University, New Jersey
Eileen Murray
Montclair State University, New Jersey
Hynes Convention Center, 306

36 EMPOW Up for Debate! Empowering Students through Argumentation in Math Class
10–12 Session
Imagine: Debate, often a staple of the humanities classroom, as an integral part of your math class! Come learn and experience ideas for creating a healthy math-debating and discussion-centered classroom that will empower and engage students of all levels. Let’s get our students constructing viable arguments and standing up to debate!
Chris Luzniak
Twitter: @cluzniak
The Archer School, Los Angeles, California
Hynes Convention Center, Ballroom C

37 EMPOW We’re All Language Learners: Advancing Academic Language Levels through the Learning Cycle
10–12 Session
Learn to support the use of academic language by understanding language levels and how they advance through a learning cycle. Experience how academic vocabulary is built, formalized, and reinforced through a sequence of mathematical tasks that engage students mathematically and capitalize on their previous experiences.
Barbara Kuehl
Twitter: @barbarakuehl
Mathematics Vision Project | MVP, Salt Lake City, Utah
Hynes Convention Center, 311

38 BEYOND Math & the World: Integrating Classical, Critical, & Community Knowledge in Authentic Investigations
General Interest Session
Explore investigations that develop deep mathematics understandings as students see mathematics’ role in their lives and community practices and as a tool to understand, critique, and take action regarding sociopolitical issues in our world. Experience authentic investigations developed with students and families; leave with tools to guide your work.
Cathery Yeh
Twitter: @YehCathery
Chapman University, Orange, California
Mark Ellis
California State University, Fullerton
Hynes Convention Center, 312

38.1 EW Making Principles to Actions Come Alive with CPM Mathematics
8–10 Exhibitor Workshop
Looking for ideas to incorporate NCTM’s eight teaching practices? Let CPM show you! Our nonprofit provides rich mathematics curriculum that is student-centered and problem-based, encouraging thinking, persevering, and sense making with complimentary PD for teachers. Experience the excitement students do, exploring CPM’s grades 6–12 curriculum.
CPM Educational Program
Elk Grove, California
Hynes Convention Center, 305

38.2 EW Leave the Math, Change the Language
3–5 Exhibitor Workshop
Access is everything. Learn ways to invite every student to the table with language strategies that lower the barrier to access. Experience these strategies based on research from NCTM and the Council of the Great City Schools ELL framework. Take tools back to your classroom that provide equity and access for all learners.
Pearson K–12 Learning
Boston, Massachusetts
Hynes Convention Center, 201
9:45 A.M.–11:00 A.M.

39  EMPOW  
**Number Sense Routines to Build Fluency for All Students**  
**Pre-K–2 Workshop**  
Make the most of every minute with number sense and visualization routines that lead students to deeper conceptual understanding of adding and subtracting to build fluency. After working with students who struggle to become fluent with adding and subtracting, we have compiled an arsenal of number-sense routines that help all students reach success.  
Jessica Scandurra  
Twitter: @jess_scandurra  
Eli Whitney School, Stratford, Connecticut  
Lana Quincy  
Nichols School, Stratford, Connecticut

**Hynes Convention Center, 206**

40  EMPOW  
**Powerful Mathematicians: Building Math Fluency with Metacognition**  
**Pre-K–2 Workshop**  
Are you interested in leading young students to be powerful mathematicians? Have you wondered how to support students to make their thinking visible? Then this workshop is for you! Together we will delve into the partnership of metacognition and math fluency to develop a plan of action for you to take back to the classroom!  
Jennifer Wheeler  
Conway Grammar School, Massachusetts

**Hynes Convention Center, 309**

41  EMPOW  
**Beyond Differentiated Math Instruction: Tackling the Tiers of MTSS**  
**3–5 Workshop**  
So many tiers, so little time! Come learn the differences between tiers in Multi-Tiered Systems of Support (MTSS) and how to help your students move forward in math by meeting them where they’re at. We will examine the differences between Tiers 1, 2, and 3; consider instructional methods and resources needed for each; and work through a case study together.  
Melinda Griffin  
American Institutes for Research, Washington, D.C.  
Jenna Richard  
American Institutes for Research, Washington, D.C.  
Teri Marx  
American Institutes for Research, Washington, D.C.

**Hynes Convention Center, 207**

42  A&E  
**Ready-to-Use Strategies to Support English Language Learners in the Math Classroom**  
**3–5 Workshop**  
Often the barrier to attaining mathematical skills for students is language, yet mathematics teachers are rarely trained in the foundations of teaching it. By utilizing some simple techniques in our classrooms, we can begin to increase students’ understanding of complex problems, language used in explaining their thinking, and peer interaction.  
Silvia Aparicio  
Arizona State University, Tempe  
Wendy Farr  
Arizona State University, Tempe

**Hynes Convention Center, 202**

43  EMPOW  
**Developing Number Sense and Reasoning One Day at a Time in Grades 3–8**  
**6–8 Workshop**  
Developing reasoning and number sense is essential to our students’ long-term success, and this is something we can develop daily. This session spotlights brief, rich, and engaging activities that develop mental mathematics and reasoning. This session will provide a collection of practical, ready-to-implement routines that can be modified for grades 3-8.  
John SanGiovanni  
Twitter: @JohnSanGiovanni  
Howard County Public School System, Westminster, Maryland

**Hynes Convention Center, 200**

44  EMPOW  
**Moving beyond Think-Pair-Share: Routines for Mathematical Discourse**  
**6–8 Workshop**  
How might we build shared understanding of mathematical ideas by facilitating meaningful mathematical discourse? How might different discussion routines elicit different types of mathematical reasoning, justification, and analysis? Explore a host of routines for making student thinking visible while creating a classroom culture of discourse.  
B. Michelle Rinehart  
Twitter: @HowWeTeach  
Region 18 Education Service Center, Fort Davis, Texas

**Boston Sheraton, Back Bay Ballroom A**
9:45 A.M.—11:00 A.M.

45 **EMPOW**
**Creating Collaborative Classrooms: Engaging Students in Meaningful Learning of Mathematics**

8–10 Workshop

Learn strategies to promote mathematical discourse in your math classes by experiencing the excitement of engaging in worthwhile mathematical tasks with others. Teachers will learn how to adjust their lessons to maximize student engagement and math discourse in middle and high school math classes.

Lisa Jasumback
CPM Educational Program, Salt Lake City, Utah

**Hynes Convention Center, 203**

47 **REVOL**
**Field Trips to Nowhere: Driving Home Calculus Concepts for All Learners through Inquiry**

10–12 Workshop

Get on the bus! Time to take a journey through the big “a-ha!” moments in calculus. Come learn how a field trip to nowhere (yes, a field trip!) can jump-start your AB, BC, or non-AP calculus course from day 1, and a simple question about polynomial derivatives can keep momentum going. First stop: FTC. Second stop: sequences and series. All aboard!

Brian Abend
Twitter: @mrabend
Bancroft School, Worcester, Massachusetts

**Hynes Convention Center, 208**

48 **TECH**
**Integrate Problem Solving, Technology, and Math Modeling Using Data Involving Important Social Issues**

10–12 Workshop

Challenge your students to solve rigorous, relevant math problems that create social awareness. Climate change, opioid deaths, payday loans, gerrymandering, hot car temp deaths—all provide excellent data that can be modeled and interpreted mathematically. Learn how to implement these activities into your classroom for grades 8–12. Get ALL materials.

Tom Reardon
Twitter: @tomreardon3
Fitch High School / Youngstown State University, Poland, Ohio

**Hynes Convention Center, 210**

49 **PRO**
**Teacher Leaders as Agents of Change: Working District-Wide in the Boston Public Schools**

Coaches/Leaders/Teacher Educators Workshop

What structures and strategies support district-wide efforts to strengthen math teaching and learning? We share aspects of our BPS Math Office collaboration with K–12 math teacher leaders on equitable math teaching practices and discuss how this leadership work is carried into schools across the district, including success and challenges.

Linda Davenport
Twitter: @LindaD_BPSMath
Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; Boston Public Schools, Massachusetts

Connie Henry
Boston Public Schools, Massachusetts

Peter Thorlichen
Boston Public Schools, Massachusetts

**Boston Sheraton, Back Bay Ballroom D**

50 **NEW**
**New and Preservice Teachers Workshop**

General Interest Workshop

Find answers to your questions on topics such as classroom management, parents, motivation, and keeping your sanity. Connect with other new teachers, learn from experienced professionals, and find resources to engage you and your students. You might even win a prize!

David Barnes
National Council of Teachers of Mathematics, Reston, Virginia

**Hynes Convention Center, 213**

50.1 **EMPOW**
**Innovation, Design Thinking & Cultural Competency: Leveraging Math & Science Classrooms**

8–10 Workshop

In our work to be excellent teachers, we need to acknowledge that we cannot nurture if we do not understand the individual nature of our students. This workshop will address how to help students understand their own identities in order to understand how and why they perceive things the way they do.

Chandra K. Smith
Princeton Day School, New Jersey

**Hynes Convention Center, 210**
11:00 A.M.–12:00 P.M.

51 **ASSESS**
Fundamental Numeracy Skills: Assessment and Intervention
Pre-K–2 Session
What are the fundamental numeracy skills young students need to be successful mathematicians? How can we assess for these skills? What interventions can we do to help students with these skills? Learn how to use a quick and effective assessment that pinpoints these skills, as well as a variety of activities that support them.
Victoria Cohen
Mt. Blue Regional School District, Farmington, Maine
Hynes Convention Center, 311

52 **EMPOW**
Let the Students Do the Thinking! How to Empower Students to Own Their Own Learning of Mathematics
Pre-K–2 Session
Learn manageable practices and strategies to empower young students to think, talk, and take ownership of their mathematics learning by using strategies that actively and authentically engage students in problem solving.
Michele Jordan
Curriculum Associates, Daphne, Alabama
Hynes Convention Center, 302

53 **EMPOW**
Math Buddies: Effective Peer Tutoring
Pre-K–2 Session
Peer tutoring has the potential to accelerate student achievement (Hattie effect size = .53). How do we orchestrate meaningful interactions among peers? Come learn how we implemented peer tutoring between two different grades for weekly math lessons that we call “Math Buddies.”
Alisha Demchak
Twitter: @BMEDemchak
Charlottesville City Schools, Virginia
Kateri Thunder
Charlottesville City Schools, Virginia
Hynes Convention Center, 204

54 **EMPOW**
Deepening Math Understanding: Discourse Moves to Engage All Students in Collaborative Sense Making
3–5 Session
Deep understanding happens when students share their thinking, not just the answer and the steps they took. Learn an instructional routine that leverages deliberate discourse moves to ensure each and every student is talking together to make sense of important mathematics.
Grace Kelemanik
Twitter: @GraceKelemanik
Fostering Math Practices, Natick, Massachusetts
Amy Lucenta
Fostering Math Practices, Natick, Massachusetts
Boston Sheraton, Republic Ballroom AB

55 **EMPOW**
Empowering Students as Mathematical Sense Makers through Teacher Questioning
3–5 Session
This session explores how teachers can use questioning to empower students as math learners and support engagement in the SMP. We will explore research findings and examine classroom examples that illustrate how specific types of questions can support math discussions in which all students have opportunities to reason, justify, and generalize.
Annie Sussman
TERC, Cambridge, Massachusetts
Hynes Convention Center, 306

56 **EMPOW**
Japanese Math Notebooking: A Vehicle to Link Problem Solving, the 5 Practices, and Accountable Talk
3–5 Session
How are educators supposed to balance creating a problem-based classroom, using the 5 Practices, and provide opportunities for Accountable Talk? See how Japanese Math Notebooking allows for teachers to provide accessible activities and problems (Japanese: Hatsumon) that engage ALL students (Japanese: Kikan Jyunshi) within understandable contexts.
Kevin Davis
Twitter: mr_davis_math
OCM BOCES, Syracuse, New York
Boston Sheraton, Back Bay Ballroom BC
11:00 A.M.–12:00 P.M.

57 **ASSESS**

Rethinking Pre-Assessments: Gathering Data with Equity in Mind
3–5 Session

All students are capable of mathematical thinking, but traditional pre-assessments usually focus on what students don’t know. Let’s examine our practices through an equity lens. Together, we will explore formative pre-assessment strategies that honor student thinking, support instructional decision making, and promote equity.

Jenna Laib
Twitter: jennalaib
Brookline Public Schools, Massachusetts

Hynes Convention Center, 209

58 **REVOL**

Step into STEAM: Creating Mathematics-Rich STEAM Learning Opportunities for Each and Every Student
3–5 Session

Join this session and step into the STEAM conversation! We will focus on practical strategies for engaging students in meaningful mathematics (and science) content and practices through authentic STEAM inquiries focused on Equity, Empathy, and Experience. You will leave with concrete ways to plan next steps in STEAM for your classroom or school!

Sarah Bush
Twitter: @sarahbbush
Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; University of Central Florida, Orlando

Hynes Convention Center, 312

59 **REVOL**

Make Symbols Meaningful: How the IM Curriculum Structure Helps Students Learn Mathematical Language
8–10 Session

Do your students ask, “Why is the alphabet in math?” An incomplete understanding of the meaning of mathematical symbols, such as variables and function notation, hinders educational progress and the enjoyment of math. We will show how the structure of activities in the IM curriculum supports students across grades 6–11 in making symbols meaningful.

Melissa Schumacher
Twitter: @MoreMathPlz
Illustrative Mathematics, Tacoma, Washington

Tina Cardone
Illustrative Mathematics, Salem, Massachusetts

Hynes Convention Center, Ballroom C

60 **REVOL**

ASA: What’s Going On in This Graph?: Free, Weekly Online Discussion of *New York Times* Graphs
10–12 Session

Build “graph” literacy in grades 7-12 in math, science, and humanities with free, weekly online “What’s Going On in this Graph?” The *New York Times*, in partnership with ASA, offers a timely graph and asks, “What do you notice?” “What do you wonder?” and “What’s up?” Students reply online and teachers moderate. Stat Nuggets explain statistics.

Sharon Hessney
American Statistical Association/New York Times, Boston, Massachusetts

Hynes Convention Center, 304

61 **REVOL**

Rethinking High School Pathways through Algebra and Function
10–12 Session

NCTM’s *Catalyzing Change* calls for shifts in the high school curriculum. What algebra/function content is essential for all students in their journey through mathematics, no matter their intended goals? How do we build a coherent pathway through this content for all students? And what is the role of technology in achieving this vision?

Gail Burrill
Past President, National Council of Teachers of Mathematics, Reston, Virginia; Michigan State University, East Lansing

Hynes Convention Center, Ballroom A

62 **REVOL**

President’s Address: Catalyzing Change: Initiating Critical Conversations in Mathematics Teaching and Learning
General Interest Session

The National Council of Teachers of Mathematics formed three writing teams at the early childhood/elementary, middle school, and high school levels with the intent to initiate the critical conversations needed to address issues in school mathematics. The *Catalyzing Change* series focuses on recommendations in school mathematics with the purpose of initiating critical conversations for improving mathematics teaching and learning in school mathematics. This talk is intended to initiate critical conversations based on the key recommendations from the *Catalyzing Change* series.

Robert Berry, III
President, National Council of Teachers of Mathematics, Reston, Virginia; University of Virginia, Charlottesville

Hynes Convention Center, Ballroom B
11:30 A.M.–12:00 P.M.

63 **A&E**

**Reading Racial Diversity: the Why and Where of Math Picture Books Starring Characters of Color**

**Pre-K–2 Burst**

Family story time can naturally be math time, when paired with the right books. We will present research on three elements critical for math learning through picture books at home: main characters that reflect U.S. diversity, deep mathematical themes, and emotionally resonant stories. List of family-favorite books rich in math, story, and diversity will be provided.

Marlene Kliman  
TERC, Cambridge, Massachusetts

Alyssa Pusey  
Charlesbridge Publishing, Watertown, Massachusetts

_Hynes Convention Center, 313_

64 **EMPOW**

**Same BUT Different: A Language-Based Routine to Promote Equity in the Math Classroom**

**Pre-K–2 Burst**

Participants in this session will unpack a powerful classroom routine that fosters student equity and agency as they explore contrasting images of similar concepts. The routine Same But Different helps students to develop a network of connected ideas and an understanding of grayscale thinking. A resource for immediate use will be provided.

Susan Looney  
Twitter: @looneymath  
Looney Math Consulting, North Easton, Massachusetts

Heather Johnson  
Looney Math Consulting, North Easton, Massachusetts

_Hynes Convention Center, 309_

65 **REVOL**

**Fractions: From Misunderstanding to Deep Understanding**

**3–5 Burst**

Did you know that using a limited number of visual models for fractions hinders students’ abilities to internalize and generalize fraction concepts? Explore four different representations of fractions and why each is so critical. Learn how different types of models provide different perceptual features and therefore serve different purposes.

Debi DePaul  
Twitter: debi_depaul  
ORIGO Education, Gig Harbor, Washington  
_Boston Sheraton, Back Bay Ballroom D_

66 **REVOL**

**Exploring Functions through a Card-Sorting Puzzle in Grades 5-8**

**6–8 Burst**

We share a card-sorting puzzle task where students connect function representations (tables, graphs, natural language, and algebraic equations) with minimal instruction or prior experience. Video from a fifth-grade implementation shows how students approached the task and their conjectures about algebraic notation.

Katharine Sawrey  
Worcester Polytechnic Institute, Massachusetts

_Hynes Convention Center, 208_

67 **BEYOND**

**Rich Tasks That Connect to a Student’s Real World**

**6–8 Burst**

Explore rich tasks designed to engage students in fostering their interest, developing persistence, and encouraging creativity and connected to a student’s real world. In this session, you will receive a packet of several rich tasks and will learn from our experience working with middle school students over the past ten years.

Hoyun Cho  
Capital University, Columbus, Ohio

Gary Lawrence  
Mustard Seed School, Hoboken, New Jersey

_Hynes Convention Center, 206_

Make the most of your membership by downloading NCTM Central, the new NCTM app! Learn more at nctm.org/confapp.
11:30 A.M.–12:00 P.M.

68  A&E  
Algebra I in Middle School?
8–10 Burst
Are your students taking algebra I in middle school? Does it count as one year of high school math? Will it put students on track for calculus or will students end math after tenth grade? We will share about this increasingly popular phenomenon and explore ideas and tools to maximize learning for middle schoolers.
Robin Schwartz
Twitter: mathconfidence
College of Mount Saint Vincent / Math Confidence, Bronx, New York

Hynes Convention Center, 207

69  TECH  
Connecting Trigonometry and Geometry
10–12 Burst
The development of a Unit Circle will lead to an understanding of why geometric terminology has been extended to trigonometry. Terms such as cosine, secant, and tangent are typical trig terms that are rooted in geometry. We’ll begin with paper folding and conclude with TI-Nspire CX demonstration as we make the connections that mystify students.
John Ashurst
Twitter: kiltedcyclist
Harlan Independent Schools (Retired), Baxter, Kentucky
Lindsay Gold
University of Dayton, Ohio

Hynes Convention Center, 202

70  A&E  
Catalyzing Change! How Integrated Mathematics Makes THE Difference
Coaches/Leaders/Teacher Educators Burst
Presentation will include a model of how standards are addressed in the Traditional Pathway, the Integrated Pathway, and the Adapted Pathway in Catalyzing Change. Participants will also see how the standards flow from grades 6–11 in each of the options. Data from Integrated states (such as Utah and North Carolina) and districts will be shared, plus a Q&A segment.
Joleigh Honey
Twitter: @joleighhoney
Utah State Board of Education, Sandy

Hynes Convention Center, 210

71  REVOL  
Redesign and Reimagine Developmental Mathematics
Coaches/Leaders/Teacher Educators Burst
Northampton is at the end of a four-year re-creation of their developmental mathematics program. Come to learn about our struggles, challenges, and successes as we redesigned how math is taught, and work with our high schools to reimagine how students come to college. Data from our study on student success and persistence will also be shared.
Celisa Counterman
Northampton Community College, Bethlehem, Pennsylvania
Hynes Convention Center, 200

72  A&E  
Self, Structural, and Systemic Change for Access and Equity for Emergent Bilinguals
General Interest Burst
Despite the burgeoning population of ELLs, they are not doing well in our schools. Maybe it is time we start changing our practices. For a start, the name is not even equitable.
Come learn equitable practices for engaging emergent bilinguals (ELLS) in mathematics.
James Ewing
Twitter: @EwingLearning
Stephen F. Austin State University, Nacogdoches, Texas

Hynes Convention Center, 310

73  BEYOND  
Using a Carnival to Bring Art, Math, and Technology to the Community
General Interest Burst
Find out how workshops and a carnival allow students to not only create games to demonstrate their favorite math concepts to the community, but also to share learning outcomes with friends and family. Through their invention of these games which incorporate math, technology and art, students can showcase and exhibit their content understanding.
R Kevin Maxwell
Penn State Fayette, The Eberly Campus, Lemont Furnace, Pennsylvania
Nicole Hill
Penn State Fayette, The Eberly Campus, Lemont Furnace, Pennsylvania
Nathaniel Bohna
Penn State Fayette, The Eberly Campus, Lemont Furnace, Pennsylvania

Hynes Convention Center, 203
11:30 A.M.–12:00 P.M.

74 **EMPOW**

**Statistical Education Discovery Projects: Engage Students with Real-World Investigations**

Higher Education Burst

Ignite students’ interest with real-world statistical investigations. For educators who wish to have students model the way statisticians work, this presentation will discuss discovery projects that include making predictions, data collection, descriptive and inferential statistical analysis, and strategies to support collaborative learning.

Marla Sole
Guttman Community College, City University of New York, New York

*Boston Sheraton, Back Bay Ballroom A*

1:00 P.M.–2:00 P.M.

75 **PRO**

**Planning with Learning Progressions in Mind**

Pre-K–2 Session

Many times, educators begin teaching a math lesson with very little knowledge of what came before and where students are headed. To overcome this, educators need tools to guide their own learning in order to foster math connections, build on student’s prior knowledge and foster conceptual understanding. Let’s explore K–2 learning progressions.

Megan Robinson
Curriculum Associates, Culver City, California

*Hynes Convention Center, 204*

76 **EMPOW**

**Arrays, Properties, and Practices**

3–5 Session

The major clusters of the standards in grades 3 through 5 depend on a conceptual understanding of, and procedural fluency with, multiplication and division situations. Using concrete, representational, and abstract thinking with the properties of operations with area/arrays, you will be prepared to nurture the Standards for Mathematical Practice.

Pia Hansen
Math Learning Center, Cheyenne, Wyoming

Jennifer Christensen
Math Learning Center, Casper, Wyoming

*Hynes Convention Center, 209*

77 **ASSESS**

**Students Checking Their Math (Without the Internet or a Calculator!)**

6–8 Session

While tech has its place, encouraging students to self-assess using their noodle increases metacognition while promoting numeracy and independence. Session will include solving CCSS items with pencil and paper using mental math and estimation as well as checks like Casting Out Nines to help students become more self-reliant and confident.

Robin Schwartz
Twitter: mathconfidence
College of Mount Saint Vincent / Math Confidence, Bronx, New York

*Boston Sheraton, Back Bay Ballroom BC*

78 **EMPOW**

**Using the Concrete-Representational-Abstract Technique to Empower Struggling Students in Algebra**

6–8 Session

Participants attending this session will learn how to teach introductory algebra to struggling students by implementing the concrete-representational-abstract technique. Specifically, individuals will learn how to use manipulatives and hands-on activities for teaching algebraic expressions and solving equations at the concrete and pictorial level.

Brooke Callan
Pattonville High School, St. Louis, Missouri

Joseph Sencibaugh
Webster University, St. Louis, Missouri

*Hynes Convention Center, 302*

79 **A&E**

**Secondary Math Pathways That Promote Access and Equity**

8–10 Session

Come hear how one district has revamped math pathways at the middle and high school levels that are designed to promote access to high-level mathematics and equity for all students in accordance with the essential recommendations of NCTM’s 2018 *Catalyzing Change* publication.

Brian Selig
Twitter: @whrds_math
Whitman-Hanson Regional School District, Massachusetts

*Hynes Convention Center, 312*
1:00 P.M.–2:00 P.M.

80 PRO
10–12 Session
In this session, we bring together the use of formative assessment lessons (FALs) and collaborative planning by providing information about a teacher-tested protocol for planning FALs and reflecting on the implementation of FALs. Participants will engage with both FALs and other participants in a collaborative lesson planning session.
Victoria Bonaccorso
Twitter: @v_bonaccorso
Montclair State University, New Jersey
Megan Roeder
Montclair State University, New Jersey
Gurkan Kose
Montclair State University, New Jersey
Hynes Convention Center, 306

81 TECH
Pythagoras, Music, and the Mathematics of Harmony
10–12 Session
How can we use mathematics to create sound? In this session we will look at the difference between Pythagorean tuning and equal temperament, creating a 12-tone scale using simple ratios. Exponential and trigonometric functions can be combined to synthesize the sound of a xylophone—will you be able to hear the difference?
Greta Mills
Oxbridge Academy, West Palm Beach, Florida
Hynes Convention Center, 304

82 TECH
Using Desmos to Embed the MPACs in Your AP Calculus Class
10–12 Session
The Mathematical Practices for AP Calculus (MPACs) state that students must reason with definitions and theorems, connect concepts, implement algebraic/computational processes, connect multiple representations, build notational fluency, and communicate. Desmos graphs and activities are ideal for embedding the MPACs in your teaching—come see how!
Dave Cesa
Twitter: @davecesa
Charlotte Latin School, North Carolina
Boston Sheraton, Republic Ballroom AB

84 PRO
Connecting and Collaborating: A Math Coaches’ Virtual Professional Learning Community
Coaches/Leaders/Teacher Educators Session
Come join us as we share the work of the Virtual Mathematics Coaches Professional Learning Community! This project began as an attempt to encourage collaboration and communication focused on the needs of math coaches. This group has been working to target specific topics that coaches wish to discuss as it develops and supports innovation.
Marta Garcia
Twitter: @martagarcia0901
Math Leadership Program at Mount Holyoke, South Hadley, Massachusetts
Polly Wagner
Math Leadership Program at Mount Holyoke, South Hadley, Massachusetts
Hynes Convention Center, Ballroom A

85 PRO
Comparison Is the Thief of Joy: Stop Trying to Live Up to What You See Online and Just Do You
General Interest Session
Everyday you see new and exciting things to try with your students. It seems great, but then the reality sets in and you feel like a failure because you aren’t doing the “newest/best thing.” This session will help you analyze all the new requirements, suggestions, social media posts, and so on, and decide if it’s something you want to include in your math time.
Christina Tondevold
Twitter: @BuildMathMinds
Build Math Minds, Orofino, Idaho
AnnElise Record
Concord, New Hampshire
Hynes Convention Center, Ballroom B

Join us at the NCTM Centennial Annual Meeting & Exposition:
Chicago | April 1–4, 2020
Something like this happens only once every 100 years!
1:00 P.M.–2:00 P.M.

**86**

**NCTM Author Panel Talks**

**General Interest Session**

Be part of the lively discussion with NCTM’s authors as the big ideas from their books are shared. Books to be discussed: *Taking Action: Implementing Effective Mathematics Teaching Practices, Grades 6–8*, *Reimagining the Mathematics Classroom*, and *Geometry: Measuring Space in One, Two, and Three Dimensions*. Casebook/Facilitators Package.

**Virginia Bastable**  
Consultant, Los Angeles, California  

**Cathery Yeh**  
Twitter: @YehCathery  
Chapman University, Orange, California

**Mike Steele**  
Twitter: @mdsteele47  
University of Wisconsin–Milwaukee

**Hynes Convention Center, Ballroom C**

1:00 P.M.–2:15 P.M.

**87**  

**EMPOW**

**Can We Talk?: Building a Math Discourse-Rich Classroom**

**Pre-K–2 Workshop**

Come learn and experience great math discourse strategies and differentiated instruction questioning styles and tasks that allow ALL students equal access to mathematics. Be ready to participate in a new structure that will help you build, support, and sustain a class of engaged learners starting as soon as tomorrow!

**Marcie Abramson**  
Brandeis University, Waltham, Massachusetts

**Boston Sheraton, Back Bay Ballroom D**

**88**  

**EMPOW**

**Cultivating Listening: Supporting Teacher and Student Listening during Mathematical Discussions**

**3–5 Workshop**

Mathematics classrooms are vibrant places where students engage in sense-making discussion. Discussions call on teachers and students to listen to each other in complex ways. Join us to think about how to cultivate a culture of listening that values the experience and knowledge of all students and works towards more equitable participation.

**Kassia Omohundro Wedekind**  
Twitter: @kassiaowedekind  
Stenhouse Publishers, Arlington, Virginia

**Allison Hintz**  
University of Washington, Bothell

**Hynes Convention Center, 309**

1:00 P.M.–2:15 P.M.

**89**  

**BEYOND**

**From Clean Water to Flood Water: Illuminating the Mathematics in the News**

**3–5 Workshop**

Water, water, everywhere (in the news)! Learn how to turn news headlines into math lessons by using data, measurement, and manipulatives. From hurricanes to floods, from drilling oil to tainted water, these lessons will have your students thinking mathematically about the world around them.

**Ming Tomayko**  
Twitter: @ming_tomayko  
Towson University, Ellicott City, Maryland

**Hynes Convention Center, 203**

**Hynes Convention Center, 311**

**Hynes Convention Center, 308**

**Hynes Convention Center, 309**

**Hynes Convention Center, 203**
1:00 P.M.–2:15 P.M.

90 **EMPOW**
Linking Language and Learning in Mathematics
6–8 Workshop
Given the language-rich expectations in the current standards, equity means that students—English learners, in particular—need to understand the mathematics they are learning, develop their capacity to use language for academic purposes, and believe they can do math. Come learn Mathematics Language Development routines that serve that purpose.

**Harold Asturias**
Lawrence Hall of Science, Berkeley, California

_Hynes Convention Center, 208_

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91 **REVOL**
Positive or Negative? Strategies for Teaching Integers in Grades 6–8
6–8 Workshop
Why are integers so hard for students? In this workshop, we will explore concrete ways to provide students with conceptual learning. Participants will experience hands-on activities for introducing integers to students and leave with resources and routines for their classrooms.

**Heidi Sabnani**
Twitter: @hlsabnani
Looney Math Consulting, Foxboro, Massachusetts

**Molly Vokey**
Looney Math Consulting, Mansfield, Massachusetts

_Hynes Convention Center, 206_

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92 **PRO**
Respond to Student Thinking as a Team: Analyze Video and Student Work on Rich Tasks with Your PLT
8–10 Workshop
Rich tasks lead students to important understandings, but fielding student responses can be challenging. “What strategy are they using? Do they need a hint? Should the class talk about this?” We’ll examine their thinking through video and student work, brainstorm productive responses, and give you tools for using this process with your staff.

**Carl Oliver**
Twitter: @carloliwitter
City-As-School, Brooklyn, New York

**Liz Clark-Garvey**
Brooklyn School for Collaborative Studies, New York, New York

_Boston Sheraton, Back Bay Ballroom A_

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93 **EMPOW**
Where Is the Language Love? Content Objectives Are Not Enough
8–10 Workshop
Join us as we examine math tasks through the lens of language. We will identify key language demands students need to understand and engage in productive math discourse. We’ll also develop a common understanding of more effective language objectives in order to write targets that will be beneficial for not only ELs, but all students.

**Michelle Blair**
Marlborough Public Schools, Massachusetts

**Heather Kohn**
Marlborough Public Schools, Massachusetts

**Lynne Medailleu**
Marlborough Public Schools, Massachusetts

_Hynes Convention Center, 200_

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94 **ASSESS**
A, B, C, D, & F: Meaningful Grades or Random Letters?
10–12 Workshop
Despite recent pushes for reform, grading and assessment practices have remained quite stagnant. In this workshop, attendees will work through activities to see how standards-based grading (SBG) ideas can influence our views on grading and assessment. Issues encountered while implementing SBG, and potential remedies, will also be discussed.

**Dean Stevenson**
Twitter: deanlstevenson
Prince William County Schools, Manassas, Virginia

_Hynes Convention Center, 202_

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95 **TECH**
Using Programming to Make Mathematical Ideas More Meaningful
10–12 Workshop
Explore how programming can encourage deeper mastery of mathematical concepts. We’ll use the intuitive, visual language Snap! to see how coding a greatest common divisor function supports a more thorough understanding than just learning the definition, studying examples, and practicing. No programming experience required. Please bring a laptop.

**Mary Fries**
Education Development Center, Inc., Waltham, Massachusetts

_Hynes Convention Center, 310_
1:00 P.M.–2:15 P.M.

96 REVOL
All Math Is the Same
Coaches/Leaders/Teacher Educators Workshop
What if your students started learning higher-level concepts in the first grade? How would those extra years of preparation pay off? In this workshop, we look at how teaching basic topics with long-range understanding of mathematics builds a solid foundation for students to easily incorporate new ideas as they mature mathematically.
Jamil Siddiqui
Twitter: @jamilsid312
2019 Massachusetts Teacher of the Year, East Bridgewater Jr/Sr High School
Hynes Convention Center, 207

97 PRO
Math Labs to Support Teacher Learning: Considering Cross-District Experiences
Coaches/Leaders/Teacher Educators Workshop
Math labs is a form of job-embedded professional learning centers on creating opportunities for teachers to work together to develop their math teaching (Kazemi et al. 2017). In this session, we’ll explore the structure of Math Labs and hear from math leaders from across five districts about how they are implementing Math Labs with their teachers.
Lynsey Gibbons
Twitter: @lynseymathed
Boston University, Massachusetts
Jany Finkielstein
Mathematics Coach, Newton, Massachusetts
Linda Davenport
Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; Mathematics Coach, Newton, Massachusetts
Hynes Convention Center, 313

98 PRO
Teaching, Learning, and Coaching through an Educative Curriculum
Coaches/Leaders/Teacher Educators Workshop
Do you feel as if teaching and learning happen in isolation? Come explore educative structures in the upcoming Illustrative Mathematics K-5 Curriculum that support teachers/coaches. These structures empower teachers in their learning, create collaborative coaching opportunities, and put students at the forefront of all instructional decision-making.
Timothy Livingston
Twitter: @SpringAPTim
Illustrative Mathematics, Lewes, Delaware
Kristin Gray
Spring ISD, Texas
Hynes Convention Center, 210

2:30 P.M.–3:30 P.M.

99 A&E
Lost in Translation: From Writers’ Workshop to Leveled Math Groups
3–5 Session
In the elementary grades, we often take ideas from literacy and apply them to math class. Sometimes that works well—e.g., sensemaking strategies for story problems. Sometimes, however, we oversimplify an approach, losing its power and purpose. In this session, we’ll look at grouping formats used in elementary math classes today.
Tracy Zager
Twitter: @tracyzager
Portland Public Schools/Stenhouse Publishers, Maine
Hynes Convention Center, Ballroom B

100 TECH
Super Cool and Fun Ways to Use Technology for Enhancing Your Math Program
3–5 Session
We will explore how to use a variety of apps for the elementary grades that are available on any computer, tablet, or Chromebook. Learn how to adapt these apps to make your math teaching in both geometry and problem solving even more exciting. In using NCTM illuminations’ apps, Scratch, and more, you will find great ideas to use in your class.
Susan Weiss
Solomon Schechter Day school, Newton, Massachusetts
Hynes Convention Center, 302

101 EMPOW
Engaging Middle School Students with Mathematics Difficulties in Meaningful Tier 2 Instruction
6–8 Session
We provide information about our Tier 2 lessons on algebra-readiness concepts and skills. We explain ways to engage middle school students with mathematics difficulties in meaningful activities by having students use mathematics tools and representations, write about the mathematics they are learning, and interact with peers for practice.
Diane Bryant
University of Texas at Austin
Brian Bryant
University of Texas at Austin
Boston Sheraton, Republic Ballroom AB
2:30 P.M.–3:30 P.M.

102 **EMPOW**
Giving a Voice and Access to All Learners through Powerful Mathematical Modeling Tasks
6–8 Session
Provide a voice in the classroom and access for all learners to engaging, authentic math tasks through mathematical modeling. We will discuss what mathematical modeling is (and is not), characteristics of rich tasks, and how to implement them effectively. We will share some rich tasks, and watch students at work doing modeling in the classroom.

Nancy Butler Wolf
Twitter: @drnanbut
University of California, Riverside
Alexis Diaz
Azusa Unified School District, California

**Hynes Convention Center, 306**

103 **TECH**
Creating Constructive, Convincing Congruence Proofs with Web Sketchpad (WSP)
8–10 Session
The CCSS defines figures as congruent if there’s an isometry (rigid motion) “that carries one onto the other.” With this definition, SAS, SSS, and so on are not axioms but theorems to prove. Students use WSP to construct the superposition; the construction steps help to reveal, sequence, and justify the proof steps. Leave with student-ready lessons.

Scott Steketee
Donovan Hayes
School District of Philadelphia, Pennsylvania
Daniel Scher
School District of Philadelphia, Pennsylvania

**Hynes Convention Center, Ballroom C**

105 **A&E**
8–10 Session
In this session, we will share how we used cycles of practitioner inquiry and research to deliberately examine our practice, and how the results of these studies guided our teacher-led initiative to give EVERY student the opportunity to have access to and succeed in rigorous math classes through detracking, differentiating, blending, and assessing.

Kristin Weller
P. K. Yonge Developmental Research School at the University of Florida, Gainesville
Taylor Bainter
P. K. Yonge Developmental Research School at the University of Florida, Gainesville

**Hynes Convention Center, 311**

106 **TECH**
Developing Core Concepts in Calculus: The Role of Interactive Dynamic Technology
10–12 Session
Experiences with interactive dynamic technology can be used to help students develop robust conceptual structures for key calculus concepts such as rate of change, concavity, derivative, accumulation, or average value. The session will also explore how these concepts play out in some typical AP exam questions.

Gail Burrill
Past President, National Council of Teachers of Mathematics, Reston, Virginia; Michigan State University, East Lansing

**Hynes Convention Center, Ballroom A**

107 **TECH**
Regression Leads to Progression!
10–12 Session
Do your students struggle to make connections between different types of growth encountered while studying functions? Come explore activities where students use technology and regression models to interpret real-world data. Regression types include linear, exponential, quadratic, and sinusoidal. Let regression inspire progress!

Scott Knapp
Twitter: @scottknapp
Glenbrook North High School, Northbrook, Illinois

**Boston Sheraton, Back Bay Ballroom BC**

108 **TECH**
Statistics beyond Symbols: Visual and Dynamic Representations That Enhance Student Understanding
10–12 Session
For many students, abstract symbols and definitions get in the way of conceptual understanding of statistics. In this session, visual representations and dynamic visual models will be used in ways that make important statistical ideas more accessible. Student work will be shown, and a variety of digital resources will be shared with participants.

James O’Keefe
Lesley University, Cambridge, Massachusetts

**Hynes Convention Center, 312**
2:30 P.M.—3:30 P.M.

109
Not Your Typical Session Title—I’ll GRANT You That!
General Interest Session
And speaking of grants, this session will inform participants about what grants and scholarships are available from the Mathematics Education Trust (MET) and how to apply. It will also provide some tips for choosing the most appropriate award for you, and for enhancing your chances of getting it. MET supports teachers with funds for materials, lesson development, conferences, coursework, professional development, technology in-service, and action research.

Ralph Connelly
Trustee, MET Board of Trustees, Reston, Virginia
Hynes Convention Center, 204

110
Organizing Teacher Leadership to Support Mathematics Teaching and Learning
General Interest Session
School leaders from a K-8 school will describe how they systematically support equitable mathematics teaching and learning across the school. We will describe our work toward supporting all students, regardless of background, with opportunities to engage mathematics through examining and changing systemic inequities and structures.

Lynsey Gibbons
Twitter: @lynseymathed
Boston University, Massachusetts
Jordan Weymer
Donald McKay School, Boston, Massachusetts
Hynes Convention Center, 204

2:45 P.M.—4:00 P.M.

111
Bringing Math to Life with Virtual Manipulatives
Pre-K–2 Workshop
Manipulatives are important tools that help students think and reason in meaningful ways about math. What changes and what stays the same when students engage with virtual manipulative alongside or instead of concrete ones? What new opportunities do virtual manipulatives provide? Explore these questions and dig into resources—bring a device!

Christine Newell
Twitter: @MrsNewell
Stanislaus County Office of Education, Modesto, California
Hynes Convention Center, 210

112
High-Yield Routines Using the Number Line in K-2
Pre-K–2 Workshop
Number lines are a flexible tool used from kindergarten to grade 2 to deepen students understandings of whole numbers. Participants will engage in clothesline math, walking number line, and beaded number line to explore connections and number relationships. These activities support students’ ability to estimate, operate, and reason about numbers.

Sarah Majors
Twitter: @sarahamajors
Lexington Public Schools, Massachusetts
Cristina Roof
Lexington Public Schools, Massachusetts
Hynes Convention Center, 310

113
Growing Mathematicians with Number Lines
3–5 Workshop
Research indicates a relationship between students’ experiences with number lines and their mathematical achievement. In this interactive session, participants will explore the progression from number tracks to number lines and engage in activities, using both digital and print resources, to help students improve their number understanding.

Andrea Kotowski
Twitter: @ORIGOAPS
ORIGO Education, Earth City, Missouri
Heather Monks
ORIGO Education, Earth City, Missouri
Hynes Convention Center, 203

114
Using Data to Inspire Teaching and Learning for Each Student in K-3
3–5 Workshop
Data activities in K-3 classes provide meaningful shared experiences to empower each and every student to make sense of their own learning within math, across subjects and in their world. Explore different data tools, connect data to critical content and use literature to inspire data use. Plenty of ideas to use immediately!

Gina Kilday
Twitter: @MathLadyRI
Exeter-West Greenwich Regional School District, Rhode Island
Anne Barbour
Exeter-West Greenwich Regional School District, Rhode Island
Boston Sheraton, Back Bay Ballroom D
2:45 P.M.—4:00 P.M.

**115 EMPOW**
Empowering Students: Understanding the Mathematics of Gerrymandering—When Equivalent Is NOT Equal!
6–8 Workshop
Join this interactive workshop to engage students in understanding the K-12 mathematical ideas behind gerrymandering and drawing of voting districts that are timely and relevant in our society. Together, we will explore a series of tasks to mathematically empower your students and experience situations when equivalent is indeed NOT equal at all!

Farshid Safi  
Twitter: @FarshidSafi  
University of Central Florida, Orlando  
Sarah Bush  
Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; University of Central Florida, Orlando  
Siddhi Desai  
University of Central Florida, Orlando

**116 EMPOW**
Mathematics Discourse without Words: Silent Collaborative Tasks That Raise All Learners’ Voices
6–8 Workshop
Silence is golden! Engage in collaborative tasks conducted partly or wholly without talking and reflect on how task-embedded wait-time fosters equity, access, and engagement for all learners. Leave with and knowing how to implement classroom-ready tasks that support discourse and advance mathematical identity and learning for all.

Norma Borenstein Gordon  
Twitter: @normabgordon  
Public Schools of Brookline, Massachusetts

**117 EMPOW**
Using Representations to Build Students’ Mathematical Identities
8–10 Workshop
Each representation; table, graph, equation, story context, or diagram, reveals important mathematical features. What do they reveal about students’ thinking? What do they reveal to our students about what we value? Let’s learn to work with our students’ representations to understand mathematics and promote positive mathematical identities.

Barbara Kuehl  
Twitter: @barbarakuehl  
Mathematics Vision Project | MVP, Salt Lake City, Utah

**118 ASSESS**
You’ve Given a Formative Assessment—Now What Do You Do with the Results?
8–10 Workshop
Formative data can be used to inform instruction in multiple “correct” ways. Using assessment data from algebra classes, we’ll discuss various ways it can inform and impact instruction. Lesson monitoring, various ways to form and use collaborative groups, and numerous differentation strategies will be discussed. Apps to collect data will be shown.

Allan Bellman  
Twitter: abellman17  
University of Mississippi, Oxford

119 TECH
Experimentation and Engagement: Using Simulations as a Means of Mathematical Modeling
10–12 Workshop
What does it mean to model mathematically? See how tasks creating experiments and simulations provide students with an engaging and interactive form of mathematical model. You’ll learn how simulating financial scenarios involving money and risk can teach students topics in finance and probability through experimentation and discovery.

Jack Marley-Payne  
Twitter: @ficycleedu  
FiCycle, New York, New York  
Philip Dituri  
FiCycle, New York, New York

**120 PRO**
Empowering School Leaders to Enact Instructional Change through Videoconference Coaching
Coaches/Leaders/Teacher Educators Workshop
LAUSD’s Division of Instruction and the UCLA Math Project have embarked on a journey to support schools in their use of CGI as an instructional approach for mathematics teaching. With 120 schools currently being serviced through onsite coaching and PD, discover how principals receive support through Zoom conferencing and coaching.

Andrew Jenkins  
Twitter: @principalcda  
Los Angeles Unified School District, California
2:45 P.M.–4:00 P.M.

121 PRO
Share Your Story: Community Organizing to Shift Math Teacher Beliefs
Coaches/Leaders/Teacher Educators Workshop
Shifting teacher beliefs can be challenging work because our beliefs intersect with our emotions. Community organizing and public narrative are powerful tools we can adopt to overcome this challenge. In this workshop, participants will learn how to craft and share a story to catalyze social change in their local communities.
Chris Nho
Twitter: @nhoskee
Chicago Public Schools, Illinois

Hynes Convention Center, 313

122 PRO
The Decision-Making Protocol for Math Coaching: Advocating Change through Research-Based Practices
Coaches/Leaders/Teacher Educators Workshop
The DMPMC’s 4 phases provide guidance to coaches and teacher leaders in making complex choices, advocating for the Mathematics Teaching Practices and selecting high-leverage coaching practices to make instructional shifts that impact all. Engages leaders in courageous conversations that emphasize math content, while also addressing the school context.
Courtney Baker
Twitter: @PibiBaker18
George Mason University, Fairfax, Virginia
Melinda Knapp
Oregon State University–Cascades, Bend

Hynes Convention Center, 309

4:00 P.M.–5:00 P.M.

123 ASSESS
Beyond Correct and Incorrect: A CGI Interview Approach to Formative Assessment
3–5 Session
Cognitively guided instruction (CGI) offers us insight into how children’s mathematical thinking develops over time. We’ll explore how teachers can use this knowledge to assess students’ mathematical thinking and inform instruction. We’ll share video of interviews, sample K-5 tasks, and ideas for keeping track of children’s learning over time.
Kendra Lomax
Twitter: KendraLomax
University of Washington, Seattle
Becca Lewis
University of Washington, Seattle

Boston Sheraton, Republic Ballroom AB

125 EMPOW
Give Them Something to Talk About: Cultivating Divergent Thinking and Robust Mathematical Discourse
6–8 Session
The tasks teachers provide are the foundation for mathematics instruction that supports robust classroom discourse, fosters divergent thinking, and cultivates intellectual curiosity. In this session, participants compare and contrast two tasks in order to develop characteristics of tasks worth talking about.
Brenda Konicke
Twitter: @brendakonicke
Math Solutions, Chandler, Arizona

Hynes Convention Center, 304

126 REVOL
Manipulatives Are for Middle School Too!—Building Conceptual Understanding with Concrete Models
6–8 Session
Do you think base-10 blocks and pattern blocks are just for elementary school? Think again! Manipulatives are for middle school too! Come explore how the manipulatives popular in K-grade 4 can also be used to develop conceptual understanding of key topics in grades 5–8. We will explore fractions, ratios, integers, and more!
Katherine Marin
Twitter: @professormarin
Stonehill College, Easton, Massachusetts

Hynes Convention Center, 311
4:00 P.M.–5:00 P.M.

127 **EMPOW**
*Catalyzing Change and the Journey of a Suburban High School District*
8–10 Session

*Catalyzing Change* challenges us to rethink our curricula, eliminate unjust tracking practices, and emphasize equitable teaching practices. This session will highlight how one high school district has struggled to engage with this vision in the face of state mandates, community pressure, and fear of the unknown.

Mark Russo
Twitter: @RussoMarkF
Pasca ngành Valley Regional High School District, Montvale, New Jersey

Hynes Convention Center, 306

128 **EMPOW**
*Creating Continuous and Dynamic Learning for All Students*
8–10 Session

How do we create a learning habitat for all students? Your apathetic students may actually be isolated! Explore a variety of daily practices that help every student win. Come create a lesson using inquiry-based, active thinking strategies that eliminate isolation, foster risk-taking, and encourage dialog while raising each student’s accountability.

Peggy Hartwig
Twitter: @mhartwig
Discovery Education, Marshfield, Wisconsin

Hynes Convention Center, 312

129 **BEYOND**
*Using Net Worth to Understand Linear Equations*
8–10 Session

Develop your students’ understanding of the concept of equality in the context of understanding wealth. In this workshop, we will look at how financial scenarios can be modeled with linear equations. Students will be able to apply their knowledge about financial transactions to understand algebra in a tangible setting.

Philip Dituri
Fordham University, New York, New York

Boston Sheraton, Back Bay Ballroom BC

130 **PRO**
*Leading a Mathematics Team Focused on Learning and Equity*
Coaches/Leaders/Teacher Educators Session

How does a team of teachers work together to improve the learning of every student? How does the team learn from one another to grow effective practices? This session will explore protocols teacher leaders can use to establish equity and help teams make sense of standards, design common assessments, and analyze data and respond.

Mona Toncheff
Twitter: @toncheff5
NCSM President-Elect, Phoenix, Arizona

Hynes Convention Center, 302

131 **A&E**
*Mathematics Intervention Classes: Powerful Practices and Structures to Support Struggling Learners*
Coaches/Leaders/Teacher Educators Session

Learn about guiding principles, practices, and structures for providing intervention classes that engage and empower struggling students to build mathematics understanding and become more motivated and confident learners. Hear district examples and discuss ways to address common challenges. Leave with ideas and tools to strengthen interventions.

Amy Brodesky
Education Development Center, Waltham, Massachusetts
Rachael Turkington
Waltham Public Schools, Massachusetts

Hynes Convention Center, Ballroom A

132 **ASSESS**
*Assessment for Learning*
General Interest Session

American schools are overwhelmed with high-stakes testing, which leads to benchmark testing—just testing for testing sake. Instead we need to shift the focus to assessment for learning. This requires instructional shifts in practice to emphasize learning over grading. This session introduces a formative assessment process to deepen learning.

David Foster
Silicon Valley Mathematics Initiative, Morgan Hill, California

Hynes Convention Center, 204
4:00 P.M.–5:00 P.M.

**133 BEYOND**

Cultivating Student Engagement and Developing Problem Solvers: Our Community Garden Story

*General Interest Session*

In this session, participants will learn how to redefine what student engagement in mathematics looks like, create interactive mathematics lessons, and develop a culture of community integration. Participants will leave the session with the tools and skills needed to create a community-based garden within their environment.

**Jamilah Hud-Kirk**  
Twitter: @fountainbears  
Clayton County Public Schools, Forest Park, Georgia

**Montrice Craddock**  
Clayton County Public Schools, Forest Park, Georgia

**Clara Lusane**  
Clayton County Public Schools, Forest Park, Georgia

Hynes Convention Center, 209

**134 EMPOW**

Unfinished Learning

*General Interest Session*

What is unfinished learning? How can we teach classrooms with students who have such varied unfinished learning? What does it mean to do grade level standards work in mathematics when unfinished learning is so common? These questions face almost every teacher and have for a long time. A few shifts can help resolve dilemma for teachers.

**Philip Daro**  
OUR, Berkeley, California

Hynes Convention Center, Ballroom B

4:30 P.M.–5:00 P.M.

**135 ASSESS**

Measuring Students Problem Solving and Inform Your Practice with Standards-Aligned Results!

*3–5 Burst*

Problem solving is central to doing math so how do we assess it? Attendees will work on questions from a valid and reliable problem-solving test series designed for grades 3–6. Questions are connected to state standards and predict students’ performance. Let’s work together on using students’ work to inform our instructional decisions.

**Jonathan Bostic**  
Bowling Green State University, Ohio

**Gabriel Matney**  
Bowling Green State University, Ohio

**Toni Sondergeld**  
Bowling Green State University, Ohio

Hynes Convention Center, 210

**136 BEYOND**

Teaching Your Students to Access Academic Language in Your Math Classroom

*3–5 Burst*

Are you looking for innovative ways to increase the use of math academic language for your students? This school was a T.E.A., Improvement Required school, for years. Come hear our story of how academic language and goal-setting were put into place to move this school from an F to a C on its T.E.A. report card and Met Standard—in ONE year!

**Cicely Alexander**  
Twitter: @AldersonES  
Lubbock ISD, Texas

**Rina Misra**  
Lubbock ISD, Texas

Hynes Convention Center, 203

**137 EMPOW**

Time to Talk

*3–5 Burst*

Use specifically designed cards to engage in meaningful conversations about mathematical knowledge and beliefs. Conversation cards promote rich math talk and foster productive discourse among students. Tips for analyzing classroom discourse and assessment conversation strategies will support teachers’ implementation of this Time to Talk approach.

**Evan Robinson**  
Saint Francis Xavier University, Antigonish, Nova Scotia, Canada

Hynes Convention Center, 207

**138 ASSESS**

Tools for Instantaneous Formative Feedback in the 1:1 Classroom

*8–10 Burst*

The evolution of the 1:1 classroom has opened new and exciting opportunities for instantaneous formative feedback. Teachers can now adjust their teaching and intervene immediately when needed. Participants will get a quick glimpse of how to implement some of these tools in their classroom, including Desmos, Nearpod, and Socrative.

**Laura Montgomery**  
Twitter: @lauramontyg  
Trinity Valley School, Fort Worth, Texas

Hynes Convention Center, 202
4:30 P.M.–5:00 P.M.

**139**  
**REVL**  
**The Financial Life Cycle: Centering a Math Curriculum around Financial Applications**  
10–12 Burst  
Do you want to incorporate meaningful applications of math in your curriculum? Finance is an application all students will find valuable. This session shows how you can create a coherent curriculum for a high school math elective that teaches the central precepts of personal finance. It is based on the Nobel Prize-winning Life Cycle Hypothesis.  
Andrew Davidson  
Twitter: @ficycleedu  
ficycle.org, New York, New York  
Hynes Convention Center, 208

**140**  
**A&E**  
**Restructuring the Algebra 1 Classroom to Provide Success for ALL Learners**  
Coaches/Leaders/Teacher Educators Burst  
Explore an algebra class model designed to interrupt the challenges our marginalized students faced. We will share the systemic changes that were implemented to support students. Using co-teaching, common planning, flexible grouping, modified schedule, and more, we have eliminated tracking, increased pass rates, and are removing the algebra gate!  
Mary Takle  
Twitter: @mtakle  
Bellevue School District, Washington  
Ainsley Goodrich  
Sammamish High School, Bellevue, Washington  
Hynes Convention Center, 309

**141**  
**PRO**  
**Structured Collaboration with Colleagues**  
Coaches/Leaders/Teacher Educators Burst  
Structured collaboration sessions: How do you provide professional learning that teachers enjoy? You let them talk to each other! Learn how groups of teachers were guided in their discussions with each other in order to explore ways to build a strong mathematical foundation for their students.  
Melissa Stewart  
Hall County Schools, Gainesville, Georgia  
Marcia Williams  
Pioneer RESA, Cleveland, Georgia  
**Boston Sheraton, Back Bay Ballroom A**

**142**  
**A&E**  
**The Art of Coaching: Doing, Thinking, and Being**  
Coaches/Leaders/Teacher Educators Burst  
Coaches of educators must stand–dance through the ups and downs of their teachers. In this session, I share how I set the stage for my coaching journey. Join us as I present a curated media presentation of various visionaries in math education, to help you answer for yourself: What goals do I have for my teachers? And for my practice?  
Evan Rushton  
Twitter: @E_Rushton  
Los Angeles, California  
Hynes Convention Center, 200

**143**  
**BEYOND**  
**Beyond the Classroom: Teaching Financial Literacy**  
General Interest Burst  
Students are highly motivated when tackling real-world meaningful problems. This presentation will use math to examine changes to the minimum wage, which students earn. For teachers who wish to incorporate financial literacy activities into their math courses, this talk will provide resources, data sets, and extensions, and will share pedagogical practices.  
Marla Sole  
Guttman Community College, City University of New York, New York  
Hynes Convention Center, 313

**144**  
**TECH**  
**Facilitating Classroom Discourse with Desmos**  
General Interest Burst  
Desmos Classroom Activities leverage technology to empower teachers and make student thinking visible. In this session, participants will use the new snapshot feature to digitally select, sequence, and craft connecting questions around student work to promote rich discussion. This session is led by a Desmos fellow and is for any experience level.  
Robert Janes  
Twitter: @MrJanesMath  
East Hartford Public Schools, Connecticut  
Hynes Convention Center, 310
4:30 P.M.–5:00 P.M.

145 BEYOND
Sidewalk Math
General Interest Burst
Public displays of mathematics are rare. Join us as we rethink this idea with Sidewalk Math, math that is done on the sidewalk for the general public to engage with. In addition to being cool, it’s a unique way for anyone to spread math in a community.

Brian Palacios
Twitter: _b_p
New York City Department of Education, Bronx, New York

Boston Sheraton, Back Bay Ballroom D

146 TECH
Using Technology to Enhance College Algebra Students’ Understanding
Higher Education Burst
In this talk, we present the findings of our mixed-methods study on the effectiveness of using technology such as online graphing calculators and smartphone apps on college algebra students’ understanding. Specifically, we narrow down areas of college algebra that are more affected by technology.

Razieh Shahriari
University of Arkansas, Fayetteville
Nama Namakshi
University of Arkansas, Fayetteville

Hynes Convention Center, 206

Infinity Bar Thursday Schedule

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<tr>
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<tr>
<td>9:30 a.m.–10:30 a.m.</td>
<td>Christina Tondelvold</td>
<td>Geoff Krall</td>
<td>Skip Fennell, Beth Kobett, Jon Wray</td>
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<tr>
<td>11:00 a.m.–12:00 p.m.</td>
<td>Chrissy Newell</td>
<td>Phil Daro</td>
<td>John Sangiovanni</td>
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<tr>
<td>12:30 p.m.–1:30 p.m.</td>
<td>Bill McCallum</td>
<td>Graham Fletcher</td>
<td>Christine Lincoln-Moore</td>
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<td>2:00 p.m.–3:00 p.m.</td>
<td>Robert Berry</td>
<td>Mike Steele</td>
<td>Tashana Howse</td>
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**Notes:**
- Sidewalk Math
  - Public displays of mathematics are rare.
  - Join us to rethink the idea of Sidewalk Math, math that is done on the sidewalk for the general public to engage with.
  - Cool and unique way to spread math in a community.

- Using Technology to Enhance College Algebra Students’ Understanding
  - Mixed-methods study on the effectiveness of technology in college algebra.
  - Narrow down areas of college algebra more affected by technology.

- Assessment: A Window Into Student Thinking
- Self, Structural, and Systemic Change for Access and Equity
- Connecting Learning Beyond the Classroom Walls
- PRO Professionalism: Educators as Learners and Agents of Change
Bridges in Mathematics is a comprehensive PK–5 curriculum that equips teachers to fully implement the national standards in a manner that is rigorous, coherent, engaging, and accessible to all learners. Bridges blends direct instruction, structured investigation, and open exploration.

Join our session on Arrays, Properties, and Practices on Friday, September 27 from 1 to 2 p.m. in Room 209 or stop by booth 212 to learn more.
HIGHLIGHTS
Regional Conference Overview & Orientation, 147
Supporting Students Who Struggle through Explicit Instruction, 151
Mathematics for Human Flourishing, 158
New and Preservice Teachers Workshop, 195
Teaching on the Edge of Understanding and at the Speed of Learning, 199
Making Connections across Representations: A Tool for Deepening Mathematical Discussions, 228

GET SOCIAL
Stay informed and get connected with attendees by using #NCTMBoston19 on social media.

Conference App
nctm.org/confapp

Twitter
@NCTM

Instagram
@NCTM.math

Facebook
facebook.com/TeachersofMathematics

REGISTRATION HOURS
7:00 a.m.–2:00 p.m.

EXHIBIT & NCTM CENTRAL HOURS
9:00 a.m.–2:00 p.m.

FIRE CODES
We have made every attempt to provide adequate seating for participants at the conference, but for your safety and because of fire regulations, only those with seats will be allowed in meeting rooms. To comply with fire codes, we will have to ask persons sitting on the floor or standing to leave the room.
7:15 A.M.–7:45 A.M.

147  EMPOW
Regional Conference Overview & Orientation
General Interest Session
Whether you’re new to NCTM or a seasoned veteran, there is something for you at the conference! Hosted by members of the Board of Directors, this session will show you how to maximize your overall conference experience. Learn all the new, innovative aspects this meeting is showcasing or discover something you’ve missed in the past. Find out how to navigate presentations, learn how to use the conference app, and network with other attendees.

Jason Slowbe
Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; Great Oak High School, Temecula, California

Boston Sheraton, Back Bay Ballroom D

8:00 A.M.–9:00 A.M.

148  EMPOW
Ready, Set, Count! Exploring Counting Collections
Pre-K–2 Session
Counting collections provides students with rich opportunities to develop efficient counting strategies. Research shows counting is one of the best ways to build number sense; however, we don’t do nearly enough of it. In this session, we will learn the counting collections routine, how to build a library of collections, and the teacher’s role.

Jessica Scandurra
Twitter: @jess_scandurra
Eli Whitney School, Stratford, Connecticut
Lana Quincy
Nichols School, Stratford, Connecticut

Boston Sheraton, Back Bay Ballroom BC

149  EMPOW
Using 10-Minute Routines to Develop Mathematical Reasoning in K-Grade 2
Pre-K–2 Session
In early childhood, routines are one of the best ways to develop students’ mathematical reasoning, ability to communicate with clarity, and listening and social skills. In this session, we will explore six differentiated reasoning routines that can be used to keep all students challenged and engaged.

Antonia Cameron
Metamorphosis Teaching Learning Communities, New York, New York
Stephanie Slabic
Metamorphosis Teaching Learning Communities, New York, New York
Jennifer Costanzo
Metamorphosis Teaching Learning Communities, New York, New York

Hynes Convention Center, 311

150  EMPOW
Retrieval Practices to Help Students Better Remember and Apply Their Mathematical Reasoning
3–5 Session
Have you witnessed students not able to remember or apply math concepts you have taught? With the intentional application of retrieval and metacognitive practices, there is potential for an increase in students remembering and applying mathematical ideas. Students need to be taught how to access and retrieve learning in order to apply it.

Lachanda Garrison
Twitter: @educationoflife
Speaker, FPO, AE

Hynes Convention Center, 311

151  EMPOW
Supporting Students Who Struggle through Explicit Instruction
3–5 Session
With a focus on multitiered systems of support, many teachers are trying to develop highly engaging Tier 1 core instruction and Tier 2 interventions. This session presents ways to avoid “teaching by telling” and instead use connections to prior knowledge and multiple representations to support students’ development of mathematical understanding.

Karen Karp
Twitter: @ksquaredmath1
Johns Hopkins University, Baltimore, Maryland

Hynes Convention Center, Ballroom A

152  REVOL
Curriculum Matters: Authentic Learning Experiences for Each and Every Student
8–10 Session
Curriculum should empower students to reason, make connections, develop mathematical ideas, and support students in effectively self-assessing their own learning. There are lots of options out there but finding the right resource can be daunting. Come learn how some districts are identifying curricula that engages students and produces results.

Joleigh Honey
Twitter: @joleighhoney
Utah State Board of Education, Sandy

Hynes Convention Center, 302
**153 EMPOW**

**Using ICOR Mathematics Classroom Observation Rubric and Classroom Videos in Instructional Rounds**

**8–10 Session**

This session will introduce ICOR Mathematics Classroom Observation Rubric with four dimensions: Content Rigor, Mathematical Discourse, Equitable Access to Content, and Classroom Ecology. Participants will view videos of secondary mathematics classrooms and use ICOR to provide feedback and reflect on best teaching practices that are student-centered.

Jaime Park  
Twitter: @JaimeParkUCLA  
University of California, Los Angeles

*Hynes Convention Center, 209*

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**154 TECH**

**Using Technology to Rethink the Analysis of Polynomial Functions through Conjectures and Reasoning**

**10–12 Session**

Why can't my students apply the theorems associated with analyzing polynomials? Do my students really need to know these theorems? During this session, participants will examine these questions and investigate strategies that incorporate the use of technology intended to develop students' conceptual understanding and visualization of polynomials.

Stephen Bismarck  
University of South Carolina Upstate, Spartanburg

*Hynes Convention Center, 304*

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**155 EMPOW**

**Empowering General Education Math Teachers of English Language Learners**

**General Interest Session**

Participants will learn how to create differentiated lessons based on cognitive demand and contextual support that will increase the potential for ELLs to acquire academic literacy in math, and reduce the linguistic difficulties associated with mathematical discourse while managing to avoid the many pitfalls that can occur during instruction.

Darlyne De Haan  
Bridgeton Public Schools, New Jersey  
Damisco Josey  
Hammonton Public Schools, New Jersey

*Hynes Convention Center, 204*

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**156 REVOL**

**Illustrative Mathematics Elementary Curriculum Design Principles**

**General Interest Session**

Illustrative Mathematics is writing a problem-based K-5 curriculum that builds a coherent sequence of mathematical ideas, supports teachers in teaching, and includes additional support to ensure each and every student has access to the mathematics. Join us as we explore key curriculum design principles, instructional routines, and sample activities.

Sarah Caban  
Twitter: @csarahj  
Illustrative Mathematics, Oro Valley, Arizona  
Noelle Conforti Preszler  
Illustrative Mathematics, Oro Valley, Arizona  
Sara Baranauskas  
Illustrative Mathematics, Oro Valley, Arizona

*Hynes Convention Center, 312*

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**157 PRO**

**Let’s Be Blunt: Too Many Students Are Being Harmed by Our Unwarranted Compliance**

**General Interest Session**

This session is a rousing call to arms to take the reins and make “bottom-up” change the norm in our schools and districts. There are so many obstacles that get in the way of great teaching and student learning. We’ll explore some of these obstacles for the purpose of raising the question of why they exist and what we need to do to overcome them.

Steven Leinwand  
Twitter: @steve_leinwand  
American Institutes for Research, Washington, D.C.

*Hynes Convention Center, Ballroom B*

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**158 A&E**

**Mathematics for Human Flourishing**

**General Interest Session**

As teachers, we can teach mathematics more effectively by connecting math to basic human desires, and showing how the practice of mathematics builds virtues that will serve our students well no matter what profession they enter. These deeply human themes—including play, beauty, truth, and justice—will inspire students to study mathematics.

Francis Su  
Twitter: @mathyawp  
Harvey Mudd College, Claremont, California

*Hynes Convention Center, Ballroom C*
8:00 A.M.–9:00 A.M.

159 **EMPOW**
Planning for Productive Struggle: A Struggle Worth Pursuing
General Interest Session
We as teachers of math also struggle at times when planning for productive struggle. How do we face those challenges? How can we empower students in owning their learning by planning for productive struggle? We will engage in activities and discussions related to planning for productive struggle and facing challenges. It is worth it!
Trena Wilkerson
Twitter: @TrenaWilkerson
President-Elect, National Council of Teachers of Mathematics, Reston, Virginia; Baylor University, Waco, Texas

_Boston Sheraton, Republic Ballroom AB_

8:00 A.M.–9:15 A.M.

160 **ASSESS**
Understanding Place Value: When 97 Isn’t Just 90 + 7
Pre-K–2 Workshop
What are the big ideas students need to understand to have a deep and flexible knowledge of place value? How can teachers assess and support the development of such understanding? What does it look and sound like? We will examine student thinking via work samples, dialogue, and activities that promote a deeper understanding of place value in K-2.
Karen Economopoulos
Twitter: Inv3_Math
TERC, Cambridge, Massachusetts
Megan Murray
TERC, Cambridge, Massachusetts

_Hynes Convention Center, 206_

161 **EMPOW**
Build It, Fold It, Draw It: Develop Understanding of the Attributes of Polygons
3–5 Workshop
Many of the attributes of polygons—side length, angle measure, symmetry, perimeter, and area—can be explored using paper folding, perimeter pieces, square tiles, and grid paper. We’ll work through a series of tasks that help students make sense of these attributes. Tasks are designed to have entry levels for all students.
Laurie Boswell
Twitter: @laboswell
Big Ideas Math, Franconia, New Hampshire

_Boston Sheraton, Back Bay Ballroom A_

162 **EMPOW**
Empowering Students to Seek Their Own Questions through Math Explorations and Number Talks
3–5 Workshop
Learn a routine for your math class that will allow all your students to participate, improve their flexibility and connection making, and increase their love for mathematics. We will share resources and experiences with you so you can do it too!
Jana Sunkle
Boston Public Schools, Massachusetts
Polly Wagner
Erving Elementary School, Massachusetts

_Hynes Convention Center, 208_

163 **TECH**
Support Rich Mathematical Discussions and Investigations Using Interactive Simulations
6–8 Workshop
Interactive simulations are flexible tools for exploring algebraic concepts while also fostering engagement, reasoning, and sensemaking. Learn how to incorporate simulations into your prealgebra and algebra classrooms, facilitate inquiry-based activities, and engage students in mathematical practices and discussions.
Amanda McGarry
Twitter: McGarryMath
University of Colorado Boulder

_Boston Sheraton, Back Bay Ballroom D_

164 **REVOL**
Think about It: Posing Problems to Encourage Student Participation
6–8 Workshop
What motivates students to want to solve a problem? How you pose a problem can have an impact. Participants will discuss the factors that affect motivation, learn how to turn ordinary exercises into extraordinary problems, solve great problems posed by others, and consider strategies for using any problem to its full potential.
Patrick Vennebush
Twitter: @pvennebush
Discovery Education, Falls Church, Virginia

_Hynes Convention Center, 200_
8:00 A.M.—9:15 A.M.

165 REVEL
Captivating Students WITH Mathematics: Boston Area Teachers Share Their Lesson Designs
8–10 Workshop
High school teachers from the Boston region will introduce how they plan and enact “mathematical stories”—lessons designed to spur student curiosity, captivate students with complex mathematical content, and compel students to engage and persevere. Participants will learn strategies to enhance the aesthetic opportunities of their lessons.
Leslie Dietiker
Twitter: lesliedietiker
Boston University, Massachusetts
Meghan Riling
Boston University, Massachusetts
Miriam Gates
Boston University, Massachusetts

Hynes Convention Center, 207

166 TECH
Diving into Desmos: An Intermediate’s Guide to Desmos Activity Builder
8–10 Workshop
Are you ready to create your own Desmos activities? Join us as we introduce the Desmos design principles and options available for creating your own high-quality activities to enhance conversations, increase engagement, and provide greater opportunities to meet the needs of all your students. Bring a tablet or laptop to maximize your participation.
Heather Kohn
Twitter: @heather_kohn
Marlborough Public Schools/Desmos Fellow, Massachusetts
Jennifer Fairbanks
Hopkinton High School/Desmos Fellow, Massachusetts

Hynes Convention Center, 202

167 EMPOW
Orchestrating Productive Discussions in High School: The Five Practices in Practice
10–12 Workshop
The Five Practices for Orchestrating Productive Discussions provide a framework for planning and enacting rich discourse-based lessons that support students in developing conceptual understanding and connecting mathematical ideas. But can it be done in high school? I share artifacts from high school teachers enacting the Five Practices.
Mike Steele
Twitter: @mdsteele47
University of Wisconsin–Milwaukee

Hynes Convention Center, 210

168 EMPOW
What Is Straight? Mathematics as a Human Experience and a Civil Rights Issue
10–12 Workshop
Starting from the work of Bob Moses in the civil rights movement and moving into the current work with the Algebra Project, we believe that mathematics can be used as an organizing tool to ensure that every child has access to quality public school education. Students from the AP pedagogical model will facilitate mathematical activities.
Kate Belin
Twitter: @katebelin
Fannie Lou Hamer Freedom High School, Bronx, New York
Rayshon Moore
Baltimore Algebra Project, Maryland
Debe Adams
Baltimore Algebra Project, Maryland

Hynes Convention Center, 203

169 EMPOW
Be Both Author and Illustrator of Mathematical Understanding
Coaches/Leaders/Teacher Educators Workshop
We want every learner in our care to be BOTH the author and illustrator of their mathematical understanding. Explore how to deepen understanding, promote productive struggle, and increase flexibility by using and connecting mathematical representations. Providing multiple pathways to success invites diverse learners’ ideas to the conversation.
Jill Gough
Twitter: jgough
Trinity School, Atlanta, Georgia

Hynes Convention Center, 309

170 PRO
Cognitive Demand in Action: It’s Not Just about the Task!
Coaches/Leaders/Teacher Educators Workshop
In our research, we see that the extent to which the students, as opposed to the teacher, are doing the mathematical “heavy lifting” in a lesson depends far more on the instructional decisions than on the task or curriculum. This session explores the “enactment” of various types of tasks, and how to keep the cognitive demand high in all cases.
Jackie Kearney
Twitter: jackiekearney23
Center for Education Policy Research at Harvard University, Cambridge, Massachusetts
Claire Gogolen
Center for Education Policy Research at Harvard University, Cambridge, Massachusetts

Hynes Convention Center, 310
8:00 A.M.–9:15 A.M.

171 **PRO**

The Coach, The Novice & The Expert
Coaches/Leaders/Teacher Educators Workshop
NCTM’s *Principles to Actions* advocates for teachers to understand what students know and need to learn and then challenge and support them to learn it well. Coaches apply this principle to teachers. In this session, participants will explore the different philosophies of coaching and determine ways to promote the expert and train the novice.

Barb Everhart
Twitter: @berealcoach
BeRealCoach, Minneapolis, Minnesota

**Hynes Convention Center, 313**

9:30 A.M.–10:30 A.M.

172 **EMPOW**

Empowering ELLs through Equitable Teaching and Learning
Pre-K–2 Session
ELLs! Rigor for all! Math mindsets! Common Core! Feeling overwhelmed? Come experience this session and get some answers and motivation. I was an elementary teacher working with ELLs for 25 years and have recently been trained by Eric Jensen to give impactful workshops. Now I am a professor and I will share 18 research-based strategies for engaging ELLs.

James Ewing
Twitter: @EwingLearning
Stephen F. Austin State University, Nacogdoches, Texas

**Hynes Convention Center, 204**

173 **EMPOW**

Fraction Routines That Count
3–5 Session
Fraction understandings in the elementary grades serve as the foundation for future math learning. Participants will be introduced to classroom routines that build important fraction understandings including open number line, fraction count arounds, and fraction number talks. These powerful routines can be implemented immediately with students.

Jean Kelly
Twitter: @BridgeElemMath
K-5 Math Coach, Lexington Public Schools, Massachusetts

Linda Menkis
K-5 Mathematics Department Head, Lexington Public Schools, Massachusetts

**Hynes Convention Center, 209**

174 **EMPOW**

Helping All Students Understand the Meaning of Word Problems
3–5 Session
We provide an overview of an intervention for third-grade students who demonstrated difficulty with solving word problems. Across a school year, we helped students understand the underlying structure of word problems instead of relying on keywords tied to operations. Students demonstrated superior word-problem performance at the end of the year.

Sarah Powell
Twitter: sarahpowellphd
University of Texas at Austin

**Hynes Convention Center, 302**

175 **EMPOW**

Ensure ALL Students Think like Mathematicians by Routinely Integrating 5 Essential Strategies
6–8 Session
Engaging ALL learners in conceptual understanding of abstract ideas is complex, yet critical. We need lesson designs that integrate research-based supports for struggling learners, including English learners and students with learning disabilities. Learn five crucial supports and how to make them routine for students and teachers!

Amy Lucenta
Twitter: @amylucenta
Fostering Math Practices, Natick, Massachusetts

Grace Kelemanik
Fostering Math Practices, Natick, Massachusetts

**Hynes Convention Center, Ballroom B**

176 **EMPOW**

Student Diagramming and Language Strategies to Support English Learners’ Fraction Problem Solving
6–8 Session
English learners (ELs) should be active participants in classroom mathematical discourse. Examine fraction tasks and EL student work recordings to understand how diagramming supports students’ fraction problem solving and communication. Also learn about several strategies to integrate with math tasks to support ELs’ mathematical communication.

Jill Neumayer DePiper
Education Development Center, Inc., Waltham, Massachusetts

Johannah Nikula
Education Development Center, Inc., Waltham, Massachusetts

Diana Serrano
Education Development Center, Inc., Waltham, Massachusetts

Boston Sheraton, Back Bay Ballroom BC
9:30 A.M.–10:30 A.M.

177  
**ASSESS**
**Using Formative Assessment to Target Instruction and Build Student Ownership in Math Intervention**

**6–8 Session**
Effective mathematics intervention requires teachers to gather and use evidence of student thinking in a timely, formative way to target instruction. This session explores formative assessment probes and two-part learning targets as tools to support teachers in setting priorities for learning and to help students self-assess their learning.

**Emily Fagan**
Education Development Center, Sudbury, Massachusetts

**Theresa MacVicar**
Somerville, Massachusetts

_Hynes Convention Center, 311_

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178  
**TECH**
**Common Accents Financial Mathematics for Middle School and High School**

**8–10 Session**
Common Sense Math requires students to have an understanding of the basic financial mathematical ideas involving compound interest. We will use a non-formula approach to savings, loans and annuities. These labs are designed so students develop a deeper understanding of real-world phenomena. TI-84 and NSpire handouts will be provided.

**Ronald Armontrout**
Hotchkiss School (Retired), Oxford, Maine

_Hynes Convention Center, 306_

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179  
**TECH**
**Design Technology-Enhanced Curricula to Engage Students**

**8–10 Session**
Learn how to implement the Standards for Mathematical Practice in online or blended courses highlighting approaches using technology. Explore curriculum components such as course storyboard, online educational resources, community, and assessment. In addition, examine sample activities and student work that promote student learning and success.

**Amy Miele**
Twitter: @AmyMieleVHS
The Virtual High School (VHS, Inc.), Maynard, Massachusetts

_Hynes Convention Center, 304_

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180  
**PRO**
**Designing Coaching Initiatives That Result in Teacher Leadership and Adult Learning Communities**

**Coaches/Leaders/Teacher Educators Session**
Coaching is a process. It does not depend on a specific person. Anyone who wants to improve teaching and learning can learn to influence school-wide improvement in teaching practice and student learning. Come and explore the many possibilities for creating an adult learning environment that results in effective teaching and improved learning.

**Lucy West**
Twitter: #MetaTLC
Metamorphosis Teaching Learning Communities, New York, New York

_Hynes Convention Center, Ballroom C_

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181  
**EMPOW**
**Emphasizing the “Group” in Groupwork: Empowering Students through Equitable Teaching Practices**

**General Interest Session**
As teachers, we are challenged to co-create safe and collaborative learning spaces that provide our students access and opportunity to illustrate their mathematical capabilities and brilliance. In this session, I will share equitable teaching groupwork strategies I have used to put the empower students across K-16 mathematics classrooms.

**Jennifer Eli**
Twitter: jelimathed
University of Arizona, Tucson

_Hynes Convention Center, 312_

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182  
**EMPOW**
**Incorporate an Equity-Based Research Theme in High-Quality Lesson Study**

**General Interest Session**
Infuse equity into the lesson study process to provide traditionally underserved students access to high-quality and rigorous mathematics and to shift teachers’ approaches to incorporating best practices for these students. This session will supply examples of how to incorporate and infuse equity into high quality lesson study.

**Susie Hakansson**
Twitter: @SusieHakansson
TODOS: Mathematics for ALL, Venice, California

**Kyndall Brown**
University of California, Los Angeles

_Hynes Convention Center, Ballroom A_
9:30 A.M.–10:30 A.M.

183  
**Math Tasks + Manipulatives = Success**  
General Interest Session

Rich mathematical tasks that engage students in solving and discussing are a vital part of a mathematics classroom. Manipulatives can be utilized as a tool to help students with such tasks by providing entry points for each and every student. Come explore some rich tasks utilizing a variety of manipulatives.

Kevin Dykema  
Twitter: @kdykema
Mattawan Consolidated Schools, Michigan

*Boston Sheraton, Republic Ballroom AB*

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9:45 A.M.–11:00 A.M.

183.3  
**Achieve Math Fact Fluency While Running for President**  
3–5 Exhibitor Workshop

Come learn about our unique and award-winning PlaySmart Dice system and our fun classroom games that teach harder-to-learn addition and multiplication facts. Fun for the whole class or great for smaller groups and after-school programs. What’s more, see how we use them in one of the most heralded education board games of the year—Election Night!

Semper Smart Games
Arlington, Virginia

*Hynes Convention Center, 305*

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Need funding for professional development? Check out grant opportunities from the Mathematics Education Trust. The next deadline to apply is November 1. Visit the MET area in NCTM Central to learn more.
9:45 A.M.–11:00 A.M.

186  **REVL**
**Counting Collections in K–5: Building Practice across a School**
3–5 Workshop
What does Counting Collections look like across the grades? How do we extend the foundational work accomplished in K-grade 2 to grow with students into grades 3-5? How can collections encourage multiplicative thinking, help mathematicians develop number relations, allow us to tackle the mathematical properties, and support the development of recordings?

**Julie Kern**
Twitter: @JulieKernUCLA
UCLA Lab School, Los Angeles, California

**Hynes Convention Center, 203**

187  **EMPOW**
**Giving Your Number Talks a Makeover: Making Student Thinking More Visual**
3–5 Workshop
A growing body of research suggests students learn best when math is visual. In spite of this, much recording of student thinking is still a series of equations. Elevate your talks by leveraging a set of flexible visual representations to support sense making. Collaborate to give recordings a makeover minus the pressure of a live student audience.

**Trish Kepler**
Twitter: @KeplerTrish
Greenwich Country Day School, Connecticut

**Hynes Convention Center, 309**

188  **EMPOW**
**Preparing Mathematical Thinkers for the Future**
3–5 Workshop
The World Economic Forum released the top 10 job skills people need to have by 2020 to be most successful. The number one skill is “complex problem solving.” Come join us as we investigate how to implement meaningful tasks to challenge all students’ thinking, engage them in discourse, and deepen students’ problem-solving skills.

**Hilary Kreisberg**
Twitter: Dr_Kreisberg
Mathematics Consultant, Hudson, Massachusetts

**Hynes Convention Center, 200**

189  **EMPOW**
**Routines: Structures That Provide Space for Curiosity and Agency in Learning**
3–5 Workshop
Routines are powerful teaching tools and a prevalent part of daily instruction. This invites us to consider the questions: What makes routines effective? Which elements provide the space for all children to engage with curiosity and have opportunities for agency? We will explore the routine Days in School and use it to look at routines in general.

**Janice Szymaszek**
Twitter: @jszymaszekmath
Campus School of Smith College, Northampton, Massachusetts

**Karen Schweitzer**
Anne T. Dunphy School, Williamsburg, Massachusetts

**Boston Sheraton, Back Bay Ballroom A**

190  **EMPOW**
**The Hierarchy of Hexagons: An Example of Geometric Inquiry**
6–8 Workshop
The hierarchy of quadrilaterals is standard fare in geometry courses at many levels. But what about hexagons? Come join a genuine inquiry session in which we will develop hexagon classification schemes, ask about relationships, and maybe even prove a few new theorems! Modifications for middle and high school classrooms will be discussed.

**Christopher Danielson**
Twitter: @trianglemancsd
Desmos, Inc., St. Paul, Minnesota

**Hynes Convention Center, 210**

191  **A&E**
**High School Modeling: Best Practices for Implementing High-Intensity Tasks for All Students**
8–10 Workshop
Modeling is a SMP AND a conceptual category, but how and when should students engage in high-intensity modeling, and how can modeling be a tool for connecting math to equity and social justice? Join us to investigate how modeling in high school provides all students with access to the crucial math skills and understandings needed for college and career.

**Barbara Beske**
Twitter: @beske3
Student Achievement Partners, Mullica Hill, New Jersey

**Hynes Convention Center, 206**

Looking for lessons, activities, and teacher resources? Check out nctm.org/crcc.
9:45 A.M.—11:00 A.M.

192 **PRO**

**How Am I Using Teacher Discourse Moves in My Instruction? A Tool for Self-Reflection on Discourse**

10–12 Workshop

Participants will be presented with a self-reflection tool focused on using Teacher Discourse Moves (TDMs) in an intentional and productive way. There will be an opportunity to analyze teachers’ use of TDMs using the tool. Participants will reflect on how the tool can be used when watching their own teaching to enhance discourse in their practice.

*Cara Goldberg*
Lexington High School, Massachusetts

_Hynes Convention Center, 207_

193 **TECH**

**Utilizing CAS (Computer Algebra System) Technology to Enhance Learning in First-Year Calculus**

10–12 Workshop

CAS technology enables all learners to delve more deeply into mathematics. This hands-on workshop engages participants in activities involving Riemann sums, infinite series, limits of sequences, the fundamental theorem of calculus, and sketching the graphs of polynomials that would be rendered impossible without deploying technological tools.

*Jay Schiffman*
Rowan University, Glassboro, New Jersey

_Boston Sheraton, Back Bay Ballroom D_

11:00 A.M.—12:00 P.M.

195 **BEYOND**

**Engaging Math Coaches in an Urban District to Lead the Intersection of Access, Equity, and Ambitious**

6–8 Workshop

How do we create accessible/equitable math communities that position all students to participate meaningfully? Session participants will engage in work facilitated with K–8 coaches to develop and expand use of ambitious teaching practices and knowledge of systemic inequalities and biases to change practices and beliefs about who can do mathematics.

*Lynne Godfrey*
Cambridge Public Schools, Massachusetts

*Julie E. Ward*
Cambridge Public Schools, Massachusetts

*Nancy Horowitz*
Consultant, Roslindale, Massachusetts

_Hynes Convention Center, 202_

195.1 **A&E**

**Girls’ Mathematics Identity: Gateway to Success in STEM**

Coaches/Leaders/Teacher Educators Workshop

This workshop will focus on girls’ math identity—the belief that you can do math and the belief that you belong—as a gateway to participation in STEM education and careers. It will look at systematic barriers that impede participation of girls and women in STEM, and possible solutions—effective approaches, practices, and strategies.

*Lorraine Howard*
Women and Mathematics Education, Philadelphia, Pennsylvania

*Merle Froschi*
FHI 360, New York, New York

_Hynes Convention Center, 208_

196 **BEYOND**

**Playful Pop-Up Math Studios in the Community**

Pre-K–2 Session

A math studio has popped up to engage families and community members around mathematics. In this session, we will share the goals, logistics, and findings from the first year of our project. Examples of materials and tasks shared with our community will be shared as well as how we made connections to the mathematics learning in our schools.

*Janice Novakowski*
Twitter: @jnovakowski38
Richmond School District, British Columbia, Columbia

_Hynes Convention Center, Ballroom A_
GREAT MATH at your DOORSTEP

NCTM REGIONAL CONFERENCES & EXPOSITIONS unite you with math education leaders and colleagues in a setting that fosters collaboration, conversation, and the sharing of knowledge. Learn about superior resources and innovative ideas that will help drive student success in your classroom, school, and district.

YOU’LL HAVE ACCESS TO—

- new strategies you can immediately put to use in the classroom;
- updates on best practices from recognized innovators;
- in-depth discussions about the latest math education tools;
- opportunities to connect, learn, and share with like-minded peers; and
- the latest educational products and resources in the exhibit hall.

WHO SHOULD ATTEND?

- PK–Grade 12 classroom teachers
- Math coaches
- Administrators
- Math teacher educators
- Preservice teachers
- Math specialists

Join NCTM in Tampa, Baltimore, or Dallas and access information and tools that will help lead your students to success in the classroom and beyond.

nctm.org/regionals
11:00 A.M.–12:00 P.M.

197 **EMPOW**

**Using Student Thinking and Connections to Facilitate Powerful Mathematics Discussions**

**Pre-K–2 Session**

Come experience powerful teaching and learning practices for engaging and empowering every student in mathematics. Leave with practical strategies that encourage students to share their mathematical ideas in a collaborative environment. And yes, younger students can do this—we’ll look at classroom videos to see these strategies in action!

**Danielle Curran**
Twitter: danigirl1216
Curriculum Associates, Reading, Massachusetts

**Hynes Convention Center, 306**

198 **EMPOW**

**Let’s “Number” Talk!**

**3–5 Session**

Promoting mathematically productive talk is essential for students to develop conceptual understanding. In this session, participants will learn the how and why behind the successful implementation of Number Talks. Leave with an understanding of how the mathematical disposition of your students can be transformed through Number Talks.

**Susan Loveless**
Twitter: @susanloveless23
Rutherford County Schools, Murfreesboro, Tennessee

**Hynes Convention Center, 209**

199 **EMPOW**

**Teaching on the Edge of Understanding and at the Speed of Learning**

**3–5 Session**

There are many things to consider when we engage students in mathematics. Why do we choose one task over another, how do we know which ones work, and what drives our decision making? The purposeful use and sequence of the right tasks can unlock what students know and inform our next move in the progression of learning.

**Graham Fletcher**
Twitter: @gfletchy
Self-Employed, McDonough, Georgia

**Hynes Convention Center, Ballroom B**

200 **ASSESS**

**Orchestrating a Meaningful Closure**

**6–8 Session**

The closure ties students’ learning together. Let’s make the most of students’ last opportunity to engage in mathematical thinking. In this session, teachers will gain an understanding of how to orchestrate a closure that provides students with the opportunity to reflect on and share their learning.

**Rikkita Watson**
Twitter: kitawats
Tyler ISD, Texas

**Brittini Ooten**
Tyler ISD, Texas

**Amber Ledbetter**
Tyler ISD, Texas

**Hynes Convention Center, 204**

201 **ASSESS**

**Prompts, Problems, and Teacher Moves for Growing Student Thinking in Geometry**

**8–10 Session**

Students enter geometry with a range of experiences in devising mathematical arguments. Come explore a framework that lets students assess their own geometric explanations and advance their skills with justifying and proving. We will also examine a series of quadrilateral problems that will challenge even your most advanced geometry students.

**Alison Langsdorf**
Twitter: @AlisonLangsdorf
Weston High School, Massachusetts

**Hynes Convention Center, 311**

202 **TECH**

**Caught Up in the Race: Modeling the Motion of Runners**

**10–12 Session**

We can engage students in the modeling process and foster mathematical curiosity by capturing data from videos. We’ll explore mathematical models for the horizontal and vertical positions of two runners on a track. Math concepts include piece wise and sinusoidal functions, parametric equations and rates of change. The video and data will be shared.

**Maria Hernandez**
Twitter: @mathmodeling
North Carolina School of Science and Mathematics, Durham, North Carolina

**Boston Sheraton, Republic Ballroom AB**
11:00 A.M.–12:00 P.M.

203 **ASSESS**
Formative Grading or: How I Learned to Stop Worrying and Love Feedback
10–12 Session
Why do we grade? Can a single number be meaningful to students? When evaluating student work, we have an opportunity and obligation to guide them forward with feedback. Instead of asking, “What did this student do wrong?” let’s give our assessments dimension, depth, and character by answering the question, “What is my student struggling with?”
Brian Abend
Twitter: mrabend
Bancroft School, Worcester, Massachusetts

**Tech**
Using GeoGebra Augmented Reality to Build and Test 3D Mathematical Models of Real-World Objects
10–12 Session
Here, we will use GeoGebra Augmented Reality (on our iOS- and non-iOS devices) to build and create 3D models of everyday, real-world objects. We will also be able to virtually “place” these objects within our surroundings to test their accuracy. In doing so, we will see how classes of functions students study in 2D can easily be applied in 3D.
Timothy Brzezinski
Twitter: @dynamic_math
Brzezinski Math, Southington, Connecticut

**A&E**
Equity in the Illustrative Mathematics Curriculum: Diverse Tools for a Diverse Classroom
General Interest Session
Are you frustrated by textbooks that aren’t designed for all the students in your classroom? IM provides customizable teaching tools so you can provide targeted supports for your students as they need them. By giving all students access to challenging problems, a wide range of students can work together to gain a deep understanding of mathematics.
Tina Cardone
Twitter: @crstn85
Illustrative Mathematics, Salem, Massachusetts
Melissa Schumacher
Illustrative Mathematics, Tacoma, Washington

206 **PRO**
Partnering with Paraeducators in Math Class
General Interest Session
Through examples of teacher-para collaboration within the Doing the Math with Paraeducators project, we, along with para/teacher pairs, will discuss key successes and challenges. As we present our findings, we will illustrate how project paras progressed toward the goal of increasing confidence as well as mathematics and pedagogical content knowledge.
Judy Storeygard
TERC, Cambridge, Massachusetts
Karen Mutch-Jones
TERC, Cambridge, Massachusetts

Hynes Convention Center, 302

207 **ASSESS**
Using Vygotsky Space to Explore Students’ Pathway to Construct Knowledge of Limits
Research Session
It is difficult to observe how students construct knowledge of mathematics. This presentation outlines how the Vygotsky space, modeled as a Cartesian product of manifestation of thought and social location, can be used as an assessment tool to observe the interplay between external and internal speech to understand how students construct knowledge.
Patterson Rogers
Emmanuel College, Boston, Massachusetts

Hynes Convention Center, 312

207.1 **CW**
Utilizing Dynamic Curriculum to Edit and Create “Tailored” Resources
10–12 Exhibitor Workshop
Learn more about how modern platforms can offer district leaders and teachers tailored resources with the ability to design and edit courses and modules. We will explore why “one size fits all” textbooks and online programs are no longer working in most math classrooms.
Walch
Portland, Maine

Hynes Convention Center, 201

Hear what’s new from exhibitors—attend an exhibitor workshop. Look for the ** CW ** symbol throughout the program book.
11:30 A.M.–12:00 P.M.

208 BEYOND

How Do You Know? Engaging Families in Open-Ended Math Conversations at Home
Pre-K–2 Burst

Children benefit when parents support math learning at home; an important classroom practice, asking open-ended math questions, can be a challenge for parents to adopt. In this session, we present research-based strategies that help parents include open-ended math questions in conversations with their children. Based on a national YMCA program.

Marlene Kliman
TERC, Cambridge, Massachusetts
Mary Haughey
YMCA of Silicon Valley, Santa Clara, California

Hynes Convention Center, 207

209 BEYOND

Let’s Talk About it! Fostering Math Talk between Parents and Children
Pre-K–2 Burst

Studies have shown that even the smallest increases in parent-child math talk lead to higher math achievement for students. This presentation will share simple and easy-to-implement strategies for teachers who want to help parents increase the frequency and quality of their math-related interactions with their children.

Anastasia Betts
Twitter: anastasiabetts
Age of Learning, Inc., Glendale, California

Hynes Convention Center, 202

210 ASSESS

Examining the Use of Multiple Writing and Discourse Tasks in Fifth-Grade Mathematics
3–5 Burst

This presentation shares the results of fifth-grade students engaged in multiple mathematical writing tasks. Tasks with different purposes allowed students to develop their metacognitive skills, interact with the material and their peers, and express their understanding. The presentation shows how these activities connect to research and standards.

Christie Martin
University of South Carolina, Columbia

Boston Sheraton, Back Bay Ballroom D

211 ASSESS

Where Do I Go from Here? Assessing Children’s Development of Geometric Reasoning
3–5 Burst

Where are we now? Where do we want to go? How can we get there? Let’s look at the development of geometric reasoning in children! Discussed will be open-ended geometry tasks and a framework for examining children’s thinking elicited in these tasks. We’ll also talk about how we can use the information gathered from students in lesson planning.

Thomas Fox
University of Houston–Clear Lake, Texas

Hynes Convention Center, 313

212 TECH

The Tyranny of the Axes, or, Lost on the Coordinate Plane
6–8 Burst

Student difficulties with graphs on the coordinate plane may be due to understanding coordinates in terms of a path from the origin as opposed a general understanding of left-right, down-up. See where this problem comes up throughout the curriculum, and find ways to help students overcome it, and develop a richer sense of graphs on coordinates.

Steven Starr
StarrWorksMath, Chicago, Illinois

Hynes Convention Center, 206

213 TECH

Students Create: Authoring a Personalized Algebra 1 Resource Book
8–10 Burst

Students Use Book Creator to compile a resource book for Algebra 1.

Patricia Embry
Twitter: @pembry24
Tampa Preparatory School, Florida

Hynes Convention Center, 210

Shop and save at the NCTM Bookstore in NCTM Central!
11:30 A.M.–12:00 P.M.

214 TECH
Locating Outliers and Influential Points Using Regression Analysis and Technology
10–12 Burst
This session will focus on the common methods which are used to detect outliers and influential points in data sets. Participants will use examples along with technology to determine the equation of the regression line and to plot the regression line with and without the influential point(s) being included in the data set.
James Graziose
Palm Beach State College, Lake Worth, Florida
Hynes Convention Center, 309

215 REVOL
Things You Should Know That Your Students Learned about Math in Science Class
10–12 Burst
Half-life, pH, logistical growth, damped oscillation, and inverse square relationships ... this is just a sampling of the many things that your math students learn in science class. Learn what your students know so that you can leverage their previous knowledge to make interdisciplinary connections to science in the math classroom.
Josh Berberian
The Shipley School, Bryn Mawr, Pennsylvania
Hynes Convention Center, 310

216 BEYOND
What Do Our Classrooms Look Like When Schools Lose the Monopoly on Math Education?
Coaches/Leaders/Teacher Educators Burst
Schools used to own math education. But now there are a growing number of franchised companies that offer a full spectrum of classes. Summer programs, tutoring, and online curricula have given families choices about how and when a student learns math. How do schools, and individual teachers, adapt to this changing landscape?
Steven Goldman
Buckingham, Browne and Nichols School, Cambridge, Massachusetts
Hynes Convention Center, 200

217 EMPOW
Conjectures and Counterexamples: Centering Student Thinking with Genuine Mathematical Conversations
General Interest Burst
By empowering students to posit their own conjectures, we invite them to take ownership over their curiosity and learning. With a focus on student-posed conjectures, dynamic and rigorous conversations unfold naturally. Counterexamples are identified, ambiguous terms are defined, and conjectures gradually become precise mathematical statements.
Paul Gafni
Robinson Center for Young Scholars, University of Washington, Seattle
Boston Sheraton, Back Bay Ballroom A

218 ASSESS
Transitioning to Standards-Based Grading at the High School Level
General Interest Burst
In our presentation, we will discuss our school’s recent transition towards standards-based grading, specifically how it relates to the high school math department. We plan to engage in an honest conversation around the benefits and challenges we have encountered during our first year.
Aleksandra Kaplon-Schilis
New York City Department of Education, New York,
Heidi Peace
The Clinton School for Writers and Artists, New York, New York
Julie Garza
The Clinton School for Writers and Artists, New York, New York
Hynes Convention Center, 208

219 EMPOW
A Framework for Semiotic Analysis of Mathematical Thinking as a Multimodal Discourse
Research Burst
In this session, I present a framework for semiotic analysis of students’ multimodal mathematical discourse involving components such as gestures, outer speech, perception, actions, tactility, or, for example, rhythm. The proposed framework builds on and extends research on interpreting gestures that co-occur with speech (Goldin-Meadow 1999; McNeill 2008).
Mirjana Hotomski
Tufts University, Medford, Massachusetts
Hynes Convention Center, 203
1:00 P.M.–2:00 P.M.

220 **EMPOW**

**Helping Our Students Build Number Sense**  
Pre-K–2 Session

Many of our students have not developed number sense. They don’t know how to look for patterns in numbers and use creative ways to solve problems. Math should be treated as a foreign language for all students. I will present ways to help students develop number sense using visuals, manipulates, and language/computation routines. Handouts will be provided.

Lori Mueller  
Great Prairie Area Education Agency, Burlington, Iowa  
*Hynes Convention Center, 209*

221 **REVOL**

**Algebra in the Elementary Math Curriculum: Building Authentic Learning Experiences for All Students**  
3–5 Session

Teachers will examine classroom vignettes of elementary grades children thinking algebraically and curricular design principles that promote it. They will explore criteria for a coherent curricular approach to developing core algebraic thinking practices and principles that enhance struggling learners’ access to authentic algebraic experiences.

Maria Blanton  
TERC, Cambridge, Massachusetts  
*Boston Sheraton, Republic Ballroom AB*

222 **EMPOW**

**Using the Tape Diagram to Solve Word Problems**  
3–5 Session

This session is designed to improve participants’ ability to effectively model and teach multiplication and division word problems by using the tape diagram. Participants will engage in authentic problem-solving experiences with a variety of problems. These activities encourage reflective discussion about the intersection of content and pedagogy.

Christine Bell  
Great Minds, Lutz, Florida  
*Boston Sheraton, Back Bay Ballroom BC*

223 **EMPOW**

**Connecting Tasks and Talk**  
6–8 Session

Pacing guides play a role in framing the enacted math curriculum. They benefit teachers by addressing the requisite mathematics content; however, they also challenge us as we look for tasks that are constrained by circumstances such as time. During this session, we will explore the connection between task and fostering engaging math dialogue.

George Roy  
Twitter: @georgejroy  
University of South Carolina, Columbia  
*Hynes Convention Center, Ballroom A*

224 **ASSESS**

**Assessing Student Thinking through Open-Ended Response**  
8–10 Session

Come learn how writing can be an assessment tool for uncovering student thinking, misconceptions, and underdeveloped concepts. Participants will use, score, and calibrate (with a rubric) student samples. This practice is designed to engage students in the process of thinking deeply about math in order to ensure student understanding of math concepts.

Brenda Mesa  
Twitter: @brmesa  
Birdville ISD, Benbrook, Texas  
*Hynes Convention Center, 312*

225 **REVOL**

**Integrating SMP 3 in Traditional Curriculum: Moving beyond Geometry**  
8–10 Session

Integrating SMP 3 into traditional curriculum has been an ongoing challenge. We share instructional activities and evidence from their implementation in a variety of topics in prealgebra, algebra, and geometry through using elements of reasoning and proof, such as developing conjectures, constructing and evaluating arguments, and using counterexamples.

Orly Buchbinder  
University of New Hampshire, Durham  
Sharon McCrone  
University of New Hampshire, Durham  
Katie Rebrovich  
University of New Hampshire, Durham  
*Hynes Convention Center, 311*
1:00 P.M.–2:00 P.M.

226 **TECH**  
**Not So Complex: A Geometric Approach to Complex Numbers from Addition through Euler’s Formula**  
10–12 Session  
Take your understanding of complex numbers to a new level using the dynamic visualization capabilities of Web Sketchpad. We’ll gain mathematical insights into complex number arithmetic, de Moivre’s theorem, and Euler’s formula through applying a geometric transformations approach to these topics. Free web-based materials will be provided.  
Daniel Scher  
Twitter: dpscher  
Scott Steketee  

227 **EMPOW**  
**Setting the Stage for Everything Else: Using Mathematical Goals to Focus Learning**  
10–12 Session  
Intentional teaching results when teachers learn to select and sequence student work for classroom discussion. Participants in this session will consider samples of student work that draws upon students’ diverse ways of thinking, while building a connected and coherent mathematical storyline aligned with the mathematical goals of the lesson.  
Scott Hendrickson  
Brigham Young University, Provo, Utah  

228 **REVOL**  
**Making Connections across Representations: A Tool for Deepening Mathematical Discussions**  
General Interest Session  
In this interactive session, we will use our own math explorations as well as examples of work of elementary and middle school students to illustrate and highlight the value and power of shaping mathematical discussions by focusing them on making connections across different kinds of representation such as story contexts, diagrams, and number lines.  
Virginia Bastable  
Consultant, Los Angeles, California  

229 **EMPOW**  
**Productive Strategies to Support Students’ Engagement in Productive Struggle**  
General Interest Session  
Engaging students in challenging tasks is essential for developing the conceptual understanding, procedural fluency, and productive habits of mind they need to prepare them for their futures. Learn strategies to increase students’ willingness to engage in such tasks and promote their positive math identities, along with common pitfalls to avoid.  
Diane Briars  
Past President, National Council of Teachers of Mathematics, Reston, Virginia; Mathematics Education Consultant, Pittsburgh, Pennsylvania  

230 **A&E**  
**Talk Number to Me: Mathematics & Mindfulness**  
General Interest Session  
Students’ positive identities as sense makers and problem solvers all rests upon their social emotional intelligence. Every student should be supported in developing a positive mathematical identity to engender formidable mathematical learning. Let’s explore Social Emotional Learning Guiding Principles to build powerful mathematical identities.  
Christina Lincoln-Moore  
Twitter: virtuouscm  
Los Angeles Unified School District, California  

231 **BEYOND**  
**Math Day: An Experience in Service Learning**  
Higher Education Session  
Five years ago, faculty from teacher education and mathematics partnered together to celebrate Math Day at a local elementary school. Using service learning, college students introduced mathematics outside of the classroom to the elementary students. The service learning experience continues today. The win-win-win benefits will be discussed.  
Michele Brague  
Misericordia University, Dallas, Pennsylvania  
Steven Tedford  
Misericordia University, Dallas, Pennsylvania  

Hynes Convention Center, 304

Hynes Convention Center, 204

Hynes Convention Center, 204

Hynes Convention Center, Ballroom B

Hynes Convention Center, 302

Hynes Convention Center, 306
Mathematical Thinking: From Assessment Items to Challenging Tasks
This compilation of problem-based activities encourages students to engage in productive struggle and deep thinking.
STOCK #14854

The 5 Practices in Practice: Successfully Orchestrating Mathematical Discussion in Your Middle School Classroom
Take a deeper dive into understanding the five practices—anticipating, monitoring, selecting, sequencing, and connecting—for facilitating productive mathematical conversations in your middle school classrooms.
STOCK #15790

Math That Matters: Targeted Assessment and Feedback for Grades 3 to 8
This resource by popular professional developer Marian Small comprehensively addresses different mathematical domains for grades 3-8.
STOCK #15893

Putting Essential Understanding into Practice: Number and Numeration, Pre-K-2
What tasks can you offer—and what questions can you ask—to determine what your students know or don't know—and move them forward in their thinking?
STOCK #14348

Create meaningful and transformative K-5 STEAM learning experiences for each and every student. Make the most of your limited instructional time and become part of the Step into STEAM movement!
STOCK #15854

Visit our bookstore at NCTM Central and SAVE AT LEAST 25% on all purchases!
1:00 P.M.–2:15 P.M.

232 **ASSESS**
Mathematizing Our Read Alouds
Pre-K–2 Workshop
Contexts, through literature, let students know what numbers represent and how they relate to each other. So let’s mathematize read alouds! Lesson plans and artifacts from classrooms will show how anticipation and “noticing and noting” can inform differentiation and next-steps planning. Time to consider a collection of read alouds is included!
Becky Holden
Twitter: @bholden86
Trinity School, Atlanta, Georgia

Hynes Convention Center, 202

233 **EMPOW**
Changing the Whole: Exploring Number Relationships
3–5 Workshop
Students benefit from hands-on tasks exploring quantity, area, and fractional relationships when the value of a whole changes. We will explore how students can use shapes to grow more fluent in number relationships, make connections, and develop proportional reasoning. Tasks can be adjusted for whole numbers, fractions, decimals, or money.
Molly Rawding
Twitter: @RawdingMolly
Lexington Public Schools, Massachusetts
Jean Kelly
Lexington Public Schools, Massachusetts

Hynes Convention Center, 206

234 **REVOL**
Connecting the Math: Coherence across K-Grade 5
3–5 Workshop
Ever wonder how the content you teach is supported by students’ previous work or extended beyond your grade level? The CCSS mathematics standards are written thoughtfully to build coherence across grade levels. Participants will engage in tasks designed to illustrate mathematical progressions across kindergarten to grade 5. Join us and let’s do some math!
Kristin DeLorenzo
Twitter: @kal391
Flemington Raritan School District, New Jersey
Liz Gardner
Flemington Raritan School District, New Jersey

Hynes Convention Center, 309

235 **EMPOW**
Mirrors, Windows, and Doors: Equitable Access through Authentic Problems in Multicultural Literature
3–5 Workshop
This workshop will provide exposure to and hands-on experience with strategies that provide diverse students a mirror, window, and door into mathematics content. Participants will leave with practical strategies to help students see how mathematics can be used to both understand and effect change in their world.
Sara Donaldson
Twitter: @swdonaldson23
Wheaton College, Norton, Massachusetts

Boston Sheraton, Back Bay Ballroom D

236 **REVOL**
Multiplication Isn’t Always Commutative: Exploring the Problems with Problem Solving
3–5 Workshop
Let us convince you! The commutative property can actually get in the way of solving word problems. Explore more meanings of multiplication and division while making sense of equal groups, area/array, and comparisons as separate problem types. Leave with strategies for better sense making, and put the commutative property in its place!
Kimberly Morrow Leong
Twitter: kmorrowleong
George Mason University, Fairfax, Virginia
Sara Delano Moore
ORIGO Education, Kent, Ohio
Linda Gojak
Past President, National Council of Teachers of Mathematics, Reston, Virginia; ORIGO Education, Kent, Ohio

Hynes Convention Center, 203

237 **TECH**
Now I See It! Conceptualizing and Visualizing Mathematics through Technology
3–5 Workshop
Participants will engage in activities for learning mathematics that go beyond practicing or assessing. Bring your laptop and be an active learner with online games, virtual manipulatives, and applications. Use the power of technology to bring a deeper conceptual understanding of mathematics to your students.
Karen Gartland
Twitter: KarenGGartland
Groton-Dunstable Regional School District, Massachusetts

Hynes Convention Center, 310
1:00 P.M.–2:15 P.M.

238 **EMPOW**
Empowering Students as Owners of Their Mathematical Thinking through Reading and Writing
6–8 Workshop
Communication through written text is critical to building mathematical understanding. How do we incorporate reading and writing strategies into math to promote ownership of learning? We will look at multiple opportunities to utilize literacy to develop a deeper mathematical understanding, give all students a voice, and engage in math practices.
Sarah Galasso
Twitter: @SarahGMath
Carnegie Learning, Anaheim, California

**Hynes Convention Center, 313**

239 **REVOL**
Fantastic Tasks and Where to Find Them
8–10 Workshop
What makes a quality task? How can I structure lessons that promote inquiry, discourse, and academic safety? In this session, we will look at different task types and various examples so your classroom can be filled with mathematical joy and deep learning. You’ll also walk away with resources to help you find, deploy, and assess rich tasks.
Geoffrey Krall
Twitter: @geoffkrall
New Tech Network, Fort Collins, Colorado

**Hynes Convention Center, 200**

240 **REVOL**
Computational Geometry: Curriculum and Applications for the Third Millennium
10–12 Workshop
Computational geometry allows students to “do the math” to better understand the way computers solve problems. Algorithmic thinking is critical to the nature of understanding mathematics. Algorithms stated in terms of geometry help solve problems like the art gallery problem and the facility location problem. Come for content and activities.
Chuck Biehl
L Charles (Chuck) Biehl, North East, Maryland

**Hynes Convention Center, 208**

241 **EMPOW**
Challenging Assumptions and Reframing Narratives: An Equity Practice
Coaches/Leaders/Teacher Educators Workshop
Every day we encounter narratives and assumptions about who are students are and what mathematics is. How do these narratives impact students’ experience in schools and their access to rigorous mathematics? In this session, we will explore ways to challenge assumptions and to reframe narratives as a necessary part of equity for all students.
Nicole Bridge
Twitter: @NicoleBridge1
Math Solutions, Attleboro, Massachusetts
Marian Dingle
DeKalb County School District, Atlanta, Georgia

**Hynes Convention Center, 207**

242 **ASSESS**
Formative Assessment and Feedback: Guiding and Informing Mathematics Teaching and Student Learning
Coaches/Leaders/Teacher Educators Workshop
Participants will be engaged in considering how to regularly implement the following classroom-based formative assessment techniques: observations, interviews, show me, hinge questions, and exit tasks. They will also analyze responses to the techniques, and discuss the importance of feedback as a support to student learning and teacher planning.
Francis (Skip) Fennell
Twitter: @SkipFennell
Past President, National Council of Teachers of Mathematics, Reston, Virginia; McDaniel College, Westminster, Maryland
Beth Kobett
Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; Stevenson University, Baltimore, Maryland
Jon Wray
Howard County Public Schools, Ellicott City, Maryland

**Hynes Convention Center, 210**

242.1 **EMPOW**
Bringing Algebra to Life
8–10 Workshop
Mathematical modeling involves students having choice and making assumptions about real-world situations in which they present recommendations and a solution. We will explore mathematical modeling in algebra by challenging participants to design a race between two competitors and then test their race designs.
Ashlee LeGear
University of Wisconsin–River Falls
Kathryn Ernie
University of Wisconsin–River Falls
Erick Hofacker
University of Wisconsin–River Falls

**Boston Sheraton, Back Bay Ballroom A**
Using Manipulatives to Help Students be Successful with Algebra

6–8 Session
Do your students struggle with algebraic concepts? See how your students benefit from a visual approach to algebra and learn how hands-on activities can help promote their understanding of algebraic concepts. Topics include integer operations, solving equations, polynomial expressions, graphing, and more!

Kevin Dykema
Twitter: @kdykema
Mattawan Consolidated Schools, Michigan

Boston Sheraton, Republic Ballroom AB

Redefining Math: Raising Issues of Identity, Coherence, and Assets within an Urban School District

Coaches/Leaders/Teacher Educators Session
Teacher leaders will engage in problem-solving tasks, consider a three-pronged approach to professional development, reflect on legitimate mathematics, and consider ways of engaging upper elementary, middle, and high school teachers, in addition to administrators, through in-service learning.

Theodore Sagun
UCLA GSE&IS, Los Angeles, California
Kristine Ho
UCLA GSE&IS, Los Angeles, California

Hynes Convention Center, Ballroom A

Developing Number Sense in the Early Grades through Math Labs

Pre-K–2 Session
The first- and second-grade teachers at our school participated in a yearlong professional development experience called Math Labs (Kazemi et al. 2017) through which we implemented strategies and routines to improve students’ number sense using rekenreks, choral counting, fact fluency strategies, number talks, and more.

Katie Starbuck
Somerville Public Schools, Massachusetts
Barbara Strell
Somerville Public Schools, Massachusetts

Hynes Convention Center, 209

Uncovering Students’ Fraction Ideas to Inform Instruction

3–5 Session
How can we learn more about students’ fraction ideas? We will share a formative assessment strategy used to learn about students’ partitioning strategies and representation and their use of fraction language and notation. We will try out the assessment approach and think about how the resulting data could be used to inform instruction.

Becca Lewis
Twitter: @lewisbecca
University of Washington, Seattle
Kendra Lomax
University of Washington, Seattle

Hynes Convention Center, Ballroom B
2:30 P.M.–3:30 P.M.

249 REVOL
Using Mathematical Tasks to Support Students’ Learning with Fractions
3–5 Session
This session will focus on characteristics of mathematical tasks and the processes of creating, modifying, or adopting tasks and how to implement them in ways that lead to students’ understanding and productive struggle. Examples will focus on fractions in grades 3-5.
Drew Polly
Twitter: @drewpolly
Charlotte, North Carolina

Hynes Convention Center, 302

250 EMPOW
Maintaining Equitable Practices in the Heterogeneous Classroom
6–8 Session
We will describe the historic and current experiences of Black students, who continue to be segregated in classrooms through ability grouping. We will experience the structure of a successful heterogeneous math lesson, analyze it through the lens of Culturally Responsive Teaching, then practice redesigning lessons with equitable teaching practices.
Heidi Fessenden
Twitter: @heidifessenden
Cambridge Public Schools, Massachusetts
Katisha John
Cambridge Public Schools, Massachusetts

Hynes Convention Center, 312

251 PRO
Becoming a Connected Teacher: Build the Professional Learning Network You’ve Always Wanted
8–10 Session
Are you willing to take a risk and try something new? Would you like to find lesson activities without having to use Google? Are you ready to change your teaching and your classroom culture? Come learn about Twitter and MTBoS and join the greatest PLN around. We will share question strategies, lesson openers, number sense builders, and friends!
Casey McCormick
Twitter: @cmmeach
Our Lady of the Assumption, Citrus Heights, California
Jennifer Fairbanks
Hopkinton High School, Massachusetts

Hynes Convention Center, 304

252 REVOL
Let’s Teach Statistics! Incorporate the Statistics Progression into Your Core Classes
8–10 Session
Do you need help teaching CCSS stats in grades 9-12? Would you like to see and participate in some activities that promote understanding of the statistics standards? Come spend an hour with us to see activities that truly follow the Statistics Progression. Are you teaching with the Traditional model? The Integrated model? We can help!
Chad Shepherd
Twitter: @cshep75
Pontiac Township High School, Illinois

Hynes Convention Center, 204

253 EMPOW
The Power of Our Questions
General Interest Session
Mathematical routines can be a useful tool for supporting students in developing number sense and reasoning, but a routine is only as good as the questions we ask while facilitating it. We’ll explore how the questions we ask affect our students’ learning experiences and send powerful messages about who has ownership over the ideas in math class.
Sarah Bent
Twitter: @SarahBent86
Mount Holyoke College, South Hadley, Massachusetts
Danielle Larkin
East Longmeadow Public Schools, Massachusetts

Hynes Convention Center, 306

254 EMPOW
General Interest Session
In this session, classroom video examples illustrate how teachers integrated mathematical argument into their curriculum and supported students’ mathematical reasoning through making connections among representations, words, and symbols. Four teachers from Henry Grew School in Boston—Quayisha Clarke, Emmanuel Fairley-Pittman, Natasha Gordon, and Isabel Schooler—will co-lead the session with the presenters.
Susan Jo Russell
TERC, Somerville, Massachusetts
Deborah Schifter
EDC, Northampton, Massachusetts

Hynes Convention Center, Ballroom C
The NCTM Annual Meeting & Exposition
is headed to the fall!
St. Louis | October 21–24, 2020

2:45 P.M.–4:00 P.M.

255 ASSESS
Click, Click, Zoom! Using Photographs and Learning Progressions as Tools for Formative Assessment
Pre-K–2 Workshop
Do you need a way to capture student thinking before it disappears? Well CLICK some photographs and ZOOM in with learning progressions! In this session, we will explore how to use photographs and learning progressions as formative assessment tools that enable you to capture student thinking, make sense of it, and use it to guide future instruction.

Katherine Marin
Twitter: @professormarin
Stonehill College, Easton, Massachusetts
Sarah Roller
University of Alabama in Huntsville
Elizabeth Cunningham
University of Alabama in Huntsville

Hynes Convention Center, 207

256 REVOL
Are Some Representations of Multiplication Better Than Others?
3–5 Workshop
We will focus on building students’ understanding of multiplication, conceptually, and contextually. In particular, we will explore how a student’s use of representations impacts their ability to make sense of the abstract thinking necessary for high school algebra. Come ready to do math, work with others, share ideas, and ask questions.

Claudine Margolis
University of Michigan, Ann Arbor
Michael Hayes
University of Massachusetts, Amherst

Hynes Convention Center, 202

257 EMPOW
Models & Manipulatives: Preventing Arithmetic before Comprehension (ABC) in Mathematics Classrooms
3–5 Workshop
All students need equitable access to high-quality resources implemented with effective instruction. Workshop participants will make length, set, and area type models and manipulatives for measurement, whole, and rational number standards to ensure concept relationships are visible and affordable, so all students can use them in and out of class.

Stacy Boote
University of North Florida, Jacksonville
David Boote
University of Central Florida, Orlando

Hynes Convention Center, 208

258 ASSESS
Using Assessment to Align Fraction Routines to Learners
3–5 Workshop
A deep understanding of fractions is critical to continued achievement in mathematics, it is crucial to assess student understanding of fractions and to use that information to match routines to student development. In our session, we will share assessments of fraction knowledge and routines designed to develop big ideas, strategies, and models.

Ellen McCrum
Twitter: @ellenmccrum
Metamorphosis Teaching Learning Communities, New York, New York
Antonia Cameron
Metamorphosis Teaching Learning Communities, New York, New York

Hynes Convention Center, 310

259 PRO
Empowering Your Students through Productive Mathematical Discourse
6–8 Workshop
We will discuss how we use the 5 Practices for Orchestrating a Productive Math Discussion with teachers and students. We will engage the audience in a rich mathematical task and role-play how to implement the 5 Practices. Teams will be provided a rich math task, a goal, and student work in order to participate in using the 5 Practices themselves.

Erick Hofacker
Twitter: @DrHofacker
University of Wisconsin–River Falls
Kathryn Ernie
University of Wisconsin–River Falls

Hynes Convention Center, 309
2:45 P.M.—4:00 P.M.

260 EMPOW
Making Math Moments That Matter
6–8 Workshop
Wondering how to create a classroom culture where students don’t want to stop exploring mathematics when the bell rings? Get introduced to our three-part framework for building easy to plan and fun to deliver lessons that will not only love, but also learn from! Learn how you can help meet the needs of all learners regardless of student readiness.
Kyle Pearce
Twitter: @MathletePearce
Greater Essex County District School Board, Windsor, Ontario, Canada
Jon Orr
Tilbury, Ontario, Canada

Hynes Convention Center, 313

261 TECH
Modeling the Statistical Experience You Wish You’d Had
6–8 Workshop
Think about your experiences in statistics. Now imagine your students engaging with statistics the exact same way. Are you excited for them? Or terrified? Let’s analyze evidence in court cases, create statistical models, and engage in simulations with high-quality tasks—all while developing students’ understanding (and love) of statistics.
Shauna Hedgepeth
Twitter: @approx_normal
Algebra Nation, Hattiesburg, Mississippi

Hynes Convention Center, 210

262 EMPOW
(Whoosh!)^3: Building an Ensemble Culture for Active Learning and Equity-Building
8–10 Workshop
We invite you into our work integrating ensemble theatre with math pedagogy to support active learning/community-building. Ensemble Culture helps students do purposeful work and feel valued, enlivens discourse, and energizes problem solving. Come play as we explore new ways into QR and support each other in transferring ideas into our own practice.
Rebecca Mitchell
Twitter: @PinemanorM
Pine Manor College, Chestnut Hill, Massachusetts
Deborah Kronenberg
Pine Manor College, Chestnut Hill, Massachusetts

Hynes Convention Center, 203

263 TECH
How Technology Makes Accessing Math Possible: Recursion as an Intuitive Tool to Investigate Various Problems
10–12 Workshop
Participants investigate recursion problems related to medicine dosage, credit card charges, movement of populations, and more. Participants are provided with lesson plans and an answer key that can be used in the classroom on Monday morning.
William Bowdish
Retired, Holmes Beach, Florida

Hynes Convention Center, 200

CPM EDUCATIONAL PROGRAM
Empowering mathematics students and teachers for 30 years through exemplary curriculum, professional development, and leadership
+ Curriculum written by a team of experienced teachers
+ Problem-based lessons for active student engagement
+ Free, comprehensive professional learning progression to support teacher expertise, growth, and leadership
+ Educational nonprofit 501(c)(3)

We are pleased to support the NCTM Regional Conference in Boston. Stop by booth #113 to meet with a CPM mentor teacher, see our materials, and request a preview.

Visit CPM.org/cpminfo or scan the QR code to get more information and view our conference sessions.

MORE MATH FOR MORE PEOPLE
2:45 P.M.–4:00 P.M.

264 TECH
Let the Sun Shine!! Using Trigonometry to Model Daylight Data
10–12 Workshop
In this hands-on session, participants will collect, plot, and model data for the hours of daylight of various world cities using trigonometric functions and technology. Comparisons between cities lead to interesting discoveries, mathematical connections, and sheds light on differences in daylight around the world. Math is everywhere!
Scott Knapp
Twitter: @scottknapp
Glenbrook North High School, Northbrook, Illinois
Boston Sheraton, Back Bay Ballroom A

265 ASSESS
Mathematics Learning Profiles: A Key to Understanding Students’ Learning and Performance
Coaches/Leaders/Teacher Educators Workshop
When students have challenges in math, educators focus on remediating skills rather than the etiology of the problem. The diagnostic paradigm of a Mathematics Learning Profile (MLP) allows teachers to identify the source(s) of learning challenges and design tailored interventions. Student work will illustrate the efficacy of the MLP framework.
Melinda Eichhorn
Gordon College, Wenham, Massachusetts
Ellen Boiselle
Boston Children’s Hospital, Massachusetts
Hynes Convention Center, 206

266 PRO
Public Teaching: A Set of Strategies Coaches Can Use to Support the “Seeing” of Teaching
Coaches/Leaders/Teacher Educators Workshop
Public teaching—live teaching incorporating moves to make teaching and decision making visible—can be used to support teachers’ learning. It is a strategy that coaches can use when teaching “model lessons.” We describe public teaching, why it might be useful in supporting teachers’ learning, and particular moves that are entailed in the practice.
Meghan Shaughnessy
University of Michigan, Ann Arbor
Nicole Garcia
University of Michigan, Ann Arbor
Boston Sheraton, Back Bay Ballroom D

Infinity Bar Friday Schedule

<table>
<thead>
<tr>
<th>Time</th>
<th>Session I</th>
<th>Session II</th>
<th>Session III</th>
<th>Session IV</th>
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</thead>
<tbody>
<tr>
<td>9:30 a.m.–10:30 a.m.</td>
<td>Virginia Bastable, Susan Jo Russell, Deborah Schifter</td>
<td>Farshid Safi</td>
<td>Franics Su</td>
<td>Steve Leinwand</td>
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<tr>
<td>11:00 a.m.–12:00 p.m.</td>
<td>Trena Wilkerson</td>
<td>Patrick Vennebush</td>
<td>Heather Khon</td>
<td>Michelle Rinehart</td>
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<tr>
<td>12:30 p.m.–1:30 p.m.</td>
<td>Tracy Zager</td>
<td>Carl Oliver</td>
<td>Diane Briars</td>
<td>Grace Kelemannik, Amy Luicenta</td>
</tr>
</tbody>
</table>
A math intervention program for K–5

Bridges Intervention provides targeted instruction and support, addressing Tier 2 within the RTI framework. Each volume contains activities, games, and practice pages that can be used for re-teaching key numeracy skills and concepts. Placement and progress monitoring assessments are included.

mathlearningcenter.org/intervention
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Once you have joined NCTM, membership in an NCTM Affiliate is a terrific way to round out your professional involvement. Affiliates offer you an additional opportunity to connect with teachers in your state, region, or city for support, professional development opportunities, community outreach, political advocacy, and information sharing.

A list of Partner Affiliates in the conference region and the Affiliates-at-Large appears listed on page 65. To join one of these organizations, email the Affiliate contact for membership information. NCTM has Affiliates throughout the United States and Canada.

For a list of all organizations affiliated with NCTM and information on how to join, visit the Affiliate Directory at nctm.org/Affiliates/Directory.

About the Host Organization

The Association of Teachers of Mathematics in Massachusetts (ATMIM) has been the serving the needs of Mathematics educators in Massachusetts since 1906. We have grown into an family that serves our members by offering three quality conferences and/or workshops each year, and offers four scholarships to high school students through the commonwealth, acknowledging their commitment to academic excellence and to community service. Each time NCTM chooses Boston as its conference venue, we are proud to be its host affiliate.

Formulate Fantastic Features

Mathematics Teacher: Learning and Teaching PK–12 (MTLT), NCTM’s exciting, new journal with a unique point of view—your view as a practicing teacher of mathematics—is seeking submissions for its feature articles, specifically focused on grade bands PK–2 and 3–5.

Front & Center: Submissions must touch on a topic that spans PK–12. When submitting, choose the Manuscript Type category “All grades PK–12.” This article should try to appeal to the wide range of MTLT readers.
Word count: 3500–5000

Feature article (grade-band specific): Submissions should focus on a narrow grade band (PK–2, 3–5, 6–8, 9–10, 11–12). When submitting, choose the grade-band category that fits your article.
Word count: 3000–3500

Focus article (grade-band specific): Submissions should focus, as well, on a narrow grade band (PK–2, 3–5, 6–8, 9–10, 11–12). This tier allows authors to share a single, well-developed idea. When submitting, choose the grade-band category that fits your article.
Word count: 1000–1500

Access https://mc04.manuscriptcentral.com/mtltpk12 to submit manuscripts. Limit your article or submission to the total word count listed above, including references and figures (where applicable). You are encouraged to include such digital components as a video clip, audio file, Livescribe™ file, SMART Board™ file, or other form of multimedia to enhance the submission.
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Boston Sheraton Hotel, Second Floor

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WOMEN

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ClassCalc Booth 314 Beverly Hills, California www.classcalc.com

ClassCalc addresses the significant equity, instruction time, math mastery, scores, and cost issues related to the status quo calculator. ClassCalc offers students and teachers a multi-subject calculator with scientific, graphing, and matrix functionality in an intuitive smartphone app. Teachers can lock student phones on the ClassCalc app for class time, quizzes, tests . . . no phone conflict = more instruction time, and no cheating or distractions. The result: Schools improve equity and test scores.

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Curriculum Associates Booth 400 North Billerica, Massachusetts www.curriculumassociates.com

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Didax Inc Booth 208 Rowley, Massachusetts www.didax.com

Didax creates innovative hands-on resources to improve the teaching and learning of mathematics. Our materials include books, manipulatives, games, and more to support students in pre-K–grade 12. We are proud to be the provider of Unifix® Cubes and related resources in the U.S. In addition, we have several outstanding partnerships within the math community. We work with Great Minds, the creators of the Eureka Math™ curriculum, to provide the only authorized grade-level manipulative kits that support the curriculum. We also work with Math Perspectives to provide Kathy Richardson’s K–2 assessment and curriculum materials including the online assessment system for Assessing Math Concepts™ and the instructional program Developing Number Concepts.
Eureka Math by Great Minds
Booth 107
Washington, D.C.
www.eureka-math.org
Eureka Math—a also known as EngageNY Math—connects math to the real world in ways that take fear out of math and build student confidence—while helping students achieve true understanding lesson by lesson, and year after year. The Eureka Math curriculum was written by a team of teachers and mathematicians who took great care to present math in a logical progression from PK through grade 12. Eureka works to establish conceptual understanding first, to dramatically reduce gaps in student learning and instill persistence in problem solving, preparing students to understand advanced math. Eureka Math provides educators with a comprehensive, in-depth professional development, print materials, digital tools, and support for educators and parents. Learn more at eureka-math.org or call 844-853-1010.

ExploreLearning
Booth 409
Charlottesville, Virginia
www.explorelarning.com
ExploreLearning develops two best of breed online solutions that help students succeed in math and science: Gizmos, the world’s largest library of highly interactive simulations for math and science in grades 3–12; and Reflex, the most powerful math fact fluency program ever developed. Both have been recognized by the SHA CODE Awards (Gizmos in 2016 (finalist), 2015 (finalist), 2013, 2010, 2007, and 2006, Reflex in 2017 (finalist), 2016, 2014, and 2012) in addition to many other accolades. Gizmos provide an inquiry-driven experience for students, helping them develop deep conceptual understanding and accelerate their ability to apply math and science skills. Students can manipulate key variables, generate and test hypotheses, and engage in extensive “what-if” experimentation. Learn more at www.explorelarning.com. Reflex is a game-based solution that helps districts meet Common Core and state requirements for math fact fluency. Reflex provides an exciting, individualized, and adaptive experience for each student and includes powerful reporting tools for educators. Learn more at www.reflexmath.com.

Forefront Math
Booth 316
Lafayette, Colorado
www.forefrontmath.com
Visualize student performance using your classroom assessments. Data on student performance across grades 3–12; and Reflex, the most powerful math fact fluency program ever developed. Both have been recognized by the SHA CODE Awards (Gizmos in 2016 (finalist), 2015 (finalist), 2013, 2010, 2007, and 2006, Reflex in 2017 (finalist), 2016, 2014, and 2012) in addition to many other accolades. Gizmos provide an inquiry-driven experience for students, helping them develop deep conceptual understanding and accelerate their ability to apply math and science skills. Students can manipulate key variables, generate and test hypotheses, and engage in extensive “what-if” experimentation. Learn more at www.explorelarning.com. Reflex is a game-based solution that helps districts meet Common Core and state requirements for math fact fluency. Reflex provides an exciting, individualized, and adaptive experience for each student and includes powerful reporting tools for educators. Learn more at www.reflexmath.com.

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Children learn best by doing! Visit us at booth 312 to learn more about ETA hand2mind’s most-loved programs and manipulatives. Discover simple solutions to integrate hands-on learning into your classroom for daily math fluency, differentiated math instruction, guided math lessons, and more. Learn about fun, NEW ways to use the ETA hand2mind manipulatives you already have in your classroom and get a sneak peek at exciting new products.

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Austin, Texas
www.hmhh.com
Houghton Mifflin Harcourt (NASDAQ: HMHC) is a global learning company dedicated to changing people’s lives by fostering passionate, curious learners. As a leading provider of pre-K–12 education content, services, and cutting-edge technology solutions across a variety of media, HMH enables learning in a changing landscape. HMH is uniquely positioned to create engaging and effective educational content and experiences from early childhood to beyond the classroom. HMH serves more than 50 million students in over 150 countries worldwide, while its award-winning children’s books, novels, nonfiction, and reference titles are enjoyed by readers throughout the world. For more information, visit www.hmhh.com. Follow HMH on Twitter, Facebook, and YouTube.

L
Learning Wrap-Ups
Booth 318
Layton, Utah
www.learningwrapups.com
Learning Wrap-Ups, Inc., is the developer and publisher of Learning Wrap-Ups, Learning Palette, and Learning Palette Online. These unique products have been developed to assist the K–5 student with development of FACT FLUENCY, and CONCEPTUAL UNDERSTANDING of important math skills. The products of Learning Wrap-Ups have been utilized in the classroom for more than 30 years.

N
NCTM Equity Affiliates
Booth 117
Temple, Arizona
www.bbamath.org; www.todos-math.org
The NCTM Equity Affiliates include BBA, TODOS, and WME. All three organizations are dedicated to advocating for equity and high-quality mathematics, particularly for African-American students, Latina/o students, and females, by developing and supporting educational leaders and providing resources to support teachers and educators in leveling the playing field for mathematics learning. The NCTM Equity Affiliates invite you to come by the booth to learn more about and join their organizations.

O
Origo Education
Booth 412
Earth City, Missouri
www.origoeducation.com/
ORIGO Education provides a complete solution for its customers by combining an innovative range of mathematics products with quality professional learning services. ORIGO—Latin for “original” or “the source”—reflects our commitment to being a premier source of inspiration for math teachers. Our product range illustrates this commitment, by offering a diverse selection of creative products that bring a renewed enthusiasm to students’ learning experiences. ORIGO covers all facets of elementary mathematics education: from traditional printed products to digital/interactive resources and professional learning. ORIGO Stepping Stones (aligned to CCSS) delivers a world-class mathematics program that seamlessly blends digital and print materials. ORIGO demonstrates a commitment to excellence by creating products that inspire and empower teachers and students.
Exhibitor Directory

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Booth 404
Hoboken, New Jersey
www.PearsonSchool.com

Pearson Learning Services is a global pre-K–12 learning company with expertise in digital and print core curriculum, supplemental content, and professional services. Recognized as an industry leader, our educational solutions are powered by innovative technology to advance personalized learning experiences and to achieve successful teaching results. We believe that learning opens up opportunities to create fulfilling careers and better lives. For more information about our pre-K–12 educational solutions, stop by and see us at booth 404 or visit PearsonSchool.com.

PhET Interactive Simulations
Booth 413
Boulder, Colorado
www.phet.colorado.edu

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R
Renaissance Learning, Inc.
Booth 216
Wisconsin Rapids, Wisconsin
www.renaissance.com

Daily and periodic progress-monitoring assessments provide teachers with vital information about each student’s math-skills development by combining Renaissance Learning™ software, such as Accelerated Math™, Accelerated Math Fluency™, and STAR Math™, and classroom-proven best practices. The result: dramatically improved math skills for grade 1–12 students.

S
Semper Smart Games
Booth 416

Stenhouse Publishers
Booth 308
Portland, Maine
www.stenhouse.com

Stenhouse Publishers provides professional development books and videos by teachers, for teachers. Our titles cover a range of content areas—from literacy and mathematics to science, social studies, the arts, and environmental education—as well as a variety of topics, including classroom management, assessment, and differentiation. All of our work is grounded in sound theory and research and informed by our authors’ years of experience in the classroom. We don’t offer programs or one-size-fits-all solutions. Instead, the teachers who write books for Stenhouse and appear in our videos share practical strategies, inspirational ideas, student work and dialogue, and stories from the classroom.

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Texas Instruments
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Dallas, Texas
www.education.ti.com

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Lansing, Michigan
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The Math Learning Center
Booth 212
Salem, Oregon
www.mathlearningcenter.org

The Math Learning Center (MLC) offers innovative and standards-based materials for elementary classrooms. Bridges’ in Mathematics, Number Corner™, and Bridges’ Intervention are designed to develop mathematical confidence and ability not only in students but also in teachers. In support of our nonprofit mission we also offer a range of free resources, from math apps to free lessons and books for educators.

W
Walch Education
Booth 105
Portland, Maine
www.walch.com

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Boston, Massachusetts • September 25–27, 2019

Robert Q. Berry, III
President, NCTM
Name of Provider: National Council of Teachers of Mathematics

Educator's Name: 

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*Note: PD time earned should be the time actually spent in sessions and/or workshops.*

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TOTAL Professional Development Hours Accrued: 

_I certify that the above-named educator accrued the indicated number of professional development hours._

Ken Krehbiel  
Executive Director, NCTM

Robert Q. Berry, III  
President, NCTM

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