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Teaching and learning math can be hard.

Math in Practice is like a math coach for every teacher. This grade-by-grade resource includes strategies and support for teaching math more confidently and effectively.

Samples, crosswalks, and more at MathInPractice.com
NCTM Regional Conference & Exposition 2017
CHICAGO | NOV 29–DEC 1

HOSTS
Illinois Council of Teachers of Mathematics (ICTM)
Metropolitan Mathematics Club of Chicago (MMC)

All Regional Conference presentations will be held at the Hyatt Regency Chicago. See pages 78–85 for floor plans.

REGISTRATION
Wednesday 3:00 p.m. – 7:00 p.m.
Thursday 7:00 a.m. – 3:00 p.m.
Friday 7:00 a.m. – 12:00 p.m.

EXHIBITS
Wednesday 4:00 p.m. – 6:00 p.m.
Thursday 8:00 a.m. – 5:00 p.m.
Friday 8:00 a.m. – 2:00 p.m.

NCTM CENTRAL
Wednesday 4:00 p.m. – 6:00 p.m.
Thursday 8:00 a.m. – 5:00 p.m.
Friday 8:00 a.m. – 2:00 p.m.

nctm.org/chicago

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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.

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Printed in U.S.A.
Welcome to Chicago! We welcome you to the NCTM Regional Conference & Exposition in Chicago, Illinois! We hope the Conference will give you an opportunity to continue your lifelong learning, reflect on and grow your professional practice, and connect with others who share your commitment to the equitable, high-quality teaching and learning of mathematics for all students.

In addition to the great sessions and workshops and the vibrant exhibits, we hope you'll also take some time to enjoy Chicago's many cultural offerings — all so you'll return home rejuvenated, excited, full of new ideas, eager to continue the conversations you started here, and ready to implement innovative ideas with your own students and colleagues.

Our talented Program Committee has worked diligently for many months to select over 250 exciting and valuable presentations addressing our seven themes:

- Designing Learning Experiences
- Dismantling Barriers: Promoting Equity and Access
- A Student’s Journey in Mathematics
- Intentional, Effective Use of Tools and Technology
- Assessment
- Professionalism: Building Capacity, Collaboration, and Leadership
- STEM: Where’s the M?

We're particularly excited to open on Wednesday night with a panel of amazing speakers presenting on equity and access, followed by a moderated question-and-answer period. This will be an engaging, dynamic kickoff to two full days of thought-provoking sessions!

While you’re here, we hope you also find time to enjoy our great city. You likely know about our world-class theatre, shopping, music, and food (Condé Nast Traveler magazine rated us “America’s Best Restaurant City” this spring). And Chicago is truly a city of neighborhoods, so if your stay allows, we hope you get a chance to get beyond downtown and experience the diversity that makes the city so exciting. But it’s not just a great place to visit; math is embedded into Chicago from the coordinate system of our street grid (with its “origin” at State and Madison) to the commerce, architecture, and sports we live among every day.

So here are a few special attractions every mathematical tourist should know about—and we’re not just talking about the periodic motion of Navy Pier’s Centennial Wheel:

- The captivating, complex reflections off the surface of Chicago’s favorite ellipsoid, Anish Kapoor’s Cloud Gate (affectionately known as “The Bean”), in Millennium Park
- Lines in Four Directions by artist Sol LeWitt, outdoors at 10 West Jackson Boulevard
- A few blocks away, more mathematical works at the Art Institute of Chicago, while across the street is a scale model of the city at the Chicago Architecture Foundation
- The new “Numbers in Nature” permanent exhibit at the Museum of Science and Industry, the largest science museum in the Western Hemisphere, features creative explorations of beautiful patterns and a mirror maze (that’s trickier than it seems).
- Mathematical themes at Hotel Indigo (abounding in the golden ratio and Fibonacci sequences), and Hotel EMC2, whose Emmy Noether event space features an installation by Eugenia Cheng, the scientist-in-residence at the School of the Art Institute of Chicago — who will speak on “How to Bake Pi: Making Abstract Mathematics Palatable” at MMC’s monthly dinner meeting on December 15
- And finally, on Saturday, please join us at Walter Payton College Prep High School, where the sine waves in the floor will be joined by even greater mathematical wonders from hundreds of elementary, middle, and high school students sharing their work on novel math projects at Math Circles of Chicago's fifth annual QED: Chicago's Youth Math Symposium (see mathcirclesofchicago.org/qed for details).

From the 1914 founding of MMC — later NCTM Affiliate #1 — to ICTM’s monthly webinars in support of the equitable, high-quality teaching and learning of mathematics, Chicago and Illinois have been closely associated with NCTM since even before its founding. On behalf of the Program Committee, the Volunteer Committee, the NCTM staff, the host organizations, and the many, many volunteers who have worked so many hours to make this conference a reality, we hope you will enjoy the sessions, the exhibits, and the chance to meet and work together with colleagues from across the country.

And thank you for being a part of it. May you return to your home and classroom informed, inspired, and ready to help your students learn with new ideas and strategies!
Program Information

The NCTM 2017 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 9:45 a.m.–11:00 a.m.
Gold Coast, West Tower, Bronze Level

Overview & Orientation

Whether you are new to the NCTM community or are a seasoned veteran, there is something exciting and engaging for everyone! In this presentation given by members of the Board of Directors, you will learn how to get the most of your conference experience. Learn what’s new or discover an opportunity you’ve missed in the past, find out how to navigate presentations, learn how to use the NCTM app, and network with other attendees. Meet other first-time attendees and join conference mentors who share your particular interests.

Thursday and Friday 7:15 a.m.–7:45 a.m.
Grand Ballroom A, East Tower, Gold Level

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 set theater style for at least 100 people. Exhibitors showcase their products and services away from the Exhibit Hall. Look for the symbol indicating exhibitor workshops in the program book.

Grade Bands

To assist attendees in finding appropriate presentations to attend, each presentation lists the presentation’s target grade-band audience. The grade bands are:

- 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

Program Updates

Visit nctm.org/Chicago 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.

Wi-Fi

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

Username: NCTM
Password: NCTM2017
Focus Strands

DESIGNING LEARNING EXPERIENCES (DLE)

The Designing Learning Experiences strand offers opportunities to inform effective teaching practice. This strand focuses on the intersection among worthwhile tasks, purposeful questioning, and supporting productive struggle with a focus on mathematical processes and practices. Sessions in this strand will explore how effective teaching can move students toward deeper understanding of important mathematical ideas.

DISMANTLING BARRIERS: PROMOTING EQUITY AND ACCESS (EQUITY)

Sessions in this strand will focus on dismantling barriers that have kept students from using mathematics to improve their own lives and the lives of their communities. Participants will examine structural barriers (e.g., racism, sexism, language barriers, lack of accommodations, and others) that disproportionately impact students’ and their communities’ experience of learning mathematics, on a personal, classroom, school, district, state, or national level. Sessions may focus on engaging in the cultures, communities, and families of our students to improve classroom outcomes as well as on examining instructional practice and programs that are effective for all students, and in particular students who may have been denied access to educational opportunities in any way for any reason, which has limited their mathematics learning.

A STUDENT’S JOURNEY IN MATHEMATICS (JRNY)

A sound mathematics curriculum develops coherently throughout a students’ school journey. A robust curriculum also encompasses solid mathematical practices while connecting and engaging students with mathematics in the real world, empowering students and improving their lives by building their critical reasoning skills. Sessions in this strand will address these components of a mathematics curriculum as well as address the question “How can teachers be supported in keeping their students’ journey coherent within curriculum restraints?”

INTENTIONAL, EFFECTIVE USE OF TOOLS AND TECHNOLOGY (TOOLS)

Technology and tools are powerful resources in the math classroom when they are used purposefully to promote sense making, reasoning, and communication among students. The sessions in this strand will explore the use of tools and technology to give students access to meaningful problems, promote student discourse, encourage mathematical curiosity and inquiry, and visualize and understand mathematical ideas.

ASSESSMENT (ASSESS)

Assessments should drive everything that happens in classrooms, including the choices teachers make about instruction and tasks. Teachers, teacher leaders, math specialists/coaches, researchers, and administrators all have roles to play in designing, supporting, and making use of effective and efficient assessment practices. Assessment includes testing but is much more than that. Sessions in this strand will address questions such as: What supports do teachers need in order to use student thinking in their planning and instruction? How can we get better at assessing things like students’ dispositions, thinking, and reasoning skills (mathematical practices)? How can we get better at assessing the extent to which our tasks meet our goals, engage our students in thinking deeply, and so on? How can we get better at using assessments to inform students about their learning?

PROFESSIONALISM: BUILDING CAPACITY, COLLABORATION, AND LEADERSHIP (CCL)

This strand is for all math educators—teachers, principals, coaches, specialists, researchers, and professors. What practices, structures, and supports empower teachers to develop their craft? Sessions in this strand will explore topics such as growing leaders within schools, districts, and regions; establishing and supporting professional learning communities; leveraging our positions to advocate for all our students; and developing mathematical and pedagogical knowledge for all teachers.

STEM: WHERE’S THE M? (STEM)

In this strand, mathematics is not subordinate. Minimally, high-quality STEM instruction requires deep content and pedagogical-content knowledge in mathematics, as well as the ability to integrate and make connections among the sciences while incorporating technology and the processes of engineering in rich, real-world contexts and applications. In essence, STEM teaching is quality teaching and learning where students are engaged in significant real-world explorations, problem solving, and mathematical modeling. The focus of this strand will involve non-trivial mathematics integrated with Science, Technology, Engineering, and perhaps other disciplines.
### 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

- Get available speaker handouts at [nctm.org/planChicago](http://nctm.org/planChicago).
- 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.

### 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.*

### For Your Child’s Safety

Due to the size and nature of the conference, this event is not an appropriate setting for children under 16 years of age. Children under age 16 will not be permitted in the Exhibit Hall. We appreciate your understanding and cooperation.

### Information Booth

The Information Booth will be in the Hyatt Regency Chicago. Staff can answer your questions about Chicago 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 Hyatt Regency Chicago Security.

### First-Aid Station

There will be a first-aid station at the Hyatt Regency Chicago during the conference. If you need medical services while in Chicago, 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/planChicago](http://nctm.org/planChicago). Handouts will be available until January 2018.

### 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 1:30 p.m. on Thursday and Friday. Check out the map of the Exhibit Hall on page 86 and the list of exhibits on pages 87–91.

### 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 book marked with the symbol ![ew](#) or see the Program Updates.
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/planChicago to check it out.

NCTM App
Start planning early and stay connected throughout the event with the NCTM mobile app. Whether you have an iPhone, iPad, Android, or tablet, the app will be 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, contact and mark exhibitors to visit
- **Directory**—Create your own profile and search for and message other attendees
- **Local Weather**—Get the forecast and current weather for the event city
- **Maps**—View floor plans and maps
- **Twitter**—Follow all the activity in the event stream

Visit nctm.org/confapp for more information.

NCTM Central
Spend some time in NCTM Central! This exciting area has everything all in one convenient location, right at the entrance of the Exhibit Hall. You can’t miss it!

- **Wednesday** 4:00 p.m.–6:00 p.m.
- **Thursday** 8:00 a.m.–5:00 p.m.
- **Friday** 8:00 a.m.–2:00 p.m.

- Whether you are a new NCTM member or a seasoned veteran, you can learn more about what your membership can do for you at **Member Services**. We can walk you through your benefits, including your online access to lessons, classroom-ready activities, online journal articles, and more. Make sure to stop by and pick up sample journals and other materials. Not a member or wish to renew your membership? Make sure to join NCTM or renew your membership onsite and be placed in a drawing for a $25.00 NCTM Gift Certificate! NCTM is its members!

- Browse the **NCTM Bookstore** and save **25% off the list price** on all purchases! 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. 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 an **Illinois 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 Illinois 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 Illinois are not valid for this Regional Conference.

- **Classroom Resources**. Drop by to learn more about the newest set of resources, **Activities with Rigor and Coherence (ARCs)**, or just to hear about all the exciting resources that are ready to use in your math classroom.

- **Networking Lounge**. Join us in our activity areas:
  - **Play and Learn**
    - Play with materials from Math On-A-Stick at the Minnesota State Fair
    - Learn how to support student learning through play
    - Share your creations in person and on social media
  - **Relax and Recharge**
    - Make use of charging stations
    - Take a seat and reflect with colleagues

- **Problems of the Week Resources**
  - Learn how to navigate to this classroom resource on the NCTM website
  - What are the advantages of using the Scenario?

- **Discover available funding and resources to support you in your career and professional development with Mathematics Education Trust (MET) grants, scholarships, and awards. Visit nctm.org/met.**

- **Stop by the Math Forum** to pick up samples of problem-solving resources, and more. Visit mathforum.org.
GET SOCIAL
Stay informed and get connected with attendees by using #NCTMregionals on social media.

Conference App
nctm.org/confapp

Twitter
@NCTM

Instagram
@NCTM.math

Facebook
facebook.com/TeachersofMathematics

HIGHLIGHTS
Opening Session: Taking Action Together for Access, Equity, and Empowerment: A Panel Discussion, 1

REGISTRATION HOURS
3:00 p.m.—7:00 p.m.

EXHIBIT HOURS
4:00 p.m.—6:00 p.m.

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.
1 EQUITY

Taking Action Together for Access, Equity, and Empowerment: A Panel Discussion

Session

Get ready for a thought-provoking evening as six speakers and a moderator share their perspectives about equity and access in mathematics education. Each speaker’s presentation will last 10 minutes. After the last speaker, the moderator will lead a 30-minute discussion and Q&A.

Grand Ballroom, East Tower, Gold Level

Danny Martin (Moderator)
University of Illinois at Chicago

Elham Kazemi
University of Washington, Seattle

Rochelle Gutiérrez
University of Illinois at Urbana-Champaign

Annie Perkins
Southwest High School, Minneapolis, Minnesota

Tyrone Howard
Education Consultant, Oak Lawn, Illinois

Kassia Omohundro Wedekind
Consultant, Falls Church, Virginia

Dina Williams
Los Angeles Unified School District, California
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GET SOCIAL
Stay informed and get connected with attendees by using #NCTMregionals on social media.

Conference App
nctm.org/confapp
Twitter
@NCTM
Instagram
@NCTM.math
Facebook
facebook.com/TeachersofMathematics

REGISTRATION HOURS
7:00 a.m.–3:00 p.m.

EXHIBIT HOURS
8:00 a.m.–5:00 p.m.

NCTM CENTRAL HOURS
8:00 a.m.–5:00 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.

2 Regional Conference Overview & Orientation
Workshop
Hosted by members of the Board of Directors, this session will show you how to maximize your overall conference experience. Learn what’s new 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.

Boards of Directors
National Council of Teachers of Mathematics, Reston, Virginia

Grand Ballroom A, East Tower, Gold Level

8:00 A.M.–9:00 A.M.

3 EQUITY Algebra Readiness for All Students
3–5 Session
This session will provide an overview of the Conceptual Algebra Readiness for Everyone, (CARE) Project. The presenters will demonstrate how the program attempts to engage all students—those of varying ability—from advanced learners to struggling and special needs students. CARE activities allow for differentiation as they can be solved at many different levels.

David Feikes
Purdue University Northwest, Westville, Indiana
Martin Briggs
Laporte Community Schools, Indiana
Renate Zavesky
Laporte Community Schools, Indiana

Plaza Ballroom, East Tower, Green Level

4 Designing and Implementing Rigorous AND Playful Mathematics Experiences for Young Children
Pre-K–2 Session
This session will address the design and implementation of mathematics tasks for young children that are both playful and rigorous. Participants will talk about how to use questioning and prompts that promote high-level mathematical reasoning and connections in the context of rich, engaging, open-ended problems and tasks for young learners.

Deborah Leslie
UChicago STEM Education, Illinois

Regency Ballroom A, West Tower, Gold Level

5 Engaging Students through Rich Problems and Questions
6–8 Session
Discover how to embrace the Standards of Mathematical Practice with rich problems that will engage and inspire your students. I will share resources and my favorite places to find problems, suggestions for transforming a traditional problem to a rich task, and effective questioning strategies.

Heather Wukelich
Austintown Local Schools, Ohio

Regency Ballroom B, West Tower, Gold Level

6 Hidden Figures: Not Just a Movie but, a Way of Equitable Academic Life
General Interest Session
Has the failure of math education led to a lack of number sense awareness that has affected the way we make decisions today? Explore ways to mathematize our students’ known world and invite them into solving meaningful mathematics tasks. Attendees will explore strategies and effective teaching practices that give urban students the power to reveal the hidden math around us everyday. My ten-minute panel talk at Wednesday’s Opening Session will explore this topic, and this session will allow us to explore the strategies and teaching practices more in depth.

Dina Williams
Los Angeles Unified School District, California

Grand Ballroom EF, East Tower, Gold Level

7 Literacy? But I Teach Math!
8–10 Session
This session will examine the use of practical research-based literacy strategies to instruct students in their approach to understanding math content. These techniques for literacy instruction in the math classroom will assist students in understanding how to navigate both multiple-choice and free response questions with greater independence.

Christina Pawlowski
Commack High School, New York
Lawrence Maggio
Plainedge High School, North Massapequa, New York

Regency Ballroom C, West Tower, Gold Level
9  JRNY
Making Tasks Worthwhile and Meaningful for Students by Doing Them Again and Again and . . .
A Student’s Journey in Mathematics
8–10 Session
If students did not find a task worth doing, then why would we ask them to do it again? Because a task can become more meaningful and worthwhile when they reflect on how to begin it in a new way; when students solve it in multiple ways and compare the results; and when they encounter the same task in another class using new mathematical content.
Ron Lancaster
University of Toronto, Ontario, Canada
EW Theater Riverside Center, East Tower, Purple Level

10  MTBOS Greatest Hits: Strategies That Magnify the Math Practices and Deepen Student Thinking
3–5 Session
Come learn how math instruction is enriched using strategies shared by our MTBOS colleagues. The soundtrack of our daily math practice includes Notice/Wonder, Estimation 180, Number Talks, WODB, and more! Instructional specialists work with teachers to help design instruction that engages students in math conversations that deepen understanding.
Alexandra Collison
Webster Central School District, New York
Melisa Phillips
Webster Central School District, New York
Eric Blask
Webster Central School District, New York
Michigan 1, East Tower, Bronze Level

BIG IDEAS MATH
BY RON LARSON AND LAURIE BOSWELL

Ron Larson and Laurie Boswell are extending the highly acclaimed Big Ideas Math program to include elementary, creating a full K–12 solution!

• Engaging, rich mathematics
• Balanced approach to instruction
• Cohesive progressions
• Dependable, innovative technology

Visit us at booth #317!
8:00 A.M.–9:00 A.M.

11 Not Just a Guess: K–2 Estimation Experiences
Pre-K–2 Session
The ability to estimate is a key part of number sense and can serve as a predictor of future math success. How can we help our students develop this skill in the early grades? Come learn how you can move your students beyond just guessing by incorporating short and powerful estimation experiences into your math routines.

Yojairy Sands
The Cathedral School, New York, New York
Maria Peneda
The Cathedral School, New York, New York

Acapulco, West Tower, Gold Level

12 TOOLS 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
Consultant, Horsham, Pennsylvania

Michigan 2, East Tower, Bronze Level

13 JRNY Conversations That Matter: Applying Math to Explore Important Real-World Issues with Linear Equations
8–10 Session
How can students use math to better understand the world, and what conversations are possible in a grades 8–10 math class? In this presentation, we’ll distinguish between conceptual understanding tasks and authentic applications. We’ll then use systems of linear equations to explore an important social question: Should we increase the minimum wage?

Karim Ani
Mathalicious, Austin, Texas

Columbus Hall IJ, East Tower, Gold Level

14 CCL We’ve Got Your Back: Supporting New Teachers
Coaches/Leaders/Teacher Educators Session
Learn about the steps a new teacher and his mentor undertook to deepen pedagogical knowledge and to develop leadership skills. We share experiences from our collaboration over the years including lesson and professional development planning, reflecting on shared teaching experiences, and creating opportunities for becoming a leader.

Frederick Dillon
@fdizzle1955
Institute for Learning, Strongsville, Ohio
Anthony Bokar
Dover High School, New Philadelphia, Ohio

Grand Ballroom CD, East Tower, Gold Level

14.1 CLE DLE Quiet Too Long—How to Amplify Student Voice
3–5 Exhibitor Workshop
Join a conversation on the foundations of discourse. Discover what research tells us about how students enter the discussion—how to promote and create culture and routines around amplifying student voice. This workshop will be interactive, lively, and fun. You’ll walk away with increased knowledge and confidence to effect change. We will use the work of Akihiko Takahashi and Japanese lesson study, as well as that of Jo Boaler, Susan Jo Russell, and Deborah Schifter.

Pearson
Chandler, Arizona

Michigan 3, East Tower, Bronze Level
14.2 CCL
Examine the Teaching of Addition of Fractions with Unlike Denominators through Problem Solving
General Interest Session
This three-hour session will begin with a presentation describing how a powerful form of lesson study can help a school address challenges of teaching and learning. Then, there will be a live lesson with grade 5 students. Finally, participants will discuss the impact of the lesson and how it cultivated Common Core math practices.

Akihiko Takahashi
DePaul University, Chicago, Illinois
Thomas McDougal
Lesson Study Alliance, Chicago, Illinois
Alexandra Johansen
Lesson Study Alliance, Chicago, Illinois

Crystal Ballroom, West Tower, Green Level

16 EQUITY
Acquiring Math as a Second Language through Reading, Writing, Listening, and Speaking
8–10 Workshop
Participants will engage in vocabulary, reading, and writing strategies and activities that promote the idea of math literacy. Using literacy strategies to build comprehension, teachers can create an environment where all students, especially English language learners, can gain a deeper understanding of mathematical concepts.

Rodrigo Portillo
Socorro ISD, El Paso, Texas

Columbus Hall AB, East Tower, Gold Level

17
Be Intentional: Developing Mathematical Thinking
Pre-K–2 Workshop
Empowering students to be active learners in the classroom begins with intentionally planned meaningful tasks that promote productive struggle, discourse, and the Standards for Mathematical Practice. As teachers, we need to promote “struggling as learning” and foster the journey students are on.

Rob Nickerson
ORIGO Education, Lakewood, Colorado
Darek Naglak
ORIGO Education, Earth City, Missouri

Columbus Hall CD, East Tower, Gold Level

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Learn more at nctm.org/confapp.
18  
**Egyptian Fractions: How Historical Contexts and Notations Can Make Fractions and Decimals Make Sense**  
3–5 Workshop  
Come learn how ancient Egyptians solved problems involving fractions and how problems from the Ahmes Papyrus can support your students in developing a deep understanding of fractions, decimals, and the connections between them. Connecting different representations will be emphasized. Leave with activities appropriate for use in the middle grades.

Christy Pettis  
University of Minnesota, Minneapolis  
Aran Glancy  
Purdue University, West Lafayette, Indiana  
Bethann Wiley  
Purdue University, West Lafayette, Indiana

**Columbus Hall KL, East Tower, Gold Level**

19  
**Frogs and Toads: A Math Circle for Teachers**  
6–8 Workshop  
Share the excitement of solving problems and doing mathematics as you participate in a math-circle style problem-solving session! Participants will work together on a challenging mathematical task. We will then all discuss implications for teaching problem solving and why engaging in mathematics is an important part of ongoing learning.

Peter Tingley  
Loyola University Chicago, Illinois  
Karin Lange  
Loyola University Chicago, Illinois

**Gold Coast, West Tower, Bronze Level**

20  
**TOOLS Implementing STEM Activities in Algebra 1 and Algebra 2**  
8–10 Workshop  
Come see how simple physical science experiments can be implemented in an algebra 1 and/or algebra 2 class to give meaning to algebraic topics. We’ll look at density/displacement, Hooke’s law, and gathering other data sets to make inferences.

Denise Young  
Blue Valley West High School, Overland Park, Kansas

**Columbus Hall EF, East Tower, Gold Level**

21  
**Instructional Strategies for Supporting the Range of Learners**  
Pre-K–2 Workshop  
This session focuses on eight instructional strategies for differentiating classroom activities to meet the needs of the range of learners. These strategies are designed to help teachers learn to adjust the learning environment, and to scaffold or extend the main math ideas of an activity, in order to support and challenge the thinking of all students.

Karen Economopoulos  
Investigations Center for Curriculum and Professional Development@TERC, Cambridge, Massachusetts

**Grand Ballroom A, East Tower, Gold Level**

22  
**Mathematical Parts of Speech: Making Sense of Integer Operations**  
6–8 Workshop  
Mathematics uses the same symbols (− and +) as adjectives and verbs. This use of symbols with multiple meanings requires learning experiences built around sense making. Learn how thinking grammatically can help students make sense of operations with integers and support productive struggle, which leads to deeper understanding.

Sara Delano Moore  
SDM Learning, Kent, Ohio

**Grand Ballroom B, East Tower, Gold Level**
8:00 A.M.—9:15 A.M.

23
Putting the 8 Standards for Mathematical Practice into Action
Coaches/Leaders/Teacher Educators Workshop
This session will focus on developing an understanding of the eight standards for mathematical practice and how they assist in developing the content standards. Participants will engage in and explore instructional strategies and mathematical tasks that use the math practice standards as a vehicle to develop the Common Core content standards.

Nicole Briatta
Zion-Benton Township High School, Illinois
Melissa DiGangi
Zion-Benton Township High School, Illinois

Comiskey, West Tower, Bronze Level

24
Using Desmos in Calculus Class
10–12 Workshop
After teaching and tinkering with the teaching of calculus for over ten years, I have found ways to use Desmos.com to facilitate the learning of various topics in AP Calculus. I’ll share some of the activities I’ve used and when I use them in the sequence of topics for the class. Come prepared with an Internet connection to do them yourselves!

Martha Mulligan
Northside College Prep High School, Chicago Public Schools, Illinois

Regency Ballroom D, West Tower, Gold Level

25
Worthwhile Tasks Hit the Mark with THOSE KIDS!
3–5 Workshop
Learning experiences should address mathematical goals, provide accessibility and encourage engagement. Experience a few tasks and analyze the varied characteristics of these experiences. All tasks have been implemented with diverse learners, including ELLs, students with special needs, and other students who have been traditionally marginalized.

Nora Ramirez
TODOS Mathematics for ALL, Tempe, Arizona

Columbus Hall GH, East Tower, Gold Level

9:30 A.M.—10:30 A.M.

26
Bridging the Parent Math Gap: Engaging Mathematics Education for Parents
Pre-K–2 Session
Mathematics teaching has changed since your students’ parents were in school. And parents are integral to student success. Put these together and you have a high need for parent math education. Help your parents bridge their math gaps to better support their children. Join this session to plan impactful parent math education for your campus.

Maria Franshaw
@mfranshawftk
River Oaks Baptist School, Houston, Texas

Columbus Hall IJ, East Tower, Gold Level

27
Bringing ELL Students into the Math Conversation
Pre-K–2 Session
English language learners sometimes struggle in math because the scaffolds that teachers use during reading instruction seem out of place next to math content. In this session, participants will learn strategies that build a culture of discourse in math class by scaffolding lessons using a variety of means of entry and previewing vocabulary.

Jan Scott
Houghton Mifflin Harcourt, Boston, Massachusetts
Dennis Ortman
Houghton Mifflin Harcourt, Boston, Massachusetts

Regency Ballroom C, West Tower, Gold Level

Shop and save 25% at the NCTM Bookstore in NCTM Central!
### 28 Conversations That Matter: Applying Math to Explore Important Real-World Issues with Middle School Statistics

**6–8 Session**

How can we use math to better understand the world, and what conversations are possible in a middle school math class? In this presentation, we’ll distinguish between conceptual understanding tasks and authentic applications. We’ll then use statistics to explore a relevant social question: How is wealth distributed in the United States?

*Karim Ani*
Mathalicious, Austin, Texas

Regency Ballroom A, West Tower, Gold Level

### 29 Desmos Updates

**10–12 Session**

Desmos is possibly the best (free) online graphing tool for middle through high school mathematics. We will look at techniques for using Desmos, some ready-to-use activities from teacher.desmos.com, and the activity builder, which teachers can use to create activities to help students explore, visualize, and understand mathematics. Bring a device.

*James Olsen*
Western Illinois University, Macomb, Illinois

Grand Ballroom EF, East Tower, Gold Level

### 30 ELL Students and Strategies: Enhancing Learning in Traditional Math Classrooms

**3–5 Session**

This session will share how an urban elementary school transformed its mathematics classrooms using strategies developed for English language learners. Regular classroom teachers, through working with an ELL teacher, were able to enhance mathematics lessons in a way that benefited both ELLs and native English speakers.

*Rita Barger*
University of Missouri–Kansas City

*HeeGyoung Song*
Hickman Mills School District, Kansas City, Missouri

Regency Ballroom B, West Tower, Gold Level

### 31 Fostering “Aha” Moments in the Math Classroom

**10–12 Session**

For many students, math and science are simply viewed as formulas and calculations. In this session, we will discuss how to create lessons by sequencing problems and ideas to foster a more conceptual understanding of topics. Participants will examine sample lessons as well as have the opportunity to create their own.

*Christina Pawlowski*
Commack High School, New York

*Lawrence Maggio*
Plainedge High School, North Massapequa, New York

Michigan 1, East Tower, Bronze Level

### 32 Identities—Not Just for Trig Any More

**10–12 Session**

The mathematical concept of an identity can be used throughout the curriculum, from prealgebra to calculus. We’ll look at ways to introduce the idea of an identity to prealgebra and algebra, and then how identities can be used through advanced algebra and trig and beyond. Even the idea of proof can be made more accessible.

*Richard Rukin*
Retired, Evanston Township High School, Illinois

Plaza Ballroom, East Tower, Green Level

### 33 MET Grants and Scholarships: What They Are, How to Apply

**General Interest Session**

Don’t Miss the Chance! The Mathematics Education Trust (MET) supports teachers with grant funds for materials, collaboration, lessons, lesson development, conferences, professional development, action research, and in-services. Learn what is available and how to apply. MET is a wonderful resource for teachers.

*Richard Seitz*
Trustee, MET Board of Trustees, Reston, Virginia

Acapulco, West Tower, Gold Level
9:30 A.M.—10:30 A.M.

34 EQUITY
Promoting Equity and Access for Every Student in Middle School Mathematics
General Interest Session
I will describe the importance of diverse students having time and support to learn challenging mathematics. Videos will be shown of my students solving problems. Participants will have opportunities to discuss the videos with regard to specific practices related to equity and student access to challenging mathematical concepts.

Richard Kitchen
University of Denver, Colorado

Michigan 2, East Tower, Bronze Level

34.1 JRNY
Advanced Algebra With Financial Applications—The Perfect 3rd/4th-Year Math Course for All Students
10–12 Exhibitor Workshop
Hear the author Rich Sgroi speak about the new 2nd Edition of Financial Algebra. Topics from algebra 2, trig, statistics, probability, geometry and precalculus are used to explore spending, banking, credit, autos, investing, mortgages, retirement, budgeting, and much more. A complementary copy of the textbook will be distributed to all attendees.

National Geographic Learning/Cengage Learning
Boston, Massachusetts

Michigan 3, East Tower, Bronze Level

34.2 DLE
Embracing Principles to Actions
8–10 Exhibitor Workshop
Wondering how to incorporate Principles to Actions in your school? Let CPM show you! For over 25 years CPM has provided rich mathematics curricula that is student-centered and problem-based and that encourages thinking, persevering, and sense making. Experience the excitement students do when exploring CPM’s curriculum. Receive free access to the curriculum.

CPM Educational Program
Elk Grove, California

Water Tower, West Tower, Bronze Level

34.3 DLE
Hands-on Learning: It’s easy with the Right Tools
General Interest Exhibitor Workshop
Do your K–5 students struggle with math fluency? Solving complex problems? Do you struggle with making center time valuable for all students? Knowing how to use the manipulatives you have? In this fast-paced session, you will learn strategies and find solutions to support your students. You will leave with goodies to use now!

ETA hand2mind
Vernon Hills, Illinois

EW Theater Riverside Center, East Tower, Purple Level

9:45 A.M.—11:00 A.M.

35 ASSESS
A Pleasure to Measure: CCSSM Activities for K–Grade 5
3–5 Workshop
Join us for an exploration of multiple measurement activities for use in K–grade 5. Each activity is linked to a specific Common Core standard, highlights creative ways to engage students, and offers extensions to relevant children’s literature or other enrichment ideas. Come prepared to participate, learn, and discuss this critical mathematical content.

Craig Cullen
Illinois State University, Normal
David Klanderman
Trinity Christian College, Palos Heights, Illinois
Jeffrey Barrett
Illinois State University, Normal

Columbus Hall EF, East Tower, Gold Level

36 EQUITY
Am I Hearing My Students?
6–8 Workshop
NCTM’s Principles to Actions advocates for teachers to facilitate meaningful mathematical discourse with their students. This session will create experiences for participants to reflect on whether math discussions are present or missing from their own math classrooms and how the conversations include or exclude the students’ voices.

Barbara Everhart
Educational Specialist, berealcoach.com, Minneapolis, Minnesota

Columbus Hall AB, East Tower, Gold Level
9:45 A.M.—11:00 A.M.

37 **TOOLS**
Cipher Solvers: Breaking the Code! How to Integrate Algebra, Geometry, and Cryptography with Technology
8–10 Workshop
Have your students creatively learn about encryption and decryption and use key concepts from algebra and geometry: slope, equations of lines, perpendicular bisectors, systems of equations, and interpretations of results. Solve algebraically, check geometrically. The session includes an engaging culmination activity done by hand or by using graphing calculator technology.

Tom Reardon
Youngstown State University/Fitch High School, Poland, Ohio

Toronto, West Tower, Gold Level

38 **Your Mathematical Heartprint: Sustaining Student Effort and Perseverance Every Day!**
General Interest Workshop
In this inspirational session, Dr. Kanold explores the nature of your current heartprint and its impact on your students and colleagues. Is it good or bad, and how do you know? He describes five intentional research-affirmed teaching strategies you can use every day to help your students persevere and sustain their effort in the mathematics of the lesson.

Timothy Kanold
Center for Teaching and Learning, Northridge, California

Columbus Hall KL, East Tower, Gold Level

39 **Eye the Prize**
Pre-K–2 Workshop
Experience the delight of math through a child’s eyes using activities to develop conceptual and perceptual subitizing skills. Activities will focus on counting skills, operations and algebraic thinking, cardinality, and numbers and operations in base ten. The prize will be your students’ understanding! Activities and website materials will be available.

Denise McDowell
Big Ideas Learning, Erie, Pennsylvania

Grand Ballroom A, East Tower, Gold Level

40 **Inquiring Minds Want to Know**
10–12 Workshop
Inquiry in the math classroom develops critical thinkers who can utilize math practices while completing engaging activities. The strategies explored in this workshop will help create an atmosphere of success, promote problem solving and teamwork, and lead to deeper levels of understanding.

James Dobrzanski
J. S. Morton East High School, Cicero, Illinois

Mary Pat Anderson
J. S. Morton East High School, Cicero, Illinois

Regency Ballroom D, West Tower, Gold Level

41 **Learning Experiences in Calculus: Integrate Fun over the Interval [struggle, learn].**
10–12 Workshop
We will look at some calculus activities that offer students a chance to struggle with problems that connect concepts across the calculus curriculum. Participants will wrestle with these problems and will discuss how these activities promote student learning (or not). We will also discuss how teachers can pose questions to enhance the activities.

Steven Condie
Illinois Mathematics and Science Academy, Naperville

Comiskey, West Tower, Bronze Level

Hear what’s new from exhibitors—attend an exhibitor workshop. Look for the symbol throughout the program book.
New! Pre-K through Grade 6 mathematics program takes flight from ORIGO Education.

This new program combines rigorous problem-solving activities, engaging digital games, and a balance of print materials to enhance students’ thinking and reasoning skills.

Experience all of our new products at Booth #432
9:45 A.M.–11:00 A.M.

42  **STEM**
**Modeling with Mathematics in Science Class: Maximizing Opportunities to Enrich the STEM Experience**
3–5 Workshop
Come explore how to mathematize hands-on science as we launch rockets, mix chemicals, and program robots. Learn how science provides many opportunities for students to engage in meaningful mathematics through investigative tasks and how capitalizing on these moments helps students develop strong skills for mathematical modeling and problem solving.

Mike Flynn
Mount Holyoke College, South Hadley, Massachusetts
**Grand Ballroom B, East Tower, Gold Level**

43  **CCL**
**New and Preservice Teachers Workshop**
Coaches/Leaders/Teacher Educators 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
**Gold Coast, West Tower, Bronze Level**

44  **STEM**
**Solving Word Problems through Algebraic Programming with Bootstrap**
6–8 Workshop
Computer science is growing in states across the U.S., and some are beginning to offer it as a math credit. However, there is little evidence of transfer between programming and math. Come discover some of the latest research in the field and known best practices for instruction using an evidence-based curriculum.

Emma Youndtsmith
Bootstrap, Boston, Massachusetts
**Columbus Hall CD, East Tower, Gold Level**

11:00 A.M.–12:00 P.M.

46  **STEM**
**Designing Mathematical Provocations to Inspire Student Thinking**
Pre-K–2 Session
Mathematical provocations inspire students to make connections and think deeply about mathematical concepts. I will share how teachers in our district use provocations to design engaging learning experiences that embed the processes and practices of mathematics. Examples of inquiry questions and materials for K–3 provocations will be shared.

Janice Novakowski
Richmond School District, British Columbia, Canada
**Acapulco, West Tower, Gold Level**

47  **CCL**
**Making Sense of Solving Equations**
8–10 Session
Finding the solution to an equation or system of equations is central in algebra. The “what is the first” approach emphasizes rote procedures and does not help students develop flexible procedures for solving equations. Thinking about the mathematical structure of an equation aided by dynamic interactive visualization can make a difference.

Gail Burrill
Past President, National Council of Teachers of Mathematics; Michigan State University, East Lansing
**Regency Ballroom B, West Tower, Gold Level**
11:00 A.M.–12:00 P.M.

48  EQUITY
Motivating Meaningful Mathematics Connections in Social and Social Justice Contexts
10–12 Session
We will explore social and social justice contexts through activities designed to engage students in mathematics that is relevant and meaningful to them. Interactive technology is used to enhance engagement. Contexts may include inequality issues, living wage, and climate change. Participants are encouraged to share their own ideas and experiences.

Tami Martin
Illinois State University, Normal
Roger Day
Amanda Miller
Regency Ballroom A, West Tower, Gold Level

49  EQUITY
Once, Twice, Three Times the Learning: Questioning & Conceptual Understanding
10–12 Session
Learn three effective techniques to adapt tasks in order to increase access for all students and to enable students to acquire and demonstrate conceptual understanding. Practice using Reversibility, Flexibility, and Generalization on our tasks, and then use them in rewriting a task of your own.

Kyle Eller
Wheaton Warrenville South High School, Wheaton, Illinois
Frederick Dillon
Institute for Learning, Pittsburgh, Pennsylvania
Plaza Ballroom, East Tower, Green Level

50  EQUITY
President’s Address: Empowerment through Access and Equity
General Interest Session
We have a long-standing and seemingly intractable problem in mathematics education: inequity. Children of certain racial, ethnic, language, gender, ability, and socio-economic backgrounds experience mathematics education in school differently and many are disaffected by their mathematics education experience. This session will address why we teach mathematics and the actions educators can take to challenge structural obstacles and implement equity-based instructional practices.

Matt Larson
Presdent, National Council of Teachers of Mathematics, Reston, Virginia
Grand Ballroom CD, East Tower, Gold Level

51  EQUITY
Singin’ & Signin’ Teaches the Way Kids Learn!
6–8 Session
Learn an engaging, kinesthetic, award-winning approach to teaching rigorous standards that invigorates and captures the energy of ALL the diverse students in your class! Leave with manipulatives and song lyrics to teach lessons including area, volume, and circumference to immediately impact and empower! Be ready for fun and be a student yourself!

Siegrid Stillman
Fallbrook Union Elementary School District, California
Regency Ballroom C, West Tower, Gold Level

Need funding for professional development?
Check out grant opportunities from the Mathematics Education Trust. The next deadline to apply is May 5. Visit the MET area in NCTM Central to learn more.
11:00 A.M.–12:00 P.M.

52 STEM
Step It Up with STEAM! Degrees, Rotations, and Spatial Reasoning with Stepper Motors
6–8 Session
With minimal programming skills, a TI-NSpire graphing calculator, and TI-Innovator, you can transform your class into one where mathematical concepts can be explored from an intuitive and engaging perspective. In our programs we will use degrees, rotations, and proportional reasoning to perform engineering feats involving a pulley system.

Michelle Goetz
Parkway North High, Saint Louis, Missouri
Ann Schlemper
Columbia College, Missouri
Kara Leaman
Columbia College, Missouri

Michigan 2, East Tower, Bronze Level

53 JRNY
Take the Number Sense Journey
Pre-K–2 Session
Participants will identify, experience, assess, and reflect the interrelated aspects of early numerical knowledge, the learning trajectory for counting, and the number relationships that will establish a strong foundation for number operations through deep understanding not memorization.

Lynn Rule
Math Consultant, MathRack, Wheaton, Illinois

Michigan 1, East Tower, Bronze Level

54 EQUITY
The Responsive Math Classroom
3–5 Session
What exactly is a culturally responsive classroom? And what does it have to do with math? This important topic is a major focus of CCSSM as well as in the NCTM book Principles to Actions. Learn how to establish a culture in which students—and teachers—appreciate the meaningful math that comes from responsive teaching.

Monica Tienda
Oak Park School District, Michigan

Grand Ballroom EF, East Tower, Gold Level

55 CCL
Using Generative Routines to Support Learning of Ambitious Mathematics Teaching
Coaches/Leaders/Teacher Educators Session
This session will engage participants in the idea of generative routines and how they can mediate teacher learning of ambitious mathematics teaching. We will focus on a particular routine, a well-specified question sequence designed to support teachers in the work of eliciting and responding to multiple student strategies in mathematics discussion.

Hala Ghoussinei
University of Wisconsin–Madison

Columbus Hall IJ, East Tower, Gold Level

55.1 EW TOOLS
Making Algebra Child’s Play® with Hands-On Equations® & HOE Fractions
6–8 Exhibitor Workshop
Hands-On Equations can enable you to introduce algebraic concepts to ALL of your students in grades 4 & up, thereby enhancing their self-esteem and interest in mathematics. Equations such as $4x + 3 = 3x + 9$ and $2(2x + 1) = x + 14$ become child’s play! Bonus: See Dr. Borenson’s new program for concretely solving fractional linear equations.

Borenson and Associates, Inc.
Allentown, Pennsylvania

Michigan 3, East Tower, Bronze Level

55.2 EW TOOLS
BYOD: Mathspace—Why You’ll Never Grade Math Assignments Again. Seriously.
General Interest Exhibitor Workshop
Meet Mathspace. You’ve seen it all, right? Adaptive learning? Yep. Handwriting recognition? Hmm. Every math question graded line-by-line? Whoa, that’s new! Students can finally show their work, and get feedback at every step: all auto-graded for you. Bye-bye, multiple choice! BYOD to try the award-winning Mathspace live, and ask about a trial!

Mathspace
New York, New York

Water Tower, West Tower, Bronze Level
11:00 A.M.–12:00 P.M.

55.3 **EQUITY**
The Tools to Facilitate Rich Conversation
3–5 Exhibitor Workshop
This workshop will focus on ways to facilitate and enhance mathematical discussions in the classroom, based around content areas. Participants will be equipped with tools and techniques to plan and manage conversations, evaluate, select, and sequence student responses, and elevate the rigor of discourse in the mathematics classroom.

Curriculum Associates
North Billerica, Massachusetts
EW Theater Riverside Center, East Tower, Purple Level

58 **EQUITY**
Family Communication: Let the Students Contribute to the Process!
General Interest Burst
Family communication is tough. There just isn’t enough time in the day to reach every home . . . or is there? When you let students take part in this communication process, you can reach every family and give the students a voice. Come to this session and learn how I use Google and social media to accomplish every teacher’s communication goals!

Marissa Walczak
Rock Island High School, Illinois
Columbus Hall AB, East Tower, Gold Level

11:30 A.M.–12:00 P.M.

56 **STEM**
Building Coherency in STEM: Support for Learning Mathematics for Chemistry
10–12 Burst
This session will focus on ways to support the learning of algebra for use in chemistry applications. We report findings from an interdisciplinary project that integrated chemistry contexts into an undergraduate algebra course in an authentic and coherent way. Our findings have implications for STEM teaching at the secondary level.

Kristen Bieda
Michigan State University, East Lansing
Jennifer Nimtz
Michigan State University, East Lansing
Columbus Hall EF, East Tower, Gold Level

59 **STEM**
Interactive Notebooks: Tapping into Left-Brain and Right-Brain Thinking
6–8 Burst
Interactive notebooks appeal to right- and left-brain learners who crave organization. Students maintain these spirals with all their work inside. Left-hand pages are used for homework while right-hand pages are used for class notes. In a sense, they create their own “text” with everything they need at their fingertips.

Kristina Barnaby
Fairfield County Day School, Connecticut
Toronto, West Tower, Gold Level

57 **ASSESS**
Community Organizations as a Vehicle to Learn Advanced Algebra and Statistics
10–12 Burst
Participants will analyze and explore the ways in which a statistics class used the environmental concerns of a community organization to learn about linear regression, correlation coefficient, and standard deviation. Data collection procedures and sample student artifacts will be shared.

Salvador Venegas
Infinity Math, Science & Technology High School, Chicago, Illinois
Grand Ballroom B, East Tower, Gold Level

60 **ASSESS**
Making Effective Assessment Habits Routine: A Case Study of a Primary Classroom
Pre-K–2 Burst
Teachers understand the importance of formative assessment and thoughtfully observe as students engage in math. However, without efficient ways to gather data, they may struggle to set a routine. We will explore a case study of a teacher who has routinized effective assessment practice for various formats, including games and small-group lessons.

Rachel Muren
UChicago STEM Education, Illinois
Comiskey, West Tower, Bronze Level
61 Mathematical Misconceptions
General Interest Burst
What does it mean to be “good” at math? Have you ever dealt with the frustrated student who says, “I thought I knew math, but I guess I really don’t . . .” We will explore some of the erroneous assumptions people make about mathematics and its workings and discuss how to combat these misconceptions in the classroom.

Carlo Ordonez
Illinois Mathematics and Science Academy (IMSA), Aurora
Columbus Hall KL, East Tower, Gold Level

62 JRNY Minion Fair Share: Cutting the Cake and Maximizing the Mathematics
3–5 Burst
A simple problem of cutting a cake into two equal pieces evolves into a valuable mathematical investigation of area, halves, symmetry, congruence, and proof. Students of all levels can engage in this task as they help the Minions solve this curious problem while journeying through the Common Core mathematical practice standards and the Principles to Actions Mathematics Teaching Practices.

Robert Mann
Western Illinois University, Macomb
Anita Reid
Lewistown High School, Illinois
Regency Ballroom D, West Tower, Gold Level

63 EQUITY Promoting Equity in Math Circles
General Interest Burst
In six years, Math Circles of Chicago has grown to serve 500 grades 5–12 students in five locations across the city. We’ve expanded into communities which previously didn’t have access to quality math enrichment, and we’ve earned important lessons about how to meet the needs of children from many backgrounds and how to work effectively with local community centers.

Douglas O’Roark
Math Circles of Chicago, Illinois
Gold Coast, West Tower, Bronze Level

64 EQUITY Read + Read + Read = Access (We Hope!)
6–8 Burst
“IDK” why my students leave word problems unattempted!! To address this age-old phenomenon, we will model the Three-Reads strategy, which helps provide students access to mathematical content and problem solving. Data collected at two different schools gauges the effectiveness of Three-Reads as a tool of access to challenging word problems.

Casey McLeod
Chicago Public Schools, Illinois
Tun Bhothinard
Chicago Public Schools, Illinois
Grand Ballroom A, East Tower, Gold Level

65 EQUITY Using Engaging Mathematics Lessons to Celebrate the Life and Accomplishments of Benjamin Banneker
General Interest Burst
Participants will learn about the accomplishments of Benjamin Banneker who was a self-taught freeborn African American man of the 1700s. We will use his life as the backdrop for engaging mathematics lessons at the elementary, middle, and high school levels. We will share other ideas on implementing culturally relevant mathematics lessons.

Shelly Jones
@ShellyMJones1
Central Connecticut State University, New Britain
Natalie Holliman
Little Rock School District, Arkansas
Columbus Hall GH, East Tower, Gold Level
11:30 A.M.–12:00 P.M.

66 Using Lesson Study to Advance Students Mathematical Proficiency in Geometry
8–10 Burst
We will describe our grades 6–12 teacher learning community’s lesson study project and key actions from Principles to Actions to support students’ mathematical proficiency. Participants will be engaged in the lesson task and receive all the supporting materials needed to teach the lesson. We will also provide student work for community discussion.

Gabriel Matney
Bowling Green State University, Ohio
Corinne Sullivan
Northmont Schools, Clayton, Ohio

Columbus Hall CD, East Tower, Gold Level

1:30 P.M.–2:30 P.M.

68 Down with Retakes!
8–10 Session
What do you do when a student fails a test? Are you sick of retakes as the solution? We will outline alternative techniques to help students improve their learning process and become more self-directed before the test as well as effective strategies for retakes that have made them manageable.

Jody Trapani
Niles North High School, Skokie, Illinois
Amy Koning
Niles North High School, Skokie, Illinois

Regency Ballroom C, West Tower, Gold Level

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MORE MATH FOR MORE PEOPLE
CPM EDUCATIONAL PROGRAM
1:30 P.M.–2:30 P.M.

69 **TOOLS**
**Engaging All Learners: Our Journey of Integrating Technology through Co-Teaching Math**

3–5 Session
Join our journey of incorporating technology into a math workshop model while also co-teaching. Learn how we use flexible scheduling and flexible grouping to meet the needs of all learners. Explore the technology tools used to create our flexible groups and to differentiate the learning.

Tabitha Eutsler  Springfield Public Schools, Missouri
Julie Allen  Springfield Public Schools, Missouri

**Regency Ballroom A, West Tower, Gold Level**

70 **TOOLS**
**How to Reinforce Mathematical Concepts by Creating a Video Library for Your Students**

8–10 Session
As a teacher, the ability to make your own videos on mathematical concepts is a powerful tool for student learning. In this session, we will demonstrate how easy it is to build a video library to share with your students. We use a variety of software and hardware to demonstrate some of the options teachers have.

Michelle Hale  Aqsa School, Bridgeview, Illinois
Angela Thompson  Crete, Illinois

**Acapulco, West Tower, Gold Level**

71 **EQUITY**
**Making Mistakes Public: Using Errors to Advance Learning at the NYC Math Lab**

3–5 Session
Students make mistakes; how teachers respond can influence how students experience math. In this session, we’ll study video of teacher responses to student errors at the NYC Math Lab and the learning that resulted from exploring errors publicly. Together, we will construct a set of responses to student errors that value all students’ ideas.

Peter Cipparone  University of Michigan, Ann Arbor
Kim Van Duzer  Public School 29, NYC Public Schools, New York City, New York

**Plaza Ballroom, East Tower, Green Level**

72 **EQUITY**
**Meaningful Practices to Meet the Needs of Every Learner: It’s about the Process**

6–8 Session
“Everything I learned about teaching, I learned from teaching students with special needs.” How do we implement a challenging curriculum with high expectations for every learner? This session will explore methods and resources for making math accessible to all, specifically for students with disabilities and emerging bilingual students.

Bridget Dunbar  St. Mary’s Public Schools, Leonardtown, Maryland

**Regency Ballroom B, West Tower, Gold Level**

73 **STEM**
**Motivating Matrices with Cryptology**

10–12 Session
Introduce students to cryptology, the science of sending and receiving secret messages that is based in math. We will learn how to encrypt messages using matrix multiplication, calculate determinants, use the inverse of a matrix to decrypt messages, and learn how matrix inverses can help us crack the code even without a secret key.

Frannie Worek  Johns Hopkins Center for Talented Youth, Baltimore, Maryland

**Michigan 1, East Tower, Bronze Level**

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Download speaker handouts!
View sessions in the mobile app or visit [nctm.org/planchicago](http://nctm.org/planchicago) to access available presentation handouts.
1:30 P.M.–2:30 P.M.

74  CCL
Preparing the Next Generation of Teachers of Mathematics: Setting Standards
General Interest Session
Learn about the Association of Mathematics Teacher Educators’ (AMTE) Standards for Preparing Teachers of Mathematics (2017) and discuss ways to support the next generation of teachers of mathematics in pre-K–12.
Jennifer Bay-Williams
@JBaywilliams
University of Louisville, Kentucky
Grand Ballroom CD, East Tower, Gold Level

75  CCL
Math Tasks and Manipulatives: A Winning Combination
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
Board of Directors, National Council of Teachers of Mathematics; Mattawan Middle School, Michigan
Michigan 2, East Tower, Bronze Level

76  TOOLS
Using Tech Tools to Make Student Thinking Visible
6–8 Session
Do you have access technology in your classroom? Interested to find out how to go beyond using it as a digital worksheet or for skill and drill type practice? The real power of having technology in the math classroom is in using it for students to show their thinking to their teachers, peers, and beyond.
Annie Forest
Berwyn South District 100, Illinois
Grand Ballroom EF, East Tower, Gold Level

77
Why Students Fail Algebra—And What K–2 Teachers Can Do to Prevent It
Pre-K–2 Session
Success in algebra opens doors and expands opportunities in many professions and careers. Unfortunately many students just “don’t get it.” I believe the reason lies in early math instruction, which is where K–2 children fail to build foundations that support algebraic thinking.
Angela Andrews
Retired, National Louis University, Chicago, Illinois
Crystal Ballroom, West Tower, Green Level

77.1  CW
Crazy 8s Club Gets Kids Fired Up About Math!
Exhibitor Workshop
Crazy 8s is a high-energy afterschool club for K–5 kids with off-the-wall activities like Glow-in-the-Dark Geometry and Toilet Paper Olympics. Bedtime Math provides free kits including directions and materials. Schools provide a coach and minimal additional supplies. Workshop participants will get hands-on experience running the club’s activities.
Bedtime Math Foundation
Summit, New Jersey
Michigan 3, East Tower, Bronze Level

77.2  CW
Rethinking Expressions and Equations: Implications for Teachers
Exhibitor Workshop
An interactive discussion will focus on a technology-leveraged approach for teaching that brings coherence across grades for content that is tough to teach and tough to learn. The session will consider the shifts necessary to develop real understanding of this content, the research behind the shifts and teachers’ role in carrying out these shifts.
Texas Instruments
Dallas, Texas
Water Tower, West Tower, Bronze Level
1:30 P.M.–2:45 P.M.

78 Buddy Teachers + Buddy Classrooms = Math Success
Pre–K–2 Workshop
In this games workshop, participants will learn the best operational/place value games for cross-graded settings. Come with a teaching partner from grades 3–5 and learn games your students can do together one time a week. For older students it enhances and deepens their mathematical understanding as they teach their buddies. Primary students win too!
Jane Felling
Box Cars and One-Eyed Jacks, Edmonton, Alberta, Canada
Regency Ballroom D, West Tower, Gold Level

79 Dismantling Barriers to Geometry by Constructing a Box from a Used Greeting Card
6–8 Workshop
By constructing a box from a greeting card, the barriers that students have with geometry will be lowered. Gain a better understanding of geometry terms and the nuances of definitions involved with quadrilaterals and polygons. Deliver an in-depth understanding of the relationships among perimeter, area, and volume-ratios and proportions, too!
Nicholas Restivo
Mathematical Olympiads for Elementary and Middle Schools, Bellmore, New York
Columbus Hall GH, East Tower, Gold Level

80 Engaging Students in Meaningful Math through Games
Pre–K–2 Workshop
Games are an effective way to engage students in learning. In this workshop, participants will experience how to support the development of pre-K–2 mathematicians through purposeful play. The focus will be on the CCSS Standards for Mathematical Practice and the content domain of Number and Operations.
David Coffey
Grand Valley State University, Allendale, Michigan
Kathy Coffey
Grand Valley State University, Allendale, Michigan
Comiskey, West Tower, Bronze Level

81 Experiencing Instructional Routines That Engage ALL Learners
8–10 Workshop
Can we teach mathematics in ways that engage and support all learners and that build student capacity to have meaningful conversations about math while working together to understand multiple solution strategies? Yes, we can! Participants will experience and discuss an inquiry-oriented instructional routine called Contemplate then Calculate.
David Wees
New Visions for Public Schools, New York, New York
Sara Toguchi
New Visions for Public Schools, New York, New York
Elizabeth Ramirez
New Visions for Public Schools, New York, New York
Grand Ballroom B, East Tower, Gold Level

82 Finding Paths to Math Understanding from Elementary to College: A Conversation for All Levels
3–5 Workshop
We will explore the journey of creating math learning experiences that challenge students and provide opportunities to provide deep learning. Are our students really understanding the math we are teaching? How do learning targets and the experiences we provide drive understanding? Does our instruction promote procedural or conceptual learning?
Mark White
Downers Grove Grade School District 58, Illinois
Christopher White
Illinois Institute of Technology, Chicago
Toronto, West Tower, Gold Level

Mingle, explore, and learn in the Exhibit Hall and NCTM Central!
**Thursday**

1:30 P.M.–2:45 P.M.

**83**

*Getting 8th- to 10th-Grade Students Thinking about Calculus Concepts WITH NO CALCULUS REQUIRED!!!*

8–10 Workshop

We will walk through projectile motion tasks and a maximizing area of a polygon task. Your students will be able to derive projectile motion formulas (without calculus!) and the area of a circle formula! Not only will they see where these formulas actually come from, they will understand pi and see it’s irrational characteristics like never before!

Jess McMurray  
Soda Springs High School, Soda Springs, Idaho  
*Columbus Hall AB, East Tower, Gold Level*

**84**

*Looking at Student Work: Insights into Learning and Teaching Mathematics*

3–5 Workshop

A close look at a single piece of student work reliably leads us to ideas and questions about teaching and learning mathematics. Using a descriptive process, we will use a structured protocol to give close attention to student thinking that provides insights into students’ mathematical understandings as well as teaching practices.

Janice Szymaszek  
Smith College, Northampton, Massachusetts  
Lara Ramsey  
Smith College, Northampton, Massachusetts  
*Grand Ballroom A, East Tower, Gold Level*

**85**

*Probability, Polynomials, and CAS: Designing Dice*

10–12 Workshop

Participants will use the TI-Nspire CX CAS Computer Algebra System to multiply and factor polynomials used to model dice in order to redesign the standard dice to create a different pair of dice such that the sum of these two dice has the same distribution as the sum of the standard six-sided dice.

Steve Phelps  
Madeira High School, University of Cincinnati, Ohio  
*Columbus Hall CD, East Tower, Gold Level*

**86**

*Real-World Applications of Trigonometry—Outdoor Trigonometry*

10–12 Workshop

We will go outside and learn how to use clinometers to measure vertical angles. You will also be able to create your own clinometer. Learn common student errors in measurement. Also, we will be using right triangle trigonometry and the law of sines to calculate measurements on objects that we can and cannot touch.

Joseph D’Agostino  
Freeport Public Schools, New York  
Kevin Harrison  
Freeport Public Schools, New York  
*Columbus Hall EF, East Tower, Gold Level*

**87**

*Supporting High-Quality Math Instruction through Peer Collaboration*

Coaches/Leaders/Teacher Educators Workshop

Peer collaboration is a strategy used to support high-quality math instruction in CPS. Peer collaboration gives teachers the opportunity to collaboratively plan, implement, and debrief a CCSSM-aligned lesson. Those who support teachers in grades 6–12 would benefit from this session.

Elizabeth Buczkowski  
Chicago Public Schools, Illinois  
Ruth Haumersen  
DePaul University, Chicago, Illinois  
*Gold Coast, West Tower, Bronze Level*

**88**

*Using Technology to Examine the Associations between Two Variables in Middle School Statistics*

6–8 Workshop

Examine the association between two variables using TI and Desmos graphing calculators. Input and analyze data, create scattergrams and lines of best fit, and learn how to interpolate and extrapolate with confidence while using social justice data.

Samuel Yusim  
Carleton Washburne School, Winnetka, Illinois  
*Columbus Hall KL, East Tower, Gold Level*
3:00 P.M.–4:00 P.M.

89  **Addressing Numeracy with the Struggling Learner**
Pre-K–2 Session
How do we begin supporting numeracy development? This session focuses on how students learn to compose and decompose whole numbers. We will view student video and discuss how to nudge their thinking towards fluent ways of computing, all while focusing on gate-keeping concepts that hold students back.

Paula Muehler
Math Learning Center, Sussex, Wisconsin
Regency Ballroom B, West Tower, Gold Level

90  **Algebra Project Youth Learning Cultures: Organizing through Knowledge, Power, and Relationship**
Coaches/Leaders/Teacher Educators Session
The Algebra Project sees young people as insurgent organizers using mathematics as an organizing tool. The typical classroom structure (“Teacher instructs students”) is too thin to support this work. Instead, we use paid peer and near-peer co-teachers in youth-controlled settings on and off campus to develop a culture of math as organizing work.

Jay Gillen
Baltimore City Schools/Algebra Project, Maryland
Regency Ballroom A, West Tower, Gold Level

91  **Bringing ELL Students Into the Math Conversation**
3–5 Session
English language learners sometimes struggle in math because the scaffolds that teachers use during reading instruction seem out of place next to math content. In this session, participants will learn strategies that build a culture of discourse in math class by scaffolding lessons using a variety of means of entry and previewing vocabulary.

Jan Scott
Houghton Mifflin Harcourt, Boston, Massachusetts
Dennis Ortman
Houghton Mifflin Harcourt, Boston, Massachusetts
EW Theater Riverside Center, East Tower, Purple Level

92  **Detracking, Differentiating Instruction, and Using Standards-Based Assessment to Help ALL Students**
10–12 Session
By eliminating tracking in honors geometry, I was able to break up cohorts of academically struggling students who had not previously been given the opportunity to take rigorous math classes. I will share the challenges and lessons learned as I used differentiation and standards-based assessment to help all students become metacognitive learners.

Kristin Weller
P. K. Yonge Developmental Research School at the University of Florida, Gainesville
Plaza Ballroom, East Tower, Green Level

93  **Developing Essential Understandings of Addition & Subtraction**
Pre-K–2 Session
“If only my students knew their basic facts!” This is a common frustration of classroom teachers. Knowing doesn’t come from worksheets, flashcards, or timed tests; it comes from strong number sense. Participants will explore the essential understandings of addition and subtraction to build numerical literacy.

Amy Schemmel Keller
Grant Wood Area Education Agency, Cedar Rapids, Iowa
Jeremiah McGraw
Grant Wood Area Education Agency, Cedar Rapids, Iowa
Acapulco, West Tower, Gold Level

94  **Do the Math**
General Interest Session
Together we’ll engage in solving mathematically rich problems. We will use this shared experience as a vehicle to examine how to use mathematical problems to develop mathematical and pedagogical knowledge for teachers. We’ll also explore student work and video clips of students solving the same problems to connect our work to the classroom.

Zachary Champagne
Florida Center for Research in Science, Technology, Engineering, and Mathematics, Jacksonville, Florida
Grand Ballroom CD, East Tower, Gold Level
3:00 P.M.–4:00 P.M.

95 CCL
How I Developed as a Mathematics Teacher over 41 Years
10–12 Session
I became a better teacher each of the 41 years of my career, largely because of the collaboration and interaction with other educators. I would like to discuss the impact these people had on my thoughts and actions as I learned to become a better mathematics teacher.

John Benson
Evanston, Illinois

Michigan 1, East Tower, Bronze Level

96 Mathematical Practices for Calculus
10–12 Session
The new calculus framework describes Mathematical Practices for AP Calculus. Why are these important and what do they look like in classrooms? Participants will consider examples of how the MPACs can be implemented as well as suggestions for what preparation students might have for these in precalculus.

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

Grand Ballroom EF, East Tower, Gold Level

97 STEM
Mathematics Is the Language of STEM
General Interest Session
Without mathematics, there would be no science, technology, or engineering! It is the last letter in the acronym, but it is also the most important. As many as five million jobs will become extinct in this digital age. Over two million new jobs will be created, many requiring mathematics. Are math educators poised to take advantage of this new reality?

Linda Rosen
@changeequation
Change the Equation, Washington, D.C.

Crystal Ballroom, West Tower, Green Level

98
String Me A-Long (Rectangle): An Interactive Introduction to Quadratics in Algebra 1
8–10 Session
Why do we teach quadratics? Why are quadratics so important for students’ understanding? Our team wrestled with this and developed a student-centered, kinesthetic task that highlights the need for quadratics. Join us as we use regressions, data sets, Desmos, and Google suite to develop students’ understanding with this foundational topic.

Tina Nocella
Adlai E. Stevenson High School, Lincolnshire, Illinois

David Irsay
Adlai E. Stevenson High School, Lincolnshire, Illinois

Heather Nissenberg
Adlai E. Stevenson High School, Lincolnshire, Illinois

Columbus Hall IJ, East Tower, Gold Level

99 EQUITY
TeamASAP—Team Access & Success in Advanced Placement
General Interest Session
Economically, racially, and ethnically diverse Evanston Township High School used student input and team drive to transform the makeup of Advanced Placement in their school. Discussion will focus on how a small team of committed teachers & students created teamASAP, focused on awareness, access, readiness, and success for all students in AP classes.

Dale Leibforth
@DaleLeibforth
Evanston Township High School District 202, Illinois

Michigan 2, East Tower, Bronze Level
3:00 P.M.—4:00 P.M.

100
Three Hurdles to Algebra Success!
3–5 Session
Help your students overcome the three main hurdles standing in their way to algebra success! Experience hands-on lessons that use manipulatives within the research-based, CRA approach to teaching that provides success for struggling learners. Lessons will develop students’ conceptual understanding of subtraction, multiplication, and fractions.

Amy Johnson
Moving with Math, Math Teachers Press, Inc., Minneapolis, Minnesota
Caryl Pierson
Math Teachers Press, Inc., Minneapolis, Minnesota

Regency Ballroom C, West Tower, Gold Level

100.1  CW  TOOLS
How to Engage Your Reluctant Learners: The Power of Using Desmos in a Mathematics Classroom
8–10 Exhibitor Workshop
Dive into unique mathematical lessons that present engaging, high-interest activities with Desmos, a graphing software. Interactives powered by Desmos present students with exploration experiences through technology that builds deep conceptual understanding. Imagine having set lessons you can implement in your classroom tomorrow that encourage students to understand math on a deeper level!

Pearson
Chandler, Arizona

Michigan 3, East Tower, Bronze Level

100.2  CW  TOOLS
What Happens When Adaptive Learning Meets Great Storytelling? Students Want to Learn Fractions!
3–5 Exhibitor Workshop
Come see how we’re solving the fractions gap with our digital tool, Amplify Fractions. Playful, quirky stories uniquely engage students, providing lessons with purpose. Adding in unlimited practice, Amplify Fractions helps students deeply understand fractions and sets them on the path to math success!

Amplify
Brooklyn, New York

Water Tower, West Tower, Bronze Level

3:15 P.M.—4:30 P.M.

101
11 Ways to Unfold a Cube, and Other Mental Gymnastics
6–8 Workshop
Come explore a variety of hands-on tasks and activities designed to develop students’ spatial reasoning skills.

Hannah Ross
Milwaukee Montessori School, Wisconsin

Columbus Hall CD, East Tower, Gold Level

102  EQUIITY
Let’s Talk Fractions! An Introduction to Fraction Number Talks
3–5 Workshop
Learn and practice the art of number talks to develop flexible thinking about fractions! Number talks facilitate discussion and support students as they gain confidence in sharing their thinking, learning from their peers and having fun! At the same time, you focus on developing the important conceptual understandings of fractions.

Bethann Wiley
University of Minnesota Twin Cities
Christy Pettis
University of Minnesota Twin Cities

Gold Coast, West Tower, Bronze Level

103  CCL
Being Intentional in K–2 Mathematics Classrooms: Navigating a Productive Journey during a Lesson
Coaches/Leaders/Teacher Educators Workshop
Often primary mathematics lessons depict a “show and tell” time with students sharing randomly. We will engage in activities to become more equipped to orchestrate meaningful learning opportunities. Participants will consider how to use similar tasks with others to promote this idea of purposefully guiding students toward deeper understanding.

Susie Katt
@susiekatt
Lincoln Public Schools, Nebraska

Regency Ballroom D, West Tower, Gold Level
Introducing
A new K–5 intervention program

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.

Join our session about Bridges Intervention on Friday, December 1st at 11:00 in the Michigan 3 room or stop by booth 427 to learn more.

mathlearningcenter.org/intervention
Columbus Hall AB, East Tower, Gold Level

Columbus Hall KL, East Tower, Gold Level

Columbus Hall EF, East Tower, Gold Level

Columbus Hall GH, East Tower, Gold Level

Grand Ballroom A, East Tower, Gold Level
3:15 P.M.—4:30 P.M.

110 This Is Why We Play: Solving Problems with NBA Data
8–10 Workshop
Will Steph Curry be the three-point king before the 2020 election? What formula can be used to predict players for the All-NBA Team? From where on the court are bank shots possible? Using NBA data and diagrams, we’ll create models to answer these questions and others. You miss 100% of the shots you don’t take—don’t miss this one! #mathslamdunk

Patrick Vennebush
Discovery Education, Falls Church, Virginia

Toronto, West Tower, Gold Level

111 Unpacking Instructional Components That Engage ALL Learners
8–10 Workshop
Come join us as we experience an instructional routine and unpack how the elements of the routine work together to improve ALL students’ learning. We will explore all of the parts of Contemplate then Calculate, why they are important, and strategies for successfully enacting the routine to engage and support a diverse group of learners.

Sara Toguchi
New Visions for Public Schools, New York, New York
Jennifer Lee Kim
New Visions for Public Schools, New York, New York
Elizabeth Ramirez
New Visions for Public Schools, New York, New York

Grand Ballroom B, East Tower, Gold Level

4:30 P.M.—5:30 P.M.

112 Breaking the Rules (Expiring Ones That Is) and Cleaning Up Your Language!
General Interest Session
We will engage participants in a discussion of common rules and vocabulary shared by K–12 teachers that students tend to overgeneralize, such as tricks and tips that do not promote conceptual understanding, rules that “expire” later in students’ mathematics careers, and vocabulary that isn’t precise. CCSSM “expiration dates” will be shared!

Sarah Bush
@sarahbbush
University of Central Florida, Orlando
Karen Karp
Johns Hopkins University, Baltimore, Maryland
Barbara Dougherty
University of Hawaii at Manoa

Crystal Ballroom, West Tower, Green Level

113 Bridging the Parent Math Gap: Engaging Mathematics Education for Parents
3–5 Session
Mathematics teaching has changed since your students’ parents were in school. And parents are integral to student success. Put these together and you have a high need for parent math education. Help your parents bridge their math gaps to better support their children. Join this session to plan impactful parent math education for your school.

Maria Franshaw
@mfranshawftk
River Oaks Baptist School, Houston, Texas

Regency Ballroom A, West Tower, Gold Level

Visit NCTM Central—connect with peers in the Networking Lounge, renew your membership, “do math” with The Math Forum, and shop for the latest titles at the Bookstore.
### 114 ASSESS
**Conferring with Mathematicians: Teaching and Assessing for Sense Making and Agency**

**General Interest Session**

How can we broaden our notion assessment to focus on sense making and nurturing students’ agency as mathematicians? This session explores how teachers can utilize conferring to more deeply understand and respond to student thinking and build communities of mathematicians.

**Kassia Omohundro Wedekind**
Belvedere Elementary School, Falls Church, Virginia

**Grand Ballroom CD, East Tower, Gold Level**

### 115 TOOLS
**Engaging Activities That Emphasize the FUN in FUNctions**

**8–10 Session**

Participants will be provided with classroom-ready hands-on lessons that utilize handheld technology to enable 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**
Union City Public Schools, New Jersey

**Regency Ballroom C, West Tower, Gold Level**

### 116 JRNY
**Number Talks: Building Computational Fluency**

**Pre-K–2 Session**

This workshop will focus on how to develop computational fluency through daily number talks. Common Core standards place emphasis on student strategies for solving problems, rather than automaticity. This workshop will give participants tools to bring back to the classroom to enhance student strategies.

**Sara Cabreda**
Joliet Public Schools District 86, Illinois

**Michigan 1, East Tower, Bronze Level**

### 117
**SmudgedMath: Blurring Tasks Sparks Mathematical Curiosity, Conversation, and Critique**

**6–8 Session**

SmudgedMath, launched by Dr. Peter Liljedahl, transforms tasks by “smudging” components, thereby increasing ambiguity and opening the mathematical process thought space. Sparking curiosity creates opportunities for students to consider tasks critically, creatively, and conceptually. Join in the experience of implementing and designing SmudgedMath tasks.

**Norma Gordon**
Public Schools of Brookline, Massachusetts

**Peter Liljedahl**
Simon Fraser University, Burnaby, British Columbia, Canada

**Judy Larsen**
Simon Fraser University, Burnaby, British Columbia, Canada

**Regency Ballroom B, West Tower, Gold Level**

### 118
**So . . . You Have to Teach a Gifted and Talented Class?**

**6–8 Session**

Using STEAM-based activities in alignment with Common Core standards, we invite you to explore strategies to identify and teach gifted and talented students. Together, we will investigate research-based methods to motivate, inspire, and differentiate instruction in a gifted and talented class to help our students develop into a growth mindset.

**Anju Thalla**
MS 216 George J. Ryan, Fresh Meadows, New York

**Tataina Etienne**
MS 216 George J. Ryan, Fresh Meadows, New York

**Acapulco, West Tower, Gold Level**
4:30 P.M.–5:30 P.M.

119  STEM

**STEM 4 ALL! Mathematical Practices and Design Process as a Framework to Engage All Learners**

8–10 Session

STEM can be a buzzword or can open a door for a student. This presentation will highlight how we can create and evaluate high-quality STEM lessons in our classroom through focusing on mathematical practices and the engineering design process. It will also explain how the application of current research can incorporate a more diverse set of learners.

Brett Doudican  
Dayton Early College Academy/University of Dayton, Ohio  
*Plaza Ballroom, East Tower, Green Level*

120  ASSESS

**Universal Design in Geometry through Project-Based Assessment**

10–12 Session

Students do not have the opportunity to demonstrate their understanding of geometry through traditional assessments. The project-based assessments demonstrated in this session include art, transformations (such as translations, reflections, and rotations), and mathematical reasoning through writing.

Michelle Hale  
Aqsa School, Bridgeview, Illinois  
Monica King  
Crete-Monee High School, Crete, Illinois  
*Grand Ballroom EF, East Tower, Gold Level*

121  ASSESS

**We Can Rebuild It, We Have the Technology: How Rich Tasks Can Make Assessment Better, Stronger**

Coaches/Leaders/Teacher Educators Session

Thanks to the ubiquity of rich mathematical tasks available through curricula and teacher websites, we have the ability like never before to radically rebuild student mindsets in math. In this session, we will explore concrete examples of tasks and systems of assessment that encourage student growth and promote teacher improvement.

Geoff Krall  
New Tech Network, Fort Collins, Colorado  
*Michigan 2, East Tower, Bronze Level*

122  ASSESS

**Why Do We Keep Talking about Data-Driven Math Instruction?**

3–5 Session

Teachers who use data-driven math instruction are highly effective. In this session, you will learn an easy-to-implement comprehensive assessment plan that combines a traditional approach with innovative authentic assessment that provides relevant data to inform instruction. Explore the roles of writing and exit tickets in driving math instruction.

Ellen Edmonds  
W. H. Sadler, Charlotte, North Carolina  
*Columbus Hall IJ, East Tower, Gold Level*

122.1  CW  ASSESS

**What it Takes to Make It Really Happen—Formative Assessment**

3–5 Exhibitor Workshop

Join this exciting workshop to learn and engage with ideas to make formative assessment real, in real classrooms, and in real time through the lens of the mathematical practices. We will look at technology to make this easier and more efficient. You’ll walk away with increased knowledge and confidence to effect change.

Pearson  
Chandler, Arizona  
*Michigan 3, East Tower, Bronze Level*

5:00 P.M.–5:30 P.M.

123  TOOLS

**3D Printers in the Classroom: Instructional STEM Options for Elementary Students**

Pre-K–2 Burst

While 3D printers have existed in research laboratories, design studios, and other industries for several years, they are now becoming popular in K–12 classrooms as well. This session will share results from 3D printing design workshops for elementary students and the STEM concepts introduced as a result of these experiences.

Candace Barritteau Phaire  
The College of New Rochelle, New York  
*Columbus Hall EF, East Tower, Gold Level*
5:00 P.M.–5:30 P.M.

124  **STEM**
**A Mathematical Tour of the Grand Piano**
*General Interest Burst*

We’ve all heard that the piano is mathematical. But where, exactly is all that math? In this burst, a piano technician/math teacher will take you through algebra, geometry, algebra 2, trigonometry, and even math on the complex plane involved in creating the most extensively engineered acoustic musical instrument in common worldwide production.

Vin Urbanowski
Academy of Information Technology & Engineering, Stamford, Connecticut

*Columbus Hall GH, East Tower, Gold Level*

125  **CCL**
**Lessons from Singapore: What I Learned during My Fulbright Fellowship**
*General Interest Burst*

From January to June 2017, I learned in three Singaporean schools how they teach and learn algebra. I also attended class at the National Institute of Education in Singapore. Through my Fulbright Fellowship, I created a summer school algebra curriculum, heavily influenced by what I learned there. In this session, I’ll share key components of what I discovered.

Martha Mulligan
Northside College Prep High School, Chicago Public Schools, Illinois

*Columbus Hall CD, East Tower, Gold Level*

126  **JRNY**
**Making Math Relevant: Reflections from a Career Changer**
*10–12 Burst*

I am a new math teacher, having recently changed careers. I previously worked as an engineer and as a patent attorney, and I often reflect on how I can use my prior work experience to help students see how relevant mathematical skills and thinking are in a variety of disciplines. I’ll share key aspects of what I have found.

Eric George
Chicago, Illinois

*Comiskey, West Tower, Bronze Level*

127  **CCL**
**Making Mathematics Accessible for All**
*General Interest Burst*

Accessibility is an essential component in creating equitable opportunities for students learning mathematics in self-contained, resource, and inclusion classrooms. Come explore lesson-planning protocols for creating access while maintaining appropriately high expectations and cognitive demands for all learners, including students with disabilities.

Andrew Gael
Cooke Center Academy, Manhattan, New York

*Grand Ballroom A, East Tower, Gold Level*

128  **CCL**
**Park City Math Institute Teacher Leadership Program: Come Join Us!**
*General Interest Burst*

The Teacher Leadership Program is a component of the Park City Math Institute. For more than 25 years this exceptional, three-week residential program, held in the beautiful mountains of Utah, has been enriching and inspiring teachers from all parts of the country. Come and learn from past participants how to become a part of this excellent PLC!

Cindy Percival
Roosevelt High School, Des Moines, Iowa

*Toronto, West Tower, Gold Level*
130  **TOOLS**
scitsitatS PA—That’s AP Statistics Flipped! How We Flipped Our Course and Doubled Our Enrollment
10–12 Burst
Using Google Classroom, EdPuzzle, and YouTube, we created video lessons for our AP Statistics students to watch for homework. Students work collaboratively on problem sets or activities/simulations during the 48-minute class period. Course enrollment has more than doubled while AP test scores have increased. You too can flip your AP Stats class successfully!

Candice Sagliano
Lake Park High School, Roselle, Illinois
Ben Bishop
Lake Park High School, Roselle, Illinois
Columbus Hall AB, East Tower, Gold Level

131  **STEM**
STEM Should Be STEAM: How to Bring Art into a Math Classroom
General Interest Burst
Math is everywhere. Art is also everywhere. So why is it that mathematics and art are taught separately and are not incorporated together? How can one bring in art into a mathematics classroom? This talk will look at bringing art into a mathematics classroom through the use of constructions tools, tessellations, origami, and crochet.

Kristine Dahlquist
Hawaii Preparatory Academy, Kamuela
Gold Coast, West Tower, Bronze Level

132  **CCL**
Teachers’ Knowledge of Statistics
6–8 Burst
In this session, I will discuss the findings of my dissertation study about teachers’ pedagogical content knowledge in middle school as they are teaching measures of center. I will give examples of what teachers’ knowledge of content, students, and teaching looks like, and I will discuss the implications for teaching.

Dhimitraq Duni
Illinois State University, Normal
Grand Ballroom B, East Tower, Gold Level

133  **CCL**
What Can MTMS Do for You, and What Can You Do for MTMS?
6–8 Burst
In this session, we will highlight some of the classroom-ready ideas that can be found in *Mathematics Teaching in the Middle School (MTMS)*, both from feature articles and regular departments. We will also discuss how you can share your own ideas with the journal. Work with the Editorial Panel to develop those ideas for articles or departments.

Peter Wiles
Eastern Illinois University, Charleston
Columbus Hall KL, East Tower, Gold Level
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HIGHLIGHTS
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REGISTRATION HOURS
7:00 a.m.–12:00 p.m.

EXHIBIT HOURS
8:00 a.m.–2:00 p.m.

NCTM CENTRAL HOURS
8:00 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.

134  
Regional Conference Overview & Orientation  
Workshop  
Hosted by members of the Board of Directors, this session will show you how to maximize your overall conference experience. Learn what’s new 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. 

Board of Directors  
National Council of Teachers of Mathematics, Reston, Virginia  
[ Grand Ballroom A, East Tower, Gold Level ]

8:00 A.M.–9:00 A.M.

135  
Creating Standards-Based Items for Common Assessments in Mathematics  
General Interest Session  
Common assessments are a vital component of the learning process. High-quality mathematics assessment items have specific characteristics and types. Come learn to identify and write these problem types, see how to create a standards-based testing blueprint, and learn a method for validating the items. 

Tyrone Martínez  
@teachnext_tmb  
Education Consultant, Oak Lawn, Illinois  
Carol Larson  
Community Consolidated School District 181, Clarendon Hills, Illinois  
[ Michigan 2, East Tower, Bronze Level ]

136  
Elevating Teacher Knowledge and Student Discourse with Number Talks and Teacher Collaboration  
Pre-K–2 Session  
Learn how collaboration with number talks can change teacher practice and elevate student learning. We will discuss how developing a core group of leaders has a cascading effect to improve student learning. Participants will learn how to utilize number talks to improve teacher content knowledge and elevate the mathematical discourse among students. 

Pam Smith  
Webster Central School District, New York  
Brenda Ehinger  
Webster Central School District, New York  
Eric Blask  
Webster Central School District, New York  
[ Regency Ballroom A, West Tower, Gold Level ]

137  
Engaging and Inspiring Assessment Strategies to Promote Student Learning  
6–8 Session  
How can assessments motivate and engage each and every learner? How can they be used for learning? High-quality assessments, which include content and process standards, inform both teachers and students about what has been learned and what has not been learned yet. Come experience four actions needed to create a meaningful assessment process. 

Mona Toncheff  
Arizona Mathematics Partnership, Phoenix  
Sarah Schuhl  
Consultant, Gresham, Oregon  
[ Grand Ballroom EF, East Tower, Gold Level ]

Thank you to all of the volunteers who have helped make this conference a success!
8:00 A.M.–9:00 A.M.

138 EQUITY
Extreme Equality in the Math Classroom
3–5 Session
During the session, two proven math programs involving students of color will be introduced: Jump Math: an international curriculum founded by John Mighton, that focuses on avoiding cognitive overload and breaking challenges into manageable steps. And URock Math: an after-school tutoring program in Brooklyn that has produced remarkable results.
Daryl Rock
Rock Academic Services, Brooklyn, New York
Columbus Hall IJ, East Tower, Gold Level

139 JRNY
From Counting to Calculus: What Stays the Same?
General Interest Session
We tend to think of the work of calculus students as being very different from that of kindergarteners, but it really shouldn’t be so. All learners can function as mathematicians. We’ll examine this claim through tasks and student ideas across the K–12 curriculum.
Christopher Danielson
Saint Paul, Minnesota
Grand Ballroom CD, East Tower, Gold Level

140 ASSESS
Gradient Assessment! Taking Your Students Where They Have Never Been Before!
8–10 Session
Too many students are not proficient on high-stakes assessments because we have not prepared them sufficiently with assessments in the classroom. Gradient assessment will not only bridge this gap, but it will motivate your students to ask more “Why?/”What if?” questions than you ever thought possible. Deep conceptual understanding is a test away.
Jess McMurray
Soda Springs High School, Idaho
Regency Ballroom C, West Tower, Gold Level

141 IMPLEMENTING STRATEGY INSTRUCTION TO IMPROVE THE PROBLEM-SOLVING PROCESS FOR STRUGGLING STUDENTS
3–5 Session
Participants will learn how to incorporate cognitive strategy instruction for improving the learning and performance of math problem solving and reasoning skills by facilitating information processing through the use of graphic organizers. Participants will also learn how to embed self-regulated strategies to teach students self-monitoring.
Jennifer Bond
Ferguson-Florissant School District, Saint Louis, Missouri
Joseph Sencibaugh
Webster University, Saint Louis, Missouri
Regency Ballroom B, West Tower, Gold Level

142 TOOLS
Math Modeling Comes Alive: Using Videos to Capture Data
10–12 Session
Engage your students with real-world modeling problems. Collecting data from videos offers hands-on experiences that can deepen student knowledge of quadratic, exponential, and sinusoidal functions. We’ll create models for water flow, ball bounce, and swing data. I will demonstrate the use of LoggerPro, share data sets, and provide classroom-ready handouts.
Maria Hernandez
North Carolina School of Science and Mathematics, Durham
Plaza Ballroom, East Tower, Green Level

143 EQUITY
Mathematicians: Not Just “White Dudes”—Helping Students See Themselves as Mathematicians
General Interest Session
Most of the mathematicians we speak about in class: Euler, Gauss, Pythagoras . . . are white men. Most of my students don’t look like that, and as such, my students struggle to see themselves as mathematicians. Come hear about how I am changing that in my classroom. It is my students’ favorite part of math class.
Annie Perkins
@anniekperkins
Southwest High School, Minneapolis Public Schools, Minnesota
Crystal Ballroom, West Tower, Green Level
8:00 A.M.–9:00 A.M.

144 **ASSESS**
**Understanding RtI in Mathematics**
Pre-K–2 Session
Response to instruction . . . What do we know? Why does it work? Entering first grade with weak knowledge of number concepts and operations is a sign that early intervention is necessary. The foundational building block of RtI is screening for at-risk status, particularly in the primary grades.

Amy Schemmel Keller
Grant Wood Area Education Agency, Cedar Rapids, Iowa

Jeremiah McGraw
Grant Wood Area Education Agency, Cedar Rapids, Iowa

**Acapulco, West Tower, Gold Level**

145

**Using the Mathematical Practices to Help All Students Gain Entry into SAT-Style Questions**
10–12 Session
This session will provide teachers with strategies that can help all students gain entry into SAT-style problems. After our session, you will be able to naturally incorporate Standards for Mathematical Practice 2, 7, and 8 into your daily lessons. These tools will provide your students’ with critical thinking skills, which will allow them to be successful.

Sue Ellen Vozza
Adlai E. Stevenson High School, District 125, Lincolnshire, Illinois

Jennifer Parisi
Adlai E. Stevenson High School, District 125, Lincolnshire, Illinois

Valerie Tomkiel
Adlai E. Stevenson High School, District 125, Lincolnshire, Illinois

**Michigan 1, East Tower, Bronze Level**

8:00 A.M.–9:15 A.M.

145.1 **EW DLE**
**MYTH: “Build It and They Will Come.” Truth: How Reality-Based Scenarios Can Attract Students to Mathematical Modeling**
8–10 Exhibitor Workshop
Dive into unique modeling lessons that present engaging, high interest situations. Unlike traditional real-world problems, reality-based Mathematical Modeling lessons present students with the modeling conceptual category. You will engage in reality-based mathematical modeling that is more challenging and closely mirrors the work of STEM professionals.

Pearson
Chandler, Arizona

**Water Tower, West Tower, Bronze Level**

8:00 A.M.–9:00 A.M.

146

**3-Act Tasks: Filling the Void of Mathematical Modeling in the Elementary Grades**
Pre-K–2 Workshop
As elementary educators we’ve misinterpreted the term “model” as simply the use of manipulatives. This is causing our students to miss the mark when it comes to modeling with mathematics. Through the use of 3-act tasks, we will explore what mathematical modeling is, what it looks like, and how we can support this work in our elementary classrooms.

Graham Fletcher
@gfletchy
Griffin-Spalding Schools, Griffin, Georgia

**Columbus Hall AB, East Tower, Gold Level**

**Hear what’s new from exhibitors—attend an exhibitor workshop. Look for the symbol throughout the program book.**
8:00 A.M.–9:15 A.M.

147 \textbf{CCL} 

\textbf{Complex Instruction Consortium} 

\textbf{10–12 Workshop} 

The Complex Instruction Consortium (CIC) is a collaborative network of math educators dedicated to improving the quality of tasks and instruction in math classrooms. We focus on creating rich, meaningful, complex, and mathematically important tasks. Come learn more about the CIC and experience tasks firsthand.

Gary Chu  
@mrGarychu  
Niles North High School, Skokie, Illinois  
Tina Nocella  
Adlai E. Stevenson High School, Lincolnshire, Illinois  
Jeff Harding  
Mundelein High School, Illinois  

\textit{Gold Coast, West Tower, Bronze Level} 

148 \textbf{ASSESS} 

\textbf{Developing Standards-Based Grading within Mathematics Classrooms} 

\textbf{Coaches/Leaders/Teacher Educators Workshop} 

What does a “B” or 87.6% convey? How can feedback be provided more effectively to support students’ continued persistence in learning and adoption of a growth mindset in learning mathematics? This how-to workshop shares our journey and evolving understanding in aligning students’ true proficiencies in learning with proper feedback and grade.

Darshan Jain  
Adlai E. Stevenson High School, Lincolnshire, Illinois  

\textit{Comiskey, West Tower, Bronze Level} 

149 

\textbf{Lesson Planning In Response to Student Thinking} 

\textbf{3–5 Workshop} 

Where does great lesson planning begin? It begins with looking at student work. Yesterday’s work, with its mathematical successes and struggles, can spark today’s learning experiences. In this session, we will share strategies we have used for eliciting ideas, analyzing student work, and purposefully planning lessons in response to student thinking.

Kristin Gray  
Cape Henlopen School District, Lewes, Delaware  
Michael Pershan  
Saint Ann’s School, New York, New York  

\textit{Columbus Hall GH, East Tower, Gold Level} 

150 

\textbf{Let’s Help More Kids Understand If Relationships between Variables Are Proportional} 

\textbf{6–8 Workshop} 

We will experience two situations involving linear relationships between variables. Participants will use multiple representations (stories, tables, graphs, and equations) to justify which situations model proportional relationships between the variables. We will focus on ways to help kids develop this knowledge versus giving them rules.

Jim Mamer  
Shawnee Middle School, Springfield, Ohio  

\textit{Columbus Hall CD, East Tower, Gold Level} 

Download speaker handouts!  
View sessions in the mobile app or visit \texttt{nctm.org/planchicago} to access available presentation handouts.
151 Preparing and Planning for Instructional Routines That Engage All Learners

8–10 Workshop
How does one plan to enact rich tasks with students? In this workshop, participants will experience an instructional routine called Contemplate then Calculate, and then select and plan a task to use with the routine. Participants will then practice using their task at their table groups and share how and why they selected this particular task.

Jennifer Lee Kim  
New Visions for Public Schools, New York, New York
Elizabeth Ramirez  
New Visions for Public Schools, New York, New York
David Wees  
New Visions for Public Schools, New York, New York

Grand Ballroom B, East Tower, Gold Level

152 Solving the Mysteries of Rational Number Division (One Example: Why Do We Invert and Multiply?)

3–5 Workshop
Frequently, students learn an algorithm “just because” that’s how it’s done. When dividing fractions, why do we invert and multiply, or why is the quotient sometimes larger than the divisor? We’ll resolve these and other mysteries as we incorporate various models.

John Ashurst  
@kiltedcyclist  
T3 National Instructor, Baxter, Kentucky
Lindsay Gold  
University of Dayton, Ohio

Regency Ballroom D, West Tower, Gold Level

153 Teaching Geometry through Play in the Primary Grades

Pre-K–2 Workshop
Participants will discuss key ideas in the geometry standards for prekindergarten to grade 2 and will engage in activities with a variety of materials, including puzzles and blocks, to develop skills for increasing the level of math talk in their classrooms and for increasing the complexity of children’s mathematical play over time.

Amy Parks  
Michigan State University, East Lansing

Columbus Hall EF, East Tower, Gold Level

154 Tools Technology for the Math Classroom: How Should I Choose the One That Fits My Goals?

6–8 Workshop
Which technology should I use with my students and why? Participants will use various types of technology, explore their pedagogical potential, and characterize them based on different factors. The session will help make informed decisions about selecting technology to support different learning goals. Bring your tablet/laptop to the session.

Karina Hensberry  
University of South Florida, St. Petersburg
Hagit Sela  
University of Florida, Gainesville
Phil Vahey  
University of Florida, Gainesville

Columbus Hall KL, East Tower, Gold Level

Mingle, explore, and learn in the Exhibit Hall and NCTM Central!
8:00 A.M.–9:15 A.M.

**155** **ASSESS**
The Mathematics Classroom: What Are Our Goals and Are We Meeting Them?
8–10 Workshop
Preparing students to be 21st-century thinkers requires innovative learning environments. What does that look like in the mathematics classroom? Explore lessons from the field on how the OECD report “Ten Questions for Mathematics Teachers—and How PISA Can Help Answer Them” can expand teaching practices to facilitate an understanding of learning.

Robin White
Howard County Public Schools, Ellicott City, Maryland
**Toronto, West Tower, Gold Level**

**156** **TOOLS**
Trigonometry: Moving from SOHCAHTOA to a Functional Understanding Using GeoGebra
10–12 Workshop
This presentation will introduce participants to interactive activities that begin with a SOHCAHTOA understanding of trigonometry, and guide students to create the unit circle. Then we find all six trig functions on the circle and explore them as dynamic, periodic functions. All the activities use GeoGebra, so bring a laptop or tablet!

Jenna Van Sickle
Cleveland State University, Ohio
**Grand Ballroom A, East Tower, Gold Level**

9:30 A.M.–10:30 A.M.

**157** **ASSESS**
Assessing to Inform Teaching and Learning: Formative Assessment Techniques for EVERY Classroom!
General Interest Session
Math specialist and teacher participants will participate in activities which engage classroom-based formative assessment. These classroom-validated techniques are used to guide planning and teaching as well as monitor and assess learning. Everyday use of observations, interviews, Show Me, hinge questions, and exit tasks make a difference!

Francis (Skip) Fennell
Elementary Mathematics Specialists and Teacher Leaders Project, McDaniel College, Westminster, Maryland
Beth Kobett
Stevenson University, Baltimore, Maryland
Jon Wray
Stevenson University, Baltimore, Maryland
**Crystal Ballroom, West Tower, Green Level**
9:30 A.M.–10:30 A.M.

159 Classroom Conversations to Support Geometric Reasoning
3–5 Session
You may be familiar with number talks as a way to develop number sense, but how can this lesson structure be used to develop geometric thinking? Engage with tasks that help students to visualize shapes and reason about their properties. Learn about strategies to implement meaningful classroom discussions about geometric ideas.

Rick Anderson
Eastern Illinois University, Charleston
Peter Wiles
Eastern Illinois University, Charleston

Plaza Ballroom, East Tower, Green Level

160 Differences in Language and Culture Impact Equity and Access—Right?
Coaches/Leaders/Teacher Educators Session
Join us for a game that explores the relationship between communication and cultures. Experience challenges faced by individuals from a non-dominant culture. Reflect and discuss the impact that these differences have on learning mathematics. Use this game as a tool to begin discussions with colleagues about equity, access, and empowerment.

Bob McDonald
TODOS Mathematics for ALL, Tempe, Arizona
Nora Ramirez
TODOS Mathematics for ALL, Tempe, Arizona

Acapulco, West Tower, Gold Level

161 Encouraging Mathematical Self-Reflection: Making Tutorials for Cryptoclub or Math Class
6–8 Session
Making tutorials about solving problems or explaining procedures can help students become more self-reflective, build connections, and identify relationships, while teachers get assessment data. Learn how to develop students’ abilities to make tutorials and self-assess using Cryptoclub materials designed to apply mathematics within crytography.

Catherine Kaduk
Maplebrook, Naperville, Illinois

Michigan 2, East Tower, Bronze Level

162 Every Operation Tells a Story
Pre-K–2 Session
When teachers expose children to a range of problem situations without prescribing strategies, children are able to build on what they have learned and apply it to more difficult problems. This session will investigate the early development of strategies for number operations using a variety of problem structures and literature.

Lynn Rule
MathRack, Wheaton, Illinois

EW Theater Riverside Center, East Tower, Purple Level

163 Neighborhood Shapes: A K–2 Geometry Exploration
Pre-K–2 Session
How can children construct a deep understanding of geometric concepts? Experience how students can develop big ideas around shapes and their attributes in ways that are meaningful, relevant, and fun. Through the lens of their neighborhood, students will study shapes, objects, and their attributes in order to create their own buildings.

Yojairy Sands
The Cathedral School, New York, New York
Michael Demianiuk
The Cathedral School, New York, New York
Maria Peneda
The Cathedral School, New York, New York

Regency Ballroom C, West Tower, Gold Level

Shop and save 25% at the NCTM Bookstore in NCTM Central!
9:30 A.M.—10:30 A.M.

164 EQUITY
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. Especially in a gatekeeper course like algebra 1, the design of an assessment system can limit students’ educational opportunities. Hear how teachers developed policies that removed barriers to success.

Timothy Hudson
DreamBox Learning, Bellevue, Washington
Columbus Hall 1J, East Tower, Gold Level

165 ASSESS
Reflections on the PSAT/NMSQT and the SAT from the College Board Math Test Development Committee
10–12 Session
The College Board administered a fully redesigned PSAT in October 2015 and a fully redesigned SAT in March 2016. Selected members of the SAT Test Development Committee will share experiences and impressions from their participation as SAT question reviewers for the College Board. Additionally, the Committee members will reflect on test data.

Bill Trapp
College Board, New York, New York
Grand Ballroom EF, East Tower, Gold Level

166 EQUITY
Using the Concrete-Representational-Abstract Technique to Teach Algebra to Struggling Students
8–10 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.

Joseph Sencibaugh
Webster University, Saint Louis, Missouri
Malayka Ferhi
Webster University, Saint Louis, Missouri
Elaina Heintz
Webster University, Saint Louis, Missouri
Columbus Hall 1J, East Tower, Gold Level

Learn more about the Math Forum resources—Ask Dr. Math, Teacher2Teacher, Problems of the Week, Math Tools, and more! Stop by NCTM Central.
9:30 A.M.–10:30 A.M.

168 STEM

You’d Never Expect It: The Surprising Careers That Involve STEM

6–8 Session

When we think about STEM careers, the standard scientist, engineer, and mathematician come to mind. But what about all of the other careers that our students aspire to have someday in the future? In this session, we will share activities focused on authentic STEM experiences through exploring career applications that emphasize the M in STEM.

Kathryn Rupe
Illinois Institute of Technology, Chicago
Judy Lederman
Illinois Institute of Technology, Chicago

Regency Ballroom A, West Tower, Gold Level

168.1 EW TOOLS

Overcoming the Relevance Barrier

6–8 Exhibitor Workshop

If your kids are into it, STEM is in it too. Come explore a new lesson series on the STEM Behind Cool Careers. Learn how technology can be used to engage your students in challenging mathematics they experience every day. Get free resources for middle grades through pre-calculus you can use in your classroom right away.

Texas Instruments
Dallas, Texas

Michigan 2, East Tower, Bronze Level

168.2 DLE

Closing the Gap: College and Career Readiness with MyMathLab for School

10–12 Exhibitor Workshop

Are your high school students ready for their next step in life? With online assignments, individualized study plans, etext, and multimedia library, MyMathLab for School lets students grow and strengthen their math skills in a digital environment to prepare them for college, career, and life. We will dive into the unique features of MyMathLab for School, take a look at various implementation models, and explore course offerings available to you. You will also leave with an code to start your own real account!

Pearson
Chandler, Arizona

Water Tower, West Tower, Bronze Level

9:45 A.M.–11:00 A.M.

169 ASSESS

Assessment and Feedback: Connecting the Two in a Practical Way

8–10 Workshop

Research is clear that when teachers engage in formative assessment their students’ learning is increased, but what are practical ways to make that happen? Come experience a process where you will look at tasks in a collaborative setting to examine students’ thinking and make decisions about how to best provide feedback to the learner to move them forward.

Sharon Rendon
@srendon2
CPM Educational Program, Summerset, South Dakota
Karen Wootton
CPM Educational Program, Odenton, Maryland

Columbus Hall AB, East Tower, Gold Level

170 CCL

Coaching Practices to Build a Dynamic Learning Culture

3–5 Workshop

How do coaches build effective relationships with teachers to promote high-quality mathematics instruction? Presenters will share tools and structures they have used in over 30 school districts in the Chicagoland area. We will highlight methods that advance generative reflection and discussions aimed at improving student engagement and learning.

Margie Pligge
@Margie.Pligge
Learning Science Research Institute, University of Illinois at Chicago
Nancy Mueller
Learning Science Research Institute, University of Illinois at Chicago
Joanne Baker
Learning Science Research Institute, University of Illinois at Chicago

Columbus Hall CD, East Tower, Gold Level
9:45 A.M.—11:00 A.M.

171  CCL
Standing Up for ALL Students: Strategies for Creative Insubordination
8–10 Workshop
Advocating for our students often requires understanding and responding to political situations at work. In this active workshop, we provide strategies to analyze the power dynamics in specific and real scenarios that can be generalized to other contexts. Be ready to role-play, reflect, and converse with others!
Rochelle Gutiérrez
University of Illinois at Urbana-Champaign
Esther Song
Lindblom Math & Science Academy, Chicago, Illinois

Columbus Hall GH, East Tower, Gold Level

172  JRNY
Conceptualizing Surface Area Measurement in Middle School Classrooms: A Sequence of Tasks
6–8 Workshop
Join in a discussion on student thinking about surface area. Participate in solving and see student work on surface area tasks designed to bring out students’ conceptual understanding. Leave this session with tasks that can be used in your classroom immediately.
Pamela Beck
Illinois State University, Normal

Grand Ballroom A, East Tower, Gold Level

173  TOOLS
Constructing Visions of Strategic Tool Use: The Equilateral Triangle Task
10–12 Workshop
This workshop will engage participants in a task focused on using appropriate tools strategically. We will develop methods for constructing equilateral triangles using a range of tools from paper to electronic. We’ll discuss strengths, limitations, and properties of tools as well as justify the methods developed. Laptops/tablets are encouraged.
Joshua Hertel
University of Wisconsin–La Crosse

Toronto, West Tower, Gold Level

174
Early Childhood Number Sense and Subitizing with Manipulatives
Pre-K–2 Workshop
Overview the skill progression of early math from infancy through kindergarten while assessing the influence of manipulatives on development in pre-number activities, number sense, subitizing, and counting. Engage in hands-on manipulative based activities and develop plans for the use of board games in teaching early math as well.
Leigh Kraemer-Naser
@CurrSolutionCtr
Curriculum Solution Center, Erie, Pennsylvania

Columbus Hall KL, East Tower, Gold Level

175
Equity and Excellence: Fractions on the Number Line for ALL Students
3–5 Workshop
This session will focus on increasing teachers’ conceptual understanding of fractions on the number line to be more effective in designing learning experiences for students. Materials can be adapted to the classroom. Best practices to support English learners will be included. Have fun learning and interacting with others about fraction sense!
Susie Hakansson
Retired, Venice, California

Columbus Hall EF, East Tower, Gold Level

176
How Do We Get Them to Talk? Classroom Participation during Math Lessons
6–8 Workshop
Many students find participation in class activities overwhelming due to, among other reasons, lack of mathematical language and right guidance. This workshop provides an impetus for helping such students to move from silent observers to active participants in the classroom. Focus will be on developing communication skills through mathematics activities.
Janet Omitoyin
University of Illinois at Chicago

Comiskey, West Tower, Bronze Level
9:45 A.M.–11:00 A.M.

177  CCL
New and Preservice Teachers Workshop
General Interest Session
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
Gold Coast, West Tower, Bronze Level

178
Rehearsing Instructional Routines That Engage All Learners
8–10 Workshop
Have you ever rehearsed teaching with other teachers? Rehearsals are an ideal way for groups of teachers to build consensus around teaching and learning. In this workshop, we’ll all participate in a rehearsal of an instructional routine called Contemplate then Calculate. We’ll then discuss how rehearsal experiences can transform teaching practice.
Liz Ramirez
New Visions for Public Schools, New York, New York
Sara Toguchi
New Visions for Public Schools, New York, New York
David Wees
New Visions for Public Schools, New York, New York
Grand Ballroom B, East Tower, Gold Level

179
Rethinking Review Day
6–8 Workshop
Throw out those old, dull review worksheets. Our session will explain alternative protocols to shift how review of content is structured in your class. Using formative assessments in conjunction with high-interest activities, we will make review day a personalized learning experience for your students.
Kelly Rooney
Tyrone Martinez
Education Consultant, Oak Lawn, Illinois
Regency Ballroom D, West Tower, Gold Level

11:00 A.M.–12:00 P.M.

180  JRNY
Culture and Identity: Humanizing Mathematics
6–8 Session
How does a student’s culture and identity shape their journey in mathematics education? How does pedagogy impact a student’s engagement and success in mathematics? I will share examples of how teachers embedded culturally relevant pedagogy, and I will share my own experiences and projects as a classroom teacher. Please share your experiences as well!
Jennifer Dao
Nichols Middle School/Northeastern University, Evanston, Illinois
Plaza Ballroom, East Tower, Green Level

181  TOOLS
Electronic vs. Paper Textbook Presentations of Various Aspects of Mathematics
General Interest Session
Textbooks now appear in paper form; in electronic form for computers, tablets, or phones; and in hybrids. Some aspects of mathematics seem better suited for one form than another. This talk discusses the platforms with regard to teaching various aspects of mathematics: vocabulary and notation, deduction, modeling, algorithms, and representations.
Zalman Usiskin
University of Chicago, Illinois
Grand Ballroom CD, East Tower, Gold Level

182
Evaluating Performance Tasks for Effectiveness
6–8 Session
Performance tasks help students demonstrate the internalization of knowledge. Session participants will learn the key features of well-written performance tasks, how to quickly evaluate resources for effectiveness, and how to infuse their teaching with well-written performance tasks to create a culture of critical thinking in their classrooms.
Jan Scott
Houghton Mifflin Harcourt, Boston, Massachusetts
Dennis Ortman
Houghton Mifflin Harcourt, Boston, Massachusetts
Regency Ballroom C, West Tower, Gold Level
Putting Essential Understanding of Geometry and Measurement into Practice in Grades 3–5
BY KATHRYN CHVAL, JOHN LANNIN, AND DUSTY JONES
KATHRYN CHVAL, VOLUME EDITOR
BARBARA J. DOUGHERTY, SERIES EDITOR
Do your students have “concept images” that limit their ideas of shapes to specific examples, oriented in particular ways? Do they confuse the size of an angle with the length of the rays in a drawing of an angle? This book demonstrates how to use multifaceted knowledge to address the big ideas and essential understandings that students must develop for success with geometry and measurement—not only in their current work, but also in higher-level mathematics and a myriad of real-world contexts.
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DON’T MISS!
More Lessons Learned from Research, Volume 1
EDITED BY EDWARD A. SILVER
Helps to link classroom teachers to all that original research has to offer
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Examining Tier 1 and Tier 2 Mathematics Instruction: Supporting Students Who Struggle

When focusing on Multi-Tiered Systems of Support, a goal is to develop highly engaging Tier 1 instruction and Tier 2 Interventions for students who struggle—particularly students with disabilities. This session considers interventions and assessments using multiple strategies for learning number, operations, and algebraic thinking.

Karen Karp
Johns Hopkins University, Baltimore, Maryland

Crystal Ballroom, West Tower, Green Level

I Know, You Know, We All Know—Access for All (to Math Content)

As educators, it is our responsibility to provide equitable access to math content for ALL students. The Three Reads Strategy will be introduced as a tool to provide such access. Participants will learn how to implement this strategy in their classrooms and see how it has supported students in accessing mathematically rich word problems in CPS.

Karen Hicks
Chicago Public Schools, Illinois
Sharonda Thomas
Chicago Public Schools, Illinois

Acapulco, West Tower, Gold Level

The Hybrid Flipped Math Classroom: Increasing Discourse and Solving Problems

As the flipped model grows increasingly popular, teachers are met with new challenges. These include promoting classroom discourse and fostering rich exploration and problem-solving experiences for their students. Bill will discuss the many structures and technology tools teachers can use to create these important experiences for their students.

William Tozzo
Bedford Schools, New York

Grand Ballroom EF, East Tower, Gold Level

Looking for lessons, activities, and teacher resources? Check out nctm.org/crcc.
11:00 A.M.–12:00 P.M.

188 Transdisciplinary Learning: Making Academics Relevant for All Students

General Interest Session
Economically, racially, and ethnically diverse Evanston Township High School has used out-of-the-box thinking to create transdisciplinary innovation in their school. Administrators and teachers will discuss their innovative courses, Geometry in Construction and Algebra in Entrepreneurship, as well as glimpses of new ideas on the horizon.

Dale Leibforth
@DaleLeibforth
Evanston Township High School, Illinois
Maryjoy Heineman
Evanston Township High School, Illinois
Erin Mancini
Evanston Township High School, Illinois

Michigan 1, East Tower, Bronze Level

189 STEM Uncovering the Mathematics in Art Sculpture: A STEAM Activity in Your Community

10–12 Session
STEAM is a hot topic in education. Students and teachers can engage in applications of mathematics through study of art sculpture. We share learning activities using sculptures from the Nathan Manilow Sculpture Park, and connect these activities to standards. We also offer suggestions for finding sculptures to mathematize in your own neighborhood.

Angela Thompson
Governors State University, University Park, Illinois
Anthony Barajas
Governors State University, University Park, Illinois
Stanislava Marrs
Governors State University, University Park, Illinois

Regency Ballroom A, West Tower, Gold Level

190 EQUITY What Does It Mean to Be “Disabled”?—Insights about Special Learners from ICME 13

General Interest Session
We will share insights on special education from a global perspective gained from attending the 13th International Congress on Mathematics Education. We will share strategies for effective teaching, pose questions dismantling the notion of mathematics “disability,” and explore ways in which environments themselves may disable learners.

Rebecca Borowski
Indiana University, Bloomington
Amber Candela
University of Missouri–St. Louis
Shawna Veit
University of Missouri–St. Louis

Michigan 2, East Tower, Bronze Level

190.1 Bridges Intervention: A New Elementary Math Intervention Program

3–5 Exhibitor Workshop
Learn about Bridges Intervention, offering targeted, high-quality instruction matched to student needs. Tier 2 and 3 students in K–5 work with models that spur thinking and engagement—starting with manipulatives, moving to two-dimensional representations and then mental images. Organized by content, progress monitoring is key to the program.

The Math Learning Center
Salem, Oregon

Michigan 3, East Tower, Bronze Level

190.2 JRNY What Does a Coherent Curriculum Really Look Like?

Coaches/Leaders/Teacher Educators Exhibitor Workshop
Quality curriculum shouldn’t just say it’s coherent, it should feel coherent. Join Great Minds for an interactive workshop where you’ll see and feel the coherence in our comprehensive PK–12 Eureka Math curriculum. Discover how students benefit from expertly crafted learning experiences, from whole number addition to polynomial multiplication.

Eureka Math/Great Minds
Washington, D.C.

EW Theater Riverside Center, East Tower, Purple Level
191  Designing Differentiated Mathematics Lessons

General Interest Burst

As our nation grows increasingly diverse, the culture of classrooms also become highly diverse. As a result, classroom teachers are challenged with meeting the needs of each and every learner. This session will provide participants with ideas for differentiating mathematics lessons and activities by scaffolding standards to the needs of learners.

Tashana Howse
Georgia Gwinnett College, Lawrenceville, Georgia

Regency Ballroom D, West Tower, Gold Level

192  Discrete Math—An Option for All Seniors!

10–12 Burst

Are you looking for an elective math class for seniors? Discrete math is perfect! Although we originally developed this course as an alternative for seniors who may not have felt successful in previous math classes, in the end we found that it was beneficial to these students as well as those more interested in and successful in STEM fields.

Nicole Flores
Chicago Public Schools, Illinois
Beth Runkel
Chicago Public Schools, Illinois

Toronto, West Tower, Gold Level

192.1  Quantitative Analysis: An Alternative to Calculus and Statistics

10–12 Burst

Two years ago, our school met with community leaders to learn about the mathematical skills that their employees need regardless of their direct connection to math. This burst will outline our senior-level math course, quantitative analysis, and how the course was created to build a rigorous curriculum that is focused on real-world community needs.

Brett Doudican
Dayton Early College Academy, Ohio

Grand Ballroom B, East Tower, Gold Level

193  Finding the Math Models in Model Rocketry: Building, Calculating, and Flying

10–12 Burst

For physics teachers, model rocketry is a demonstration of Newton’s laws. For the math teacher, model rocketry is a font of rigorous modeling opportunities for teaching and contextualizing algebra 1, geometry, algebra 2, and precalculus skills and concepts. Find the hidden mathematics of model rocketry in this burst.

Vin Urbanowski
Academy of Information Technology & Engineering, Stamford, Connecticut

Columbus Hall EF, East Tower, Gold Level

194  Harnessing the Power of Student Reflection to Increase Learning

3–5 Burst

Dewey said, “We do not learn from experience; we learn from reflecting on experience.” Having students reflect on assessments encourages true understanding. Reflection helps to set goals and to guide instruction and student growth. Reflection makes learning stick. When students learn how to and have time to reflect, student achievement increases.

Rachel Manjarres
@Rachel6325
Woodridge School District 68, Illinois
Diana Parker
Woodridge School District 68, Illinois

Grand Ballroom A, East Tower, Gold Level

195  Increasing Discourse in the Math Classroom

6–8 Burst

We know that dialogue in the mathematics classroom is essential to engage each and every student and develop their understanding of concepts. Hear some easy-to-implement ways to increase the level of dialogue in your class!

Kevin Dykema
Board of Directors, National Council of Teachers of Mathematics; Mattawan Middle School, Michigan

Comiskey, West Tower, Bronze Level
196  
Is the Success of Gestured Instruction Affected by Students’ Preexisting Incorrect Math Strategies?

Pre-K–2 Burst

This study seeks to explain the interaction of internal and external factors in children’s math learning. We do so by analyzing the effect of math instruction with or without gesture, and how incorrect strategies that children use to solve unfamiliar math problems may influence the effectiveness of instructor techniques for learning math concepts.

Theodora Koumoutsakis  
University of Chicago, Illinois
Andrew Mistak  
Northeastern Illinois University, Chicago
Amena Khan  
Northeastern Illinois University, Chicago

Columbus Hall KL, East Tower, Gold Level

197  
K–2 Science Technology Engineering and Mathematics Activities for Understanding Wind Turbines

Pre-K–2 Burst

K–2 STEM concepts using wind turbine curriculum materials and online resources will be shared. These tasks are appropriate for schools with or without an on-site wind turbine.

Kim Hartweg  
Western Illinois University, Macomb
Abha Singh  
Western Illinois University, Macomb

Columbus Hall KL, East Tower, Gold Level

198  
Quick and Effective Formative Assessment Strategies

General Interest Burst

Do you want to use daily formative assessment, but feel like you struggle to implement it effectively? We will present practical strategies for utilizing formative assessment in the math classroom that are easy to plan and can be quickly analyzed to have an immediate impact on your instruction.

Pauline Zdonek  
School District 89, Melrose Park, Illinois
Scott Wold  
School District 89, Melrose Park, Illinois

Columbus Hall AB, East Tower, Gold Level

199  
The Tyranny of the Axes, or, Lost on the Coordinate Plane

General Interest Burst

Many students have difficulty understanding graphs on the coordinate plane. One source of this difficulty may be that students understand coordinates in terms of a path from the origin as opposed a general understanding of left-right, down-up. Explore ways to help students develop a better sense of graphs on coordinates.

Steven Starr  
Retired, Chicago Public Schools, Illinois

Columbus Hall CD, East Tower, Gold Level

12:15 P.M.–1:15 P.M.

199.1  
Hands-On Operations: Using Manipulatives for Understanding of ALL Four Operations

3–5 Exhibitor Workshop

Come use place-value manipulatives to understand and practice addition, subtraction, multi-digit multiplication, and long division algorithms for whole numbers and decimals. Learn how to help all learners master the move from concrete to the representation to the ultimate abstract algorithm with a deep understanding of regrouping and place value.

Singapore Math  
Tualatin, Oregon

EW Theater Riverside Center, East Tower, Purple Level
1:30 P.M.–2:30 P.M.

200  EQUITY
Black (Math) Lives Matter: Four Ways Math Reform Fails Black Communities and What to Do about It!
General Interest Session

We can create communities of competent, creative, and engaged black students of mathematics when we are honest about the four prevailing forces that challenge mathematics teachers, leaders, and reformers. We acknowledge that the boldness of 21st-century math reform has sputtered in black communities and present ways the movement can be refitted.

Lou Matthews
Bermuda Public Schools, St. David’s, Bermuda
Rebeca Matthews Sousa
Bermuda Public Schools, St. David’s, Bermuda

Crystal Ballroom, West Tower, Green Level

201  CCL
Building Capacity by Coaching Coaches
Coaches/Leaders/Teacher Educators Session

Math coaches often do not receive the training that they need to do their job. Come learn from our work coaching coaches in urban middle schools. We will discuss specific ways we helped coaches develop their skills in leading learning walks, giving feedback, fostering professional learning cycles, implementing lesson study, and more.

Nicora Placa
Hunter College, New York, New York

Michigan 2, East Tower, Bronze Level

203  TOOLS
Create Visible Learners in the Mathematics Classroom Using Technology
6–8 Session

This session will emphasize how to transform a math classroom from compliant teenagers to students who own their learning using technology. Participants will gain tools and strategies to create visible learners while engaging in talk about learning. Through videos, student work samples, and pictures, participants will take away useful tools.

Christy Vehe
@Vehcamath
Valley View School District 365U, Romeoville, Illinois
Nicole Sangpeal
Valley View School District 365U, Romeoville, Illinois

Regency Ballroom B, West Tower, Gold Level

204  JRNY
From Counting to Problem Solving: Supporting the Development of Understanding for Each Student
Pre-K–2 Session

Beginning problem solving can seem challenging for students and teachers. This session will focus on how to use students’ ideas of counting (including partial ideas) to support their problem solving. Video examples of how to support the connection between counting collections and problem solving will be provided and discussed.

Megan Franke
University of California, Los Angeles

Grand Ballroom CD, East Tower, Gold Level

205  A Student’s Journey in Mathematics

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Grand Ballroom CD, East Tower, Gold Level

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1:30 P.M.–2:30 P.M.

206 Math Games: No Seriously . . . These Are Games—Winners and Learners
6–8 Session
Connecting the CCSS Standards for Mathematical Practice to learning through playing games is the object and design of this session. These teacher-created games are made to be used in a large classroom setting to provide all students with a fun and creative way to review and reinforce math concepts previously taught. Each game focuses on one of the mathematical practices.

Susan Chadaz
Garland Elementary School, Tremonton, Utah
Acapulco, West Tower, Gold Level

207 Professional Learning Communities (PLCs): Teacher Collaboration Strategies for Student Success
General Interest Session
Learn about productive ways to utilize student work, video of lessons, assessment data, and PLC protocols to improve teaching practices and increase student achievement in mathematics. Strategies included in this presentation are the product of a successful three-year school improvement grant at Peoria High School in Peoria, Illinois.

Kelsey Clarkson
Peoria High School, Illinois
Regency Ballroom A, West Tower, Gold Level

208 Ready, Set, Code!—Integrating Computer Programming into Your Math Curriculum
3–5 Session
Curious how computer programming fits into your classroom? Learn how to incorporate coding into daily lesson plans, starting with mini challenges for fourth graders and building into full-scale projects for middle schoolers and beyond. We will even play with writing a bit of code ourselves, so make sure to bring a device!

Hannah Ross
Milwaukee Montessori School, Wisconsin
Plaza Ballroom, East Tower, Green Level

209 Rethinking Assessment: A Skill We Develop with Our Students, and a Responsibility We Share
10–12 Session
Quizzes, tests, and assignments . . . how can we foster students’ capacity to assess their understanding? How do we give students feedback on their learning process and on how they convey their understanding? We will share strategies that guide our next actions as teachers and students’ next actions as engaged learners—before and after an assessment.

Scott Galson
Walter Payton College Prep High School, Chicago, Illinois
Benjamin Walker
Walter Payton College Prep High School, Chicago, Illinois
Grand Ballroom EF, East Tower, Gold Level
211 Comparing Use of Structure (SMP 7) in Mathematical and Statistical Tasks
6–8 Workshop
Standard for Mathematical Practice 7 calls for students to look for and make use of structure, but structure in math tasks has important differences from structure in statistical tasks. Compare and contrast SMP 7 in math and statistical tasks. Learn how to support students’ use of structure in both settings. Walk away with SMP 7–focused tasks you can use tomorrow!

Stephanie Casey
Eastern Michigan University, Ypsilanti, Michigan
Jonathan Bostic
Bowling Green State University, Ohio

212 JRNY Developing a Deeper Understanding of Mathematical Modeling in K–Grade 5
Coaches/Leaders/Teacher Educators Workshop
Join us as we explore Standard for Mathematical Practice 4 (Model with mathematics) across K–grade 5 through tasks that require students to use models to solve challenging tasks. We will examine student work samples and create a display to better understand how mathematical modeling progresses across the elementary grades.

Mary Ellen Dairyko
UChicago STEM Education, Illinois
Rachel Muren
UChicago STEM Education, Illinois
Amanda Zimolzak
UChicago STEM Education, Illinois

213 Developing Algebraic Thinking and Problem Solving without the “X’s”
Pre–K–2 Workshop
Strategies to develop algebraic thinking, including use of the equal sign, other representations, patterns, and solving for unknowns will be the focus for this hands-on workshop. Attendees will be actively engaged with manipulatives, effective questioning strategies, and the exploration of real-life problems that promote algebraic thinking.

Donna Knoell
Consultant, Shawnee Mission, Kansas

Columbus Hall AB, East Tower, Gold Level

214 TOOLS Facilitating Mathematical Conversations with Desmos Activities
8–10 Workshop
Teachers can use Desmos activities to facilitate mathematical conversations between students. These conversations can help guide learning, clarify understandings, and encourage precise communication. The use of teacher tools, such as the dashboard, pacing, and anonymity will be modeled and discussed. All Desmos activities and tools are free!

Adam Poetzel
@AdamPoetzel
University of Illinois at Urbana-Champaign
Anna Scholl
Xavier High School, Cedar Rapids, Iowa

Columbus Hall EF, East Tower, Gold Level

The NCTM Annual Meeting & Exposition is coming up!
Washington D.C. | April 25–28, 2018
1:30 P.M.–2:45 P.M.

216 **ASSESS**

**Hanging Out on a Number Line: You’re on the Spot!**

3–5 Workshop

Get up and move as you physically demonstrate your understanding of numbers, operations, and algebraic reasoning. This powerful workshop helps students see and feel position on a number line. Number sense and reasoning are needed to locate your spot! Answer the following: The endpoints are 3/4 and 1 3/4. Where are you located if you are 1 1/3?

Laurie Boswell
The Riverside School, Franconia, New Hampshire

**Columbus Hall GH, East Tower, Gold Level**

217 **TOOLS**

**Math and Art Integration for Engagement and Enrichment**

3–5 Workshop

Participants will engage in two different math lessons revolving around art. One will focus on making art inspired by mathematical structure and one on doing mathematics inspired by a piece of art. We will discuss the use of art to create engaging problems, to lower barriers to participation, and to increase student ownership of results.

John Golden
Grand Valley State University, Allendale, Michigan

Heather Minnebo
West Michigan Academy of Arts and Academics, Spring Lake

**Columbus Hall KL, East Tower, Gold Level**

218 **ASSESS**

**Maximum Info in Minimum Time: Grading and Scoring Strategies That Help You Work Smarter, Not Harder**

6–8 Workshop

Grading with checks and x’s takes minimum time. Reading, digesting, and giving meaningful feedback on student responses gives maximum info, but is time consuming and not always possible. I’ll share strategies to spend as much time on “grading” as it took students to produce the work. You can reclaim your time and have formative data. Win-win!

Belinda Thompson
LearnZillion, Washington, D.C.

**Grand Ballroom B, East Tower, Gold Level**

219 **TOOLS**

**The Struggle Is Real: Anticipating Student Misconceptions**

6–8 Workshop

How do you respond to student misconceptions in your classroom? Often we fail to actively envision how our students might approach and reason through a given task. Participants will anticipate student responses before engaging with a virtual student group in a live classroom.

Derek Pipkorn
Mequon-Thiensville School District, Mequon, Wisconsin

Katelyn Albright
Mequon-Thiensville School District, Mequon, Wisconsin

**Comiskey, West Tower, Bronze Level**

220 **EQUITY**

**Stats Trumps Hate**

10–12 Workshop

We will explore how to engage statistics learners in topics of social justice. You will learn how to find resources, discuss strategies to have conversations with your student population, and discover how to incorporate these ideas of justice into the classroom and curriculum in a way that empowers students to use math to change the world.

Megan Schmidt
St. Francis High School, Minnesota

Carl Oliver
City-As-School, Brooklyn, New York

**Grand Ballroom A, East Tower, Gold Level**

Get social! Stay informed and get connected with attendees by following #NCTMregionals on social media.
1:30 P.M.–2:45 P.M.

221 STEM
STEM Storytelling: Using Picture Books to Integrate Mathematics
Pre-K–2 Workshop
Join us for two integrative STEM activities based upon the picture books “Listen to Our World” and “The Most Magnificent Thing.” Participants will engage in hands-on activities using manipulatives to classify animals into “habitats” and then design and build a pet transport. Counting, graphing, working with money, and measuring length will be emphasized.

Lindsey Herlehy
Illinois Mathematics and Science Academy, Aurora
Karen Togliatti
Illinois Mathematics and Science Academy, Aurora

Columbus Hall CD, East Tower, Gold Level

3:00 P.M.–4:00 P.M.

222 TOOLS
“Who Wants to Be a Millionaire”: A Contestant’s (Mathematical) Perspective
General Interest Session
How does knowledge of expected value affect a game show contestant’s “best choice” in a given situation? How have differing prize values and rules changed the Millionaire game over the years? Come use various dynamic technologies to explore, play, and simulate with a recent Millionaire contestant.

Mike Reiners
Christ’s Household of Faith School, Saint Paul, Minnesota

Regency Ballroom B, West Tower, Gold Level

223 Creating and Using Truly “Groupworthy” Mathematics Tasks
6–8 Session
Group work should be about students relying on each others’ ideas and insights to solve a puzzle or problem. Many tasks that claim to be groupworthy could be accomplished independently. We will engage two fun, rigorous, and challenging mathematics tasks designed specifically to require input from all participants before the task can be completed.

Matthew McLeod
Education Development Center, Inc., Chicago, Illinois
Eden Badertscher
Education Development Center, Inc., Waltham, Massachusetts
Mary Wedow
Education Development Center, Inc., Waltham, Massachusetts

Grand Ballroom EF, East Tower, Gold Level

224 JRNY
Curriculum with a Message
10–12 Session
High school courses often lack meaningful flow or themes that are obvious to students. What if students could see the entire scope of algebra 2 in four weeks? Or learn the language of calculus in five? We will explore how you can take standards and craft a message that makes your curriculum more meaningful and more than a random set of tasks.

Jonathan Claydon
Houston, Texas

Regency Ballroom B, West Tower, Gold Level

225 ASSESS
Differentiating Assessments with a Growth Mindset
8–10 Session
Have you been redesigning lessons with a growth mindset? Are you dissatisfied with your fixed mindset assessments? Come learn how to create assessments that give student choice, have open-ended questions, utilize technology, and allow for differentiation.

Scott Miller
Naperville Central High School, Illinois
David Sladkey
Naperville Central High School, Illinois
Rachel Fruin
Naperville Central High School, Illinois

Acapulco, West Tower, Gold Level
3:00 P.M.–4:00 P.M.

226 JRNY
Engaging Struggling Students with Social Justice Mathematics
10–12 Session
To achieve equity in mathematics education, it’s not enough for students to play the game—we have to help them change the game. Hear how one district designed a “game changing” third-year high school math course to engage underprepared students in rigorous mathematics through financial and social justice topics using a wide variety of resources.

Jennifer Lawler
Kenosha Unified School District, Wisconsin
Steven Gorski
Kenosha Unified School District, Wisconsin

Plaza Ballroom, East Tower, Green Level

227 JRNY
I Have Selected a Challenging, Open-Ended Math Task—Now What?
3–5 Session
Join us as we explore ways to support productive struggle with open-response tasks. We will plan a task by previewing content and practices and identifying students’ strategies and misconceptions. We will discuss grouping students to promote discourse and examine ways to support students in the productive struggle of solving open-response tasks.

Katie Flores
UChicago STEM Education, Illinois

Regency Ballroom A, West Tower, Gold Level

228 JRNY
In 1st Grade It’s Called Missing Addend, in 7th Grade It’s Called Algebra!
Pre-K–2 Session
Participants will learn how much of what students are required to learn in upper elementary and junior high math is rooted in the math for kindergarten and first grade. Participants will take part in a variety of math games and activities that will demonstrate the relationships between worthwhile early math learning and later math success.

John Felling
Retired, Black Gold Regional Schools, Edmonton, Alberta, Canada

Michigan 1, East Tower, Bronze Level

229 TOOLS
Lesson Planning for a 1:1 Classroom: What Do We Need to Consider? What Is Different?
General Interest Session
Your students have devices, now what? We will engage in a discussion on lesson planning for 1:1 classrooms. We will look at how to plan for integrating technology in ways that will allow students to develop conceptual understanding. Devices have added a new complexity to math classrooms, and questions on when and how to use it must be considered.

Joshua Males
Lincoln Public Schools, Nebraska

Michigan 2, East Tower, Bronze Level

230 EQUITY
Native American–Based Mathematics Materials for the Classroom
General Interest Session
This session presents mathematics materials based in the culture and mathematics of Native American Peoples for integration into K–12 or undergraduate courses. These materials—both paper and electronic—are classroom ready, and they are developed and piloted in consultation with Tribes throughout the West.

Charles Funkhouser
California State University Fullerton
Miles Pfahl
Turtle Mountain Community College, St. John, North Dakota

Columbus Hall IJ, East Tower, Gold Level

231 TOOLS
Teaching Algebra in a 1:1 Math Classroom
8–10 Session
Have you ever thought about implementing new ways to keep your student’s engaged? This session will focus on taking the attention off the teacher and holding students accountable for their own learning with the use of technology. Topics included will be technology applications, student self-assessment ideas, and the flipped classroom model.

Kim Magee
Webster Central School District, New York

Regency Ballroom C, West Tower, Gold Level
3:00 P.M.–4:00 P.M.

232 **TOOLS**
Using Technology to Increase Conceptual Understanding in Algebra and Geometry
8–10 Session

Many topics in algebra and geometry are difficult to address conceptually and tend to be taught procedurally. We’ll explore interactive applets that let students “notice and wonder”; talk about mathematical situations; and develop conceptual understandings of triangle properties, linear equations, systems of equations, and factoring trinomials.

Annie Fetter
The Math Forum at NCTM, Reston, Virginia
EW Theater Riverside Center, East Tower, Purple Level

3:15 P.M.–4:30 P.M.

233 **A Look at Preschool Math: Conversations, Small Group Instruction, & Math Talks**
Pre-K–2 Workshop

This interactive session focuses on planning for successful small-group math instruction. Participants try activities that ask them to consider the importance of mathematical language, questioning techniques, and the strategic use of math tools. It also includes beginning math talks and connecting conversations during small group, transitions, and play.

Cyndi Lopardo
Chicago Public Schools, Illinois
Jen Hetrick
Chicago Public Schools, Illinois
Grand Ballroom A, East Tower, Gold Level

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Stop by Member Services in NCTM Central (Exhibit Hall).
3:15 P.M.–4:30 P.M.

234 STEM Coding in Math Classes: How to Incorporate Easy Coding Projects in Existing Math Courses
8–10 Workshop

Students have become familiar with basic coding techniques. In this workshop, we will explore ways to extend their understanding of coding using Scratch (or Snap) free coding software to create projects for current algebra, geometry, and precalculus classes. BYO computer (laptop, iPad, whatever) with Internet access or Scratch downloaded.

Martin Funk
New Trier High School, Winnetka, Illinois
Julie Bar
New Trier High School, Winnetka, Illinois

Comiskey, West Tower, Bronze Level

235 EQUITY Crafting Creative Math Lessons for the Transitioning ELL Student
6–8 Workshop

ELL students need special supports within the math classroom. In this interactive workshop, you will learn and engage in techniques that support ELL students and promote vocabulary acquisition, including the Three Reads strategy and other collaborative activities that increase student engagement, conceptual knowledge, and mathematical proficiency.

Linda Lichter Sumita
Chicago Public Schools, Illinois
Marlene Collins
North Palos School District, Palos Hills, Illinois

Columbus Hall EF, East Tower, Gold Level

236 JRNY Developing and Assessing Addition Fact Fluency
Pre-K–2 Workshop

What does it really mean to be fluent with addition facts, and how is this idea reflected in state and national standards? Come explore how we can use strategies, games, and activities in meaningful ways to develop a trajectory for helping all students become fluent with addition facts, and consider ways to authentically assess fact fluency.

Gina Kling
UChicago STEM Education/Western Michigan University, Kalamazoo

Columbus Hall EF, East Tower, Gold Level

237 Facilitating Meaningful Mathematics Discourse and Productive Struggle in Middle School
6–8 Workshop

The NCTM Effective Mathematics Teaching Practices provide a framework for high-quality instruction that promotes meaningful thinking and reasoning. In this workshop, we will analyze middle school classroom artifacts (narrative and video cases, student work) and identify teacher moves that support meaningful discourse and productive struggle.

Mike Steele
University of Wisconsin–Milwaukee

Columbus Hall GH, East Tower, Gold Level

238 STEM Klein Bottles and Pottery: A STEAM Exploration
10–12 Workshop

How do a mathematics teacher educator and an art teacher see a geometric form differently? How do they see that form in the same way? And how can geometry translate into pottery? We will explore these questions and more as we discuss the STEAM collaboration we did to lead to our cover story in the October 2016 issue of Mathematics Teacher.

Christopher Smith
Augsburg College, Minneapolis, Minnesota
Jana Paré
Chanhassen High School, Minnesota

Columbus Hall CD, East Tower, Gold Level
3:15 P.M.–4:30 P.M.

239  **EQUITY**
Problem-Based, Enhanced-Language Learning: Providing Access to ELLs

3–5 Workshop

Problem-Based, Enhanced-Language Learning (PBELL) is a model that provides access to rigorous content instruction and academic language to culturally and linguistically diverse learners in the math classroom. This workshop will provide ideas in problem-based instruction, content-language objectives, mathematics discourse, collaboration, and integration of reading, writing, listening, and speaking.

Silvia Aparicio  
Arizona State University, Tempe  
Stephanie Lund  
Arizona State University, Tempe  
Jenni Birrell  
Arizona State University, Tempe

**Grand Ballroom B, East Tower, Gold Level**

240  **ASSESS**
Supporting Productive Struggle in the Math Classroom 6–12

8–10 Workshop

Students at the secondary level often have a belief that struggle is “bad” in math. Teachers need to help them see that while unproductive struggle leads to shutting down, productive struggle is HOW we learn best. Students should expect struggle/cognitive dissonance during math class and should have a set of strategies to employ to be productive.

Amy Rybaczuk  
CPM/St. Charles East High School, Illinois

**Columbus Hall KL, East Tower, Gold Level**

241  **CCL**
Widening Impact: Building District-Wide Leadership Capacity for Systemic and Coherent Change

Coaches/Leaders/Teacher Educators Workshop

This session will highlight how the Chicago P12 Math Collaborative is using a multi-tiered, innovative approach to professional learning in order to build and sustain math leadership capacity in every Chicago public school. Participants will gain an understanding of this approach through active engagement, video observation, and discussion.

Ruth Haumersen  
DePaul University, Chicago  
Lynn Narasimhan  
DePaul University, Chicago  
Jessica Mahon  
DePaul University, Chicago

**Gold Coast, West Tower, Bronze Level**

242  **ASSESS**
You’ve Completed a Timely Formative Check—Now What Do You Do with the Information?

10–12 Workshop

Formative data can be used to inform instruction in multiple “correct” ways. Using sets of data collected from an algebra class, we’ll discuss various ways it can inform and impact instruction. Lesson monitoring and various ways to form and use collaborative groups will be discussed. Tools to collect formative data quickly will also be presented.

Allan Bellman  
University of Mississippi, Oxford

Kayton Hosket  
University of Mississippi, Oxford

**Toronto, West Tower, Gold Level**

---

Join us at the NCTM 2018 Regional Conferences & Expositions:

Kansas City, Missouri | November 1–3
Seattle, Washington | November 28–30
PREMIER MATH EDUCATION EVENT

NCTM ANNUAL MEETING & EXPOSITION 2018
April 25-28 | Washington, DC

Empowering the Mathematics Community

It’s never too early to plan ahead for the leading math education event of the year. Network with thousands of your peers and fellow math education professionals to exchange ideas, engage with innovation in the field, and discover new learning practices that will drive student success.

The latest teaching trends and topics will include:

- **Tools and Technology**: Enhancing Instruction and Promoting Innovation
- **Access, Equity, and Empowerment**: Transformative Practices and Professional Accountability
- **Purposeful Curriculum**: Cultivating Coherence and Connections
- **Teaching and Learning**: Building a Community of Empowered Learners
- **Assessment**: Involving and Empowering Students
- **Professionalism**: Empowering Teachers through Community
- **Mathematical Modeling**: Interpreting the World through Mathematics
- **Emerging Issues and Hot Topics**

The NCTM Annual Meeting & Exposition is ideal for:

- PRE-K–12 TEACHERS
- MATH TEACHER EDUCATORS
- NEW AND PROSPECTIVE TEACHERS
- MATH COACHES AND SPECIALISTS
- MATH RESEARCHERS
- SCHOOL AND DISTRICT ADMINISTRATORS

Learn more at nctm.org/annual
and follow us on Facebook, Instagram, LinkedIn, Twitter, YouTube #NCTMannual
This certificate is presented to

in recognition of attendance and participation at the
NCTM 2017 Regional Conference & Exposition

Chicago, Illinois • November 29–December 1, 2017

Matt Larson
President, NCTM
Name of Provider: National Council of Teachers of Mathematics

Educator’s Name: ______________________________________________________

Description of Professional Development Activity: This is a three-day regional conference sponsored by the National Council of Teachers of Mathematics. More than 200 presentations are offered for teachers of prekindergarten through college. Topics range from administration to geometry, precalculus to statistics.

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

<table>
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<tr>
<th>Date</th>
<th>Session #</th>
<th>Session Title</th>
<th>Presenter Name(s)</th>
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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

Matthew Larson
President, NCTM

Please check with your state education agency and local administration to determine whether these conference hours can be used for professional development credits.

NCTM Regional Conferences & Expositions are an opportunity to share knowledge and learn with leaders in the field of mathematics education. Gain new strategies to unleash the mathematical mind of every student when you take advantage of superior math resources right on your doorstep.

What you’ll get:

- Innovative ideas you can immediately put to use
- Updates on classroom best practices from recognized innovators
- In-depth discussion about the latest education resources
- Knowledge-sharing with like-minded peers
- Interaction with the latest tools and products in the robust exhibit hall

Who should attend?

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

Join NCTM in Kansas City or Seattle and discover the tools that will help you promote the mathematical habits of mind that will lead your students to college and career success.

Learn more at nctm.org/regionals and follow us on #NCTMregionals
Please send this application form and your payment to NCTM, P.O. Box 75842, Baltimore, MD 21275-5842.

Visit nctm.org/membership to learn more and join!

1 Contact Information All fields are required for processing.

First Name ___________________________ Last Name ___________________________

School _____________________________

Address (check one):  □ School Address  □ Home Address

City __________________________ State/Prov __________________________ ZIP/PC __________________________

Country __________________________ Phone __________________________

Primary E-mail __________________________

Your grade level interest (check all that apply):  □ Pre-K–2   □ 3–5   □ 6–8   □ 9–12  □ Higher Education

Your professional level:  □ Administrator □ Experienced Teacher  □ Early Career Teacher □ Coach/Specialist □ College Professor

2 Select Membership Journal

Full members select a print subscription to one NCTM journal (print version includes online access to the same journal).

Select ONE journal below:  

- Teaching Children Mathematics (TCM) (Pre-K–6) □ $96  □ $84  □ $42  □ $30
- Mathematics Teaching in the Middle School (MTMS) (5–9) □ $96  □ $84  □ $42  □ $30
- Mathematics Teacher (MT) (8–14) □ $124  □ $112  □ $70  □ $58
- Journal for Research in Mathematics Education (JRME) □ $124  □ $112  □ $70  □ $58
- Mathematics Teacher Educator (an NCTM/AMTE online journal) N/A  N/A  N/A  □ $24


3 Buy Additional

Full Member  E-Member  Print Journals (Full Mbr Only)  Digital Journals

4 Payment Summary

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SUBTOTAL: Membership and Additional Journals ................................................................. $ ____________

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☐ Check here to remove your name from rental lists (companies renting lists must obtain approval from NCTM before using lists).
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Affiliate Information

Join an NCTM Affiliate Today

Once you have joined NCTM, membership in an NCTM Affiliate is a terrific way to round out your professional involvement. Affiliates offer you an opportunity to link 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 this conference’s region and the Affiliates-at-Large appears on page 75. To join one of these organizations, email the Affiliate contact for membership information. NCTM has more than 200 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 Organizations

The Metropolitan Mathematics Club of Chicago (MMC) is a major professional organization of mathematics educators in the greater Chicago area. Founded in 1914 as the Men’s Mathematics Club of Chicago, the MMC was instrumental in the founding of the National Council of Teachers of Mathematics six years later. For this reason, the MMC was given NCTM affiliate charter #1. The MMC changed its name (but not its initials) after it admitted women in 1972. (A separate Women’s Mathematics Club [WMC] existed from 1916, the organizations resisted mergers, and the WMC ceased existence later in the 1970s.) The MMC hosts dinners featuring high-quality speakers monthly throughout the school year, a conference of workshops each winter, and biennial summer workshops.

The Illinois Council of Teachers of Mathematics (ICTM) is the premier organization in the state working to promote equitable, high-quality mathematics teaching and learning for all children. Organized in 1949 by a small group of interested mathematics teachers, ICTM’s members now include mathematics educators living in every corner of the state and working with students at all grade levels, from early childhood to university. ICTM’s various leadership, collaboration, advocacy, and professional development activities—including a dynamic annual conference, a vibrant program of mathematics contests for middle and high school students, online professional development and networking activities, and support of affiliates throughout the state—aim to create and foster greater interest in the teaching of mathematics, and greater learning opportunities for all students.

NCTM's Mathematics Education Trust (MET) channels the generosity of contributors through the creation and funding of grants, awards, honors, and other projects that support the improvement of mathematics teaching and learning. MET provides funds to support classroom teachers in the areas of improving classroom practices and increasing mathematical knowledge; offers funding opportunities for prospective teachers and NCTM’s Affiliates; and recognizes the lifetime achievement of leaders in mathematics education.

If you are a teacher, prospective teacher, or school administrator and would like more information about MET grants, scholarships, and awards, please:

- Visit our website, www.nctm.org/met
- Call us at (703) 620-9840, ext. 2112
- Email us at exec@nctm.org

Please help us help teachers! Send your tax-deductible gift to MET, c/o NCTM, P.O. Box 75842, Baltimore, MD 21275-5842. Online donations also are welcome at www.nctm.org/donate. Your gift, no matter its size, will help us reach our goal of providing a high-quality mathematics learning experience for all students.

The Mathematics Education Trust was established in 1976 by the National Council of Teachers of Mathematics (NCTM).
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NCTM wishes to thank our **2017 Chicago Regional Conference Committees** for their generous support and dedication planning this Regional Conference.

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Principles to Actions Professional Learning Toolkit

CTM's Principles to Actions Professional Learning Toolkit provides grade-band-specific professional learning modules focused on the Effective Teaching Practices and Guiding Principles from Principles to Actions: Ensuring Mathematical Success for All—NCTM’s landmark publication that connects research with practice. Specific research-based teaching practices that are essential for a high-quality mathematics education for each and every student are combined with core principles to build a successful mathematics program at all levels.

The Principles to Actions toolkit helps support professional learning with teachers by analyzing mathematical tasks, narrative and video cases, student work samples, vignettes, and more. Each module includes a presentation, presenter notes, and required materials. Teachers learn by abstracting general ideas from the specific examples about how to effectively support student learning.

The teaching and learning modules were developed in collaboration with the Institute for Learning at the University of Pittsburgh and are available exclusively to NCTM members. Limited modules are provided for each grade level.

Building on Principles to Actions

Many related publications build on Principles to Actions and the toolkit.

Principles to Actions–related publications explore implementing the effective mathematics teaching practices; go in depth about the research behind Principles to Actions; and elaborate on such topics as access and equity, tools and technology, assessment, and more.

• Taking Action: Implementing Effective Mathematics Teaching Practices in—
  – Grades Pre-K–5
  – Grades 6–8
  – Grades 9–12

This set of grade-band books elaborates on the teaching and learning principles described in Principles to Actions. Each book provides examples and activities to help teachers develop their understanding of the eight effective mathematics teaching practices and how they can be enacted in the classroom.

• Enhancing Classroom Practice with Research behind “Principles to Actions”

This book summarizes and synthesizes the research behind each of the guiding principles and essential elements in Principles to Actions. It also provides examples of what this research might look like in classroom practice. This resource will provide readers with a sense of where the field stands in its knowledge and hypotheses about the big ideas put forth in Principles to Actions. In addition, it makes the principles and elements—as well as the research—concrete for readers by offering examples from classroom practice.

• Access and Equity: Promoting High-Quality Mathematics in—
  – Grades Pre-K–2
  – Grades 3–5
  – Grades 6–8
  – Grades 9–12

• Principles to Actions Elaboration Series
  – Access and Equity
  – Curriculum
  – Tools and Technology
  – Assessment
  – Professionalism
Escalators, elevators, and restrooms are indicated on each floor. Elevators are conveniently located throughout the hotel for guests with disabilities or where no escalator is present.

Crossing between towers: Cross between towers via the Skybridge or the Concourse. You may also cross from the lobby level via the crosswalk on Wacker Drive.
Floor Plans

Hyatt Regency Chicago
Purple Level (East Tower)

Note: Above setups are tables and chairs ONLY without space left for other equipment such as staging, AV, display tables, registration tables or coffee breaks.

Room Dimensions (in feet):
- **RIVERSIDE EXHIBIT HALL**: HALL CEILING HEIGHT 12', 70,000 sq. ft., 2,330 sq. ft., 7,000 sq. ft., —, —, —, —, 355
- **EAST**: —, 30,000 sq. ft., 870 sq. ft., 2,500 sq. ft., 2,400 sq. ft., —, —, —, 151
- **WEST**: —, 40,000 sq. ft., 1,330 sq. ft., 4,500 sq. ft., 3,300 sq. ft., —, —, —, 204
- **EAST DOCK (D, E, F)**: —, 3 Bays, —, —, —, —, —, —

Room Name:
- RIVERSIDE EXHIBIT HALL
- EXHIBITS and NCTM CENTRAL
- EW THEATRE
- NCTM REGISTRATION

**CAPACITY CHART**:
- **Banquet 6' Rnds of 10**: (No AV)
- **Room Size**: Sq. Ft. Reception Theater (AV), Classroom (AV), Boardroom U-Shape Hollow, Square Exhibit

**FOR SHOW USE**: NOT AVAILABLE.

**NORTH COLUMBUS DRIVE**

Hyatt Regency Chicago
151 East Wacker Drive
Chicago, Illinois 60601, USA
T +1 312 565 1234
F +1 312 239 4541
chicago.regency.hyatt.com
Hyatt Regency Chicago
Gold Level (West Tower)
Floor Plans

Hyatt Regency Chicago
Bronze Level (West Tower)

Room Dimensions

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Hyatt Regency Chicago
Bronze Level (East Tower)
Hyatt Regency Chicago
Green Level (East Tower)
Exhibit Hall Floor Plan

REGISTER

REGISTRATION

EXHIBITOR LOUNGE

1102

40' Smart Wall

40' Table

AWD

CEILING HEIGHT IS 10' UNDERNEATH 3'-5''

Exhibitor Workshop Theater

Imagine Learning

103 202

203 302

200 201

206 107

Math Teachers Press

Curriculum

209 308

207 306

MathCON

Mathspace

Scolab

Houghton Mifflin Harcourt

20' 20'

Texas Inst

213 312

Houghton Mifflin

Foundation

Bedtime Math

MathWorks

MathField

MathWise

MathEd

MathWorks

MathField

MathWise

MathEd

Japan Math

Big Ideas Learning

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