Program Book

Washington, DC

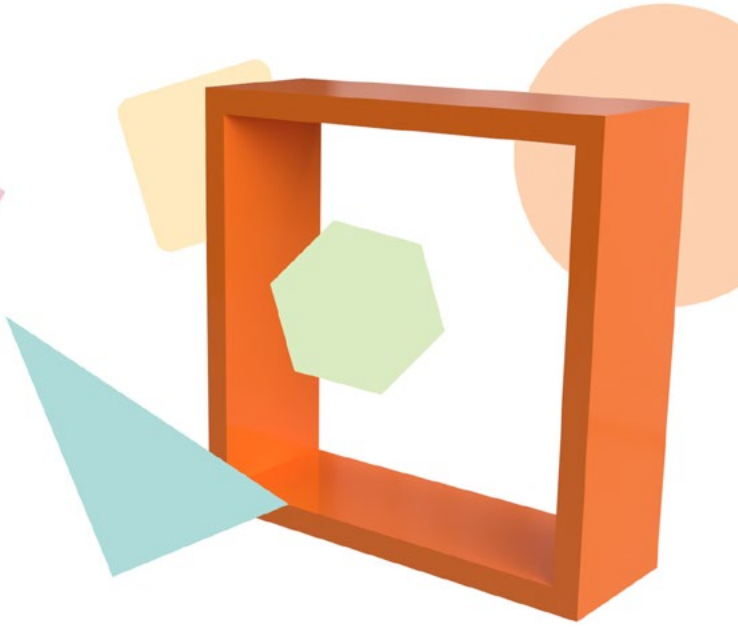
NCTM®

2023 ANNUAL MEETING & EXPOSITION

Oct. 25-28, Washington, DC

#NCTMDC23

Visit Amplify at booth 312!



Stop by booth 312 for exclusive previews of exciting new products, access to free resources and activities, and fun swag. Then join us for sessions where we dive deeper into hot topics for math educators at all grade levels, including:

Thursday, Oct. 26, 9:30 a.m. EDT, Room 158AB

Doing right by the 8 Mathematical Practices

Featuring Fawn Nguyen

Let's engage in the 8 Mathematical Practices and find practical ways to embed problem solving into students' everyday interaction with mathematics.

Thursday, Oct. 26, 2:30 p.m. EDT, Room 158AB

Class openers and quick games to foster numeric, algebraic, and geometric thinking

Featuring Oscar Perales and David Poras

Learn new class openers, games, and puzzles to spark student interest and deepen conceptual understanding for students of all ages.

Friday, Oct. 27, 2:30 p.m. EDT, Room 158AB

Math Teacher Lounge LIVE!

Featuring Dan Meyer and Jennifer Bay-Williams

Join us for a live Math Teacher Lounge podcast session! We'll be investigating games in math fluency and finding fun, innovative ways to get all students engaged in math instruction.

See more exciting sessions and events at amplify.com/NCTM

Amplify.

Contents

CREATING SPACES FOR CHANGE THROUGH COMMUNITY: IT STARTS WITH YOU

Building and learning as a community begins with each member. In this conference, participants can learn and develop professionally through connecting with other educators and sharing ideas for moving forward. Our math classrooms are currently presenting a myriad of challenges, and this conference provides ideas to address those challenges.

HOSTS

Maryland Council of Teachers of Mathematics
Virginia Council of Teachers of Mathematics

MEETING FACILITY

All Annual Meeting presentations will be held in the Walter E. Washington Convention Center (WEWCC) and the Marriott Marquis Headquarters Hotel. See pages 138–141 for floor plans.

ALL TIMES ARE EASTERN

REGISTRATION

Wednesday	7:30 AM – 7:00 PM
Thursday	7:00 AM – 5:00 PM
Friday	7:00 AM – 5:00 PM

EXHIBITS

Wednesday	4:00 – 6:00 PM
Thursday	9:00 AM – 5:00 PM
Friday	9:00 AM – 5:00 PM

The dedicated exhibit hall time is scheduled from 12:00 – 1:00 PM on Thursday and Friday.

NCTM CENTRAL

Wednesday	10:00 AM – 6:00 PM
Thursday	9:00 AM – 5:00 PM
Friday	9:00 AM – 5:00 PM

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

nctm.org/dc2023

2023
ANNUAL MEETING & EXPOSITION
Oct. 25-28, Washington, DC

About Host Organizations....140
ADA Shuttle Service....10
Advertising Guide....139
Affiliates....140
All Gender Restrooms....10
App....9
Contactless Payments....5
Committees....141
Delegate Assembly....11
Event Code of Conduct....5
Exhibits....10
- Directory....146
- Exhibit Hall Floor Plan....145
- Exhibitor Workshops....10

First Aid....10
Floor Plans....142
Focus Strands....7
Information Booth....10
NCTM Central....9
- Bookstore....9
- Classroom Resources....9
- Mathematics Education Trust (MET)....9
- Member Services....9
- MET Celebration....9
- Mobile App....9
- Networking Lounge....9
- Professional Development Services....9

NCTM Officers....141
Online Conference Planner....9
Parking....10
Presentation Handouts....9
Program Information
- Annual Meeting Overview & Orientation....6
- Grade Bands....6
- Strands....7
- Focus Strands....7
- New Teacher Strand....8
- Types of Presentations....5
- Wednesday Presentations....11
- Thursday Presentations....13
- Friday Presentations....65
- Saturday Presentations....123

Regional Caucuses....11
Registration and Access to Presentations....5
Research Conference....8
Speaker Index....157
Sponsors....139
The BOOKSTORE at NCTM Central....9
Wi-Fi Access....9

Welcome to Washington, DC!

Welcome to the NCTM Annual Meeting and Exposition! We are all so excited and grateful that you took time away from your family and friends to join us in our Washington D.C. for professional growth and personal connection. Presenters included in this program have traveled from near and far to share best practices that support NCTM's vision for mathematics teaching and learning. The conference halls will be filled with participants ready for in-person opportunities to participate in inclusive sessions and conversations with educators from around the world. Our hope is that you will learn and grow during your time here, and bring home ideas to spark student learning and promote changes in the schools and districts you serve.

We are excited to learn from our keynote speakers, Jamila Dugan, Julia Aguirre and Karen Mayfield-Ingram, and Crystal Watson. The presentations included in this conference program have passed a triple-blind review conducted by our expert program committee. This conference will see the debut of a new format, the "Practice Session," which allows you to focus on in-depth learning from a handful of specifically selected presenters. All of the presentations center around the five strands for the conference:

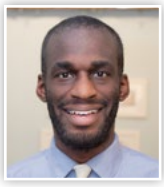
- Uplifting and Inspiring the Mathematics Educator
- Creating Inclusive, Engaging, and Rigorous Mathematics for All
- Challenging and Advancing Policy and Structures in Mathematics Education
- Expanding the Narrative of Who Belongs
- Improving Core Instruction through Deeper Mathematical Content and Pedagogical Knowledge

With nearly 500 presentations on the program, there will be many options for you to attend, and new ways to narrow down which talk is for you. The app has been newly updated, with many ways to filter selections, including how in-depth the topic is. Additionally, Pathways will be on the program for the first time. Pathways are collections of talks around a new and hot topic. Here are just a few of the Pathway topics that will be on the program:

- Data Science
- AI and the classroom
- Differentiation
- In student words
- Social Justice and Teaching

While you are here in America's Capitol, we hope you take the opportunity to venture out to a museum, enjoy world-class cuisine, and have your voice heard among legislators in the halls of congress. Make sure to check out the presentations and offers available in the vendor area, which will also have new opportunities for educators to make connections with their peers.

More than anything, we deeply appreciate your commitment to education, and the trust you put in us to provide you with a great event. We know there are numerous opportunities for in person and online professional development, and we are honored that you chose to join us in D.C Annual Conference and Exposition. On behalf of the Program Committee, the NCTM Staff, and our host affiliates, Maryland Council of Teachers of Mathematics and Virginia Council of Teachers of Mathematics, Thank you for taking time to learn and grow with us!



Carl Oliver
PROGRAM COMMITTEE CHAIR
City-As-School, New York City Department of Education

Agida Manizade
HOST AFFILIATE LIAISON,
Virginia Council Teachers of Mathematics, Radford Child Development, Inc., Virginia

John Seelke
HOST AFFILIATE LIAISON,
Maryland Council Teachers of Mathematics, Montgomery County Public Schools, Maryland

Christine Thereault
HOST AFFILIATE LIAISON,
Maryland Council Teachers of Mathematics, Urbana Elementary, Frederick, Maryland

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) allow speakers to convey information about multiple topics or broad ideas in lecture format. Rooms are set in either theater or classroom style.

Workshops (75 minutes) allow speakers to engage participants in an interactive environment. Rooms are set with round tables for interaction.

Bursts (30 minutes) allow speakers to quickly convey information on a specific topic or idea. Rooms are set with round tables.

NEW! Practice Sessions (120 minutes) This year's new Practice Sessions are 2-hour sessions focused on putting the ideas that are learned into practice and extend the focus beyond the classroom.

Exhibitor Workshops (60 minutes) allow exhibitors to showcase their products and services. Look for the symbol indicating exhibitor workshops in the program book. Rooms are set in either theater or classroom style.

Session Content Level

To also help you find appropriate presentations to attend, each presentation lists the presentation's intended audience:

- Introduction to the Topic
- Intermediate
- In-depth

Insightful Education Sessions, Dynamic Exhibits

The NCTM Annual Meeting & Exposition is 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.

You will walk away with the following:

- 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

Contactless Payments

NCTM will provide contactless payment options at NCTM registration, the NCTM Bookstore, and NCTM Central. Accepted credit card payments will include any US- and most internationally issued magstripe or chip cards bearing a Visa, Mastercard, American Express, or Discover logo. Checks may be accepted for exact amount at registration only. All payments are to be made in United States Dollars (USD$). No cash payments. Please check with individual exhibitors and sponsors regarding their onsite payment policies.

Tips for a Rewarding Annual Meeting & Exposition

- Access the **conference app** for program and speaker information, to connect with other attendees, and to share your feedback. Visit **nctm.org/confapp**.
- Speaker handouts are available for download on the NCTM Mobile App.
- Keep the conversations going, connect with other attendees and speakers, access and share session resources, ask questions, and more in the MyNCTM online community at **my.nctm.org/DC2023**.
- If you're experiencing the conference with your colleagues, attend different presentations and share your learnings with one another after the conference.
- **Be safe!** Remove your name badge when you leave the conference facilities.
- Together, Events DC and Aramark have developed innovative food and beverage options inside Walter E. Washington Convention Center. Coffee, snacks and lunch are available for purchase inside the food court adjacent to the exhibit hall.
- Silence your cell phone during presentations.

Registration and Access to Presentations

Registration is in East Salon AB at the Walter E. Washington Convention Center (WEWCC). You must wear your badge to attend all presentations and to enter the NCTM Exhibit Hall. You will need to show a picture ID to have your badge reprinted.

By registering and attending the NCTM 2023 Annual Meeting & Exposition, 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.

Event Code of Conduct

All communication at NCTM events should be appropriate for a professional audience, including people of many different backgrounds regardless of gender, gender identity and expression, age, sexual orientation, disability, physical appearance, body size, race, ethnicity, or religion. By attending an NCTM event, you agree to adhere to our Code of Conduct policies, which can be found at **nctm.org/policies**.

Grade Bands

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

- PreK–Grade 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)
- Coaches/Leaders/Teacher Educators
- General Interest—issues of interest across multiple grades and audiences
- Research

Annual Meeting Overview & Orientation

Whether this is your first NCTM Annual Meeting or your twentieth, we have something for you! Hosted by members of the Board of Directors, this orientation will help you get the most out of your time at the NCTM 2023 Annual Meeting. Learn about the new features of this year's meeting or discover something you missed at previous ones. Find out how to navigate presentations, learn to use our conference app, and network with other attendees.

■ Wednesday	Presentation #1	4:00–4:30 PM	Salon C	WEWCC
■ Thursday	Presentation #4	7:15–7:45 AM	Salon C	WEWCC

Focus Strands

UPLIFTING AND INSPIRING THE MATHEMATICS EDUCATOR

Educators' professional lives are a continual push against limited time and resources—now more than ever. Although teaching is filled with days of ongoing interactions, it can easily feel isolating and defeating with ever-growing expectations. As a community of educators, we must find ways to collaborate and grow together in manageable, effective, and inspirational ways. Examples of sessions in this strand might include the following:

- Self-care resources and practices
- Connecting teachers and building community through online and in-person experiences
- Routines that can improve classroom teacher sustainability and effectiveness.
- Building professional learning networks

CREATING INCLUSIVE, ENGAGING, AND RIGOROUS MATHEMATICS FOR ALL

Each and every student has the right to engage in grade-level content. To do this, we must create inclusive and rigorous learning experiences for all learners that center the needs of multilingual students and those with disabilities in math. Educators must also challenge practices and structures that deny access in our instruction and produce stagnation through separation. Each and every student can learn from and contribute to mathematics classes if instructional practices are inclusive, engaging, and rigorous. Examples of sessions in this strand might include the following:

- Assessment that is informative and encouraging
- Co-teaching/integration teaching strategies for success
- Centering the culture of non-English learners in the classroom
- Universal design for learning in mathematics
- Creating accessible tasks

CHALLENGING AND ADVANCING POLICY AND STRUCTURES IN MATHEMATICS EDUCATION

Policies and structures are often put into place with an intention of improving student outcomes; however, at times these policies and structures further perpetuate inequities. The needs of our students and society are rapidly changing, and as a result, we need a comprehensive review of the classroom structures and site policies that affect student learning. As we gather at the home of America's decision makers, let's empower teachers to make decisions that promote positive change in their district, school, and classroom. Examples of sessions in this strand might include the following:

- Review of evaluation and assessment policies
- Classroom structures that support the development of mathematical practices
- Broadened pathways to rigorous mathematical instruction
- Strategies for increasing the diversity of culture, practice, and thought
- Reflection of past and present decisions and the implications
- Recognizing and responding to disparities in schools and district outcomes
- Incorporating data science into classrooms and school decision-making

EXPANDING THE NARRATIVE OF WHO BELONGS

Our mathematics classrooms should be places that nurture a sense of belonging and foster positive mathematical identities for all students. This requires us to focus explicit attention on how students see themselves in their daily learning. Instruction must center, leverage, and build on their experiences and strengths, include a diverse representation of contexts that allow students to see themselves in the mathematics, and provide opportunities to think deeply about community and global contexts for mathematics situations. Examples of sessions in this strand might include the following:

- Instructional strategies such as representation in contexts and resources
- Broadening perspectives by using data to visualize and understand local and global issues
- Instilling students with an identity as mathematicians
- Activities that model community-building and genuine connections through math

IMPROVING CORE INSTRUCTION THROUGH DEEPER MATHEMATICAL CONTENT AND PEDAGOGICAL KNOWLEDGE

A deeper knowledge of mathematical content empowers teachers to engage students in developing deep conceptual understanding and mathematical thinking and reasoning. When teachers are equipped with a deep understanding of mathematics and equitable teaching strategies, they are poised to increase students' joy for mathematics and decrease the number of students requiring intervention. Examples of sessions in this strand might include the following:

- Improvements for core instruction that reduce the need for interventions.
- Deep mathematical understanding of concepts
- Appropriate use of assessment
- Reflection and practice of math pedagogical knowledge

Additional Strands (continued)

NEW TEACHER STRAND

This strand offers sessions and workshops targeting the questions and concerns of new teachers and those training to become teachers. Presentations are grade-band specific and include topics from management and motivation, to engaging struggling students, to a celebration of those beginning their teaching careers. The strand targets early-career teachers and those working on certification; all are welcome.

Start early with the New Teacher Strand Kickoff (session #91) on Thursday at 9:45 AM and finish with the New Teacher Celebration (session #463) on Friday at 2:45 PM for more fun. Visit **nctm.org/newteacher** for more information about resources for new teachers.

EQUITY STRAND

The Equity strand features presentations given by the Benjamin Banneker Association, TODOS: Mathematics for ALL, and Women and Mathematics Education.

PRESIDENTS' SERIES

The Presidents' Series highlights connections within the mathematical community at different levels. Presentations are scheduled throughout the conference.

NCTM COMMITTEE SESSION

NCTM committee presentations are identified by the symbol above. For a list of all NCTM committees, please visit **nctm.org**.

NEW NCTM PUBLICATIONS

These sessions feature authors and contributors from NCTM's newest publications.

Pathways

500+ session choices can be daunting, even for the most seasoned NCTM Annual Meeting attendees. This year, we've developed learning Pathways—curated selections on key topics to help guide your meeting journey. Visit Pathways **(nctm.org)** for these key topics list of sessions.

- Data Science
- Ai and the Classroom
- Differentiation
- Intervention
- Support/UDL
- Classroom Meets Policy
- In Student Words
- Social Justice and Teaching

Research Conference

The NCTM Research Conference is on Tuesday and Wednesday, October 24–25, 2023. A separate registration fee is required to attend the Research Conference. More information is available at **nctm.org/research2023**. Stay connected with other Research Conference attendees by using #NCTMResearch23 on Twitter, Facebook, LinkedIn, and Instagram.

Attendees registered for the NCTM Annual Meeting & Exposition may attend Wednesday's Research Conference presentations at no extra cost just by showing their Annual Meeting badge. The Wednesday program includes Linking Research and Practice sessions, with the Linking Research and Practice Plenary at 1:30 PM. Concurrent sessions begin at 8:00 AM and continue until 4:00 PM on Wednesday.

Wi-Fi Access

Complimentary Wi-Fi will be available throughout public spaces of the Walter E. Washington Convention Center (WEWCC) and the Marriott Marquis Hotel.

Username: **NCTM**

Password: **NCTM2023**

Mobile App

The NCTM app keeps you connected with every aspect of the Annual Meeting including sessions, speakers, and exhibits. This free app allows you to view the exhibit hall floor plan, highlight your favorite presentations, rate presentations, and connect with other attendees. Visit nctm.org/confapp for more information.

In addition, the NCTM app connects to the conference itinerary planner so you can personalize and keep track of everything in one convenient place.

Speaker Handouts

Attendees can access electronic speaker presentation handouts through the conference app and itinerary planner.

Itinerary Planner

The itinerary planner is a great way to search the conference program book, set up your schedule, and download presentation handouts. The itinerary planner is updated with the latest program changes and presentation information. Visit **nctm.org/planDC**.

Program Updates

Visit **nctm.org/DC2023** 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.

MET Celebration

Attend the Mathematics Education Trust (MET) Celebration, sponsored by Forrest T. Jones & Company, on Wednesday evening after the Opening Session Keynote. Toast the NCTM 2023 Lifetime Achievement Award recipients. Tickets can be purchased ahead of time by logging into your registration and adding the event or you may purchase onsite with an agent at registration.

NCTM Central

Visit NCTM Central at the Walter E. Washington Convention Center (WEWCC) in West Hall A during exhibit hours to learn how NCTM supports you and the field of mathematics education:

- Get sample journals and more at Member Services.
- Update your membership information and learn about your benefits.
- Discover available funding and resources to support you in your career and professional development through the Mathematics Education Trust (MET).
- Explore NCTM's Classroom Resources and learn about NCTM's collection of lesson plans, problems, and more.
- Connect with peers, speakers, NCTM committee members, and authors in the Networking Lounge.
- Learn about NCTM's Professional Development offerings, including upcoming events (Annual Meetings, Regional Conferences, and Virtual Conferences) and NCTM's Professional Learning Services.
- Visit all centers in NCTM Central and place your name into a drawing for a chance to win a $50.00 NCTM Gift Certificate!

The BOOKSTORE at NCTM Central

Check out the totally redesigned and cashless Bookstore at NCTM Central. Shop NCTM's newest titles, best-sellers, and math-themed products for great gifts and incentives. Get your Notice and Wonder merch here! Save up to 35% off the list-price books and free shipping* on all books purchased through the Online Bookstore. Preview at **nctm.org/catalog**.

**Bookstore discounts and free standard shipping are limited to NCTM 2023 Washington DC Annual Meeting Badge Holders who purchase from the online NCTM bookstore from October 25 through October 28, 2023. Free shipping limited to the contiguous United States. Discounts and free shipping do not apply to bulk or purchase orders, individuals only, please. The NCTM Bookstore is not equipped to handle shipping from the meeting site. The Business Service Center in the Walter E. Washington Convention Center can assist you with your shipping needs.*

Bookstore Hours inside the Exhibit Hall:

	EXHIBIT HALL
Wednesday	10:00 AM – 6:00 PM
Thursday	9:00 AM – 5:00 PM
Friday	9:00 AM – 5:00 PM

Note on Sales Tax Exemptions: To qualify for sales tax exemption in the NCTM Bookstore, you must furnish a copy of a District of Columbia tax exemption certificate, issued by the district, at the time of purchase. The law requires NCTM to keep a copy of the certificate, which we cannot return to you. You must pay with a purchase order, check, or credit card from the school to which the exemption certificate is issued. NCTM cannot accept personal checks, personal credit cards, or cash in conjunction with tax exemption certificates.

Information Booth

The NCTM Information Booth is located near the Mount Vernon Entrance. Staff can answer your questions about the conference program and assist you with housing questions, directions and local information from transportation and historical sites to shopping and entertainment.

Lost-and-Found

You may retrieve or turn in lost-and-found items at the NCTM Information Booth located near the Mount Vernon Entrance. At the end of the conference, lost-and-found items will be turned over to Convention Center Security.

Lactation Room

The Mamava is a freestanding lactation suite designed to provide attendees with a private space to attend to their lactation needs. The pod comes complete with two spacious benches, a fold-down table, and power outlets. Mamava pods can be unlocked with the proprietary Bluetooth enabled SmartLock. The convention center has two Mamava pods; one is located near Room 103AB and the other, which is ADA accessible, is near Room 140A. To access the pods:

- SmartLock features a 10-digit keypad that is used to open the pod with the code: 8008
- Be sure to lock the deadbolt to maintain privacy when the pod is in use.

All Gender Restrooms

All gender restrooms are located throughout the Walter E. Washington Convention Center, near room 207 (Level 2) and 150 (Level 1) and the Marriott Marquis Hotel, restrooms near Marquis Ballroom 11 (Level 2).

Bag and Coat Check Service

During conference hours Friday from 7:00 AM–5:00 PM and Saturday from 7:30 AM–1:00 PM you may check your belongings with a convention center staff member in room 103B. Please pick up all items each day by closing time; you may not leave items overnight.

First Aid

A first aid station is located inside Exhibit Hall D. If you need medical services while in Washington, DC, please check with your hotel concierge for the closest medical facilities. For any medical emergency, call 911 without hesitation.

For Your Child's Safety

During installation and dismantlement, no one under the age of 16 will be allowed in the Exhibit Hall. Due to the size and professional nature of the conference, and for your child's safety, children under the age of 16 are not permitted in the Exhibit Hall during show hours.

Exhibit Hall

Visit the NCTM exhibit hall to explore, try out, and purchase products and services for your classroom or to help you meet your career goals. Meet the people who produce these products, get fresh ideas, and see how products work. The hall will be open on:

Wednesday	4:00 PM-6:00 PM
Thursday	9:00 AM–5:00 PM
Friday	9:00 AM–5:00 PM

Dedicated exhibit hall time is scheduled 12:00–1:00 pm on Thursday and Friday. Check out the map of the exhibit hall on page 141 and the Exhibitor Directory on pages 142–151.

Exhibitor Workshops

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

ADA Shuttle Service

Attendees requiring ADA assistance getting to and from the convention center or NCTM conference hotels can request shuttle service by calling 1-866-378-3915. For more information, please see the supervisor at the shuttle desk located in L Street Lobby North.

Parking/Metro

The Convention Center is located at the Mt. Vernon Square/7th Street-Convention Center station stop and is served by Metro's Green and Yellow lines. Alternatively, take the Red Line to the Gallery Place-Chinatown Metro station which is a 5 minute walk from the Convention Center.

More than 3,000 parking spaces are located within a three-block radius of the Convention Center including surface lots and garages. Exhibitors and attendees are encouraged to use these public parking facilities. Parking regulations are heavily enforced in the Convention Center's surrounding residential areas. There is no public parking at the Convention Center. Use Spot Hero and save time by booking your parking ahead of time. Parking rates vary daily.

Regional Caucuses

The NCTM Affiliates' Region Caucuses and Delegate Assembly provide a forum for sharing information on emerging issues. The Regional Caucuses information is below.

All regional caucuses will be held at the Marriott Marquis Hotel on Wednesday, October 25. The Marriott is conveniently connected to the Walter E. Washington Convention Center.

Check in for Regional Caucuses is from 1:30-2:00 pm in Marquis Ballroom Salon 5. Individual Caucus rooms open at 2:30 pm. Western Caucuses will meet at 7:00 pm in Salon 5.

REGION	PRESIDERS	ROOM
Affiliate-at-Large & Canada	**Paul Alves**, Resource Teacher – Mathematical Literacy, Peel District School Board, Ontario, Canada **Marci Ostmeyer**, Professional Development Director, Columbus, Nebraska	**Independence E**
Central	**Rebekah Baker**, Associate Professor – Department of Teacher Education, Anderson University, Anderson, Indianna **Ben Lawson**, Student Affiliate Representative, Bowling Green State University Graduate Student	**Independence Ballroom A–C**
Eastern	**Steve Levesque**, Teacher, Burrillville High School, Harrisville, Rhode Island	**Marquis Ballroom Salon 5**
Southern	**Bernard Frost**, Assistant Superintendent for Curriculum and Instruction, Orangeburg, South Carolina	**Capitol/Congress**
Western (7:00-9:00 pm)	**Kim Zeydel**, Educational Therapist/Dyslexic Specialist, McCall, Idaho	**Marquis Ballroom Salon 5**

Wednesday Afternoon Session

4:00 PM–4:30 PM

1 Annual Meeting Overview and Orientation

General Interest Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, East Salon C

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

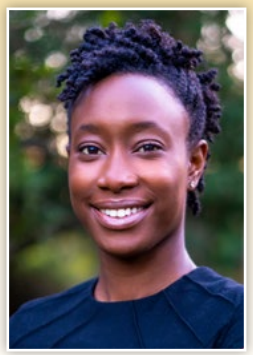
Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia

Wednesday Evening Session

5:30 PM–7:00 PM

2 Opening Session: Climbing Out of Equity Traps and Tropes

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, Exhibit Hall E



Many of our district and school equity efforts focus on oversimplified quick fixes and implementation of off-the-shelf solutions. Although we may feel a sense of urgency to address deep-rooted equity issues, our attempts are often thwarted by landmines that can be identified and removed through strategic analysis and creative action. In this keynote, Dr. Dugan lays out common equity traps and tropes that can undermine our well-intentioned efforts. Through storytelling and real-world examples, we explore why it is so hard to move equity work forward while beginning to find the courage to move toward next-generation models for school transformation and unhinge ourselves from a legacy of "implementation" over imagination.

Jamila Dugan, JD Learning Partners, San Diego, California

Need funding for professional development? Check out grant opportunities from the Mathematics Education Trust at **nctm.org/grants.** The next deadline to apply is November 1. Visit the MET area in NCTM Central to learn more.

- Uplifting and Inspiring the Mathematics Educator
- Creating Inclusive, Engaging, and Rigorous Mathematics for All
- Challenging and Advancing Policy and Structures in Mathematics Education
- Expanding the Narrative of Who Belongs
- Improving Core Instruction through Deeper Mathematical Content and Pedagogical Knowledge
- Presidents' Series
- New Teacher Strand
- Equity Strand
- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

Thursday Morning Session

7:00 AM–9:00 AM

3 Seventy-Second Annual Delegate Assembly

General Interest Session
Walter E. Washington Convention Center, 145AB

This session is a forum for designated delegate leaders of NCTM Affiliates to make recommendations to the NCTM Board of Directors concerning activities and policies of NCTM and mathematics education.

Member and Affiliate Relations Committee, National Council of Teachers of Mathematics, Reston, Virginia

Thursday Morning Session

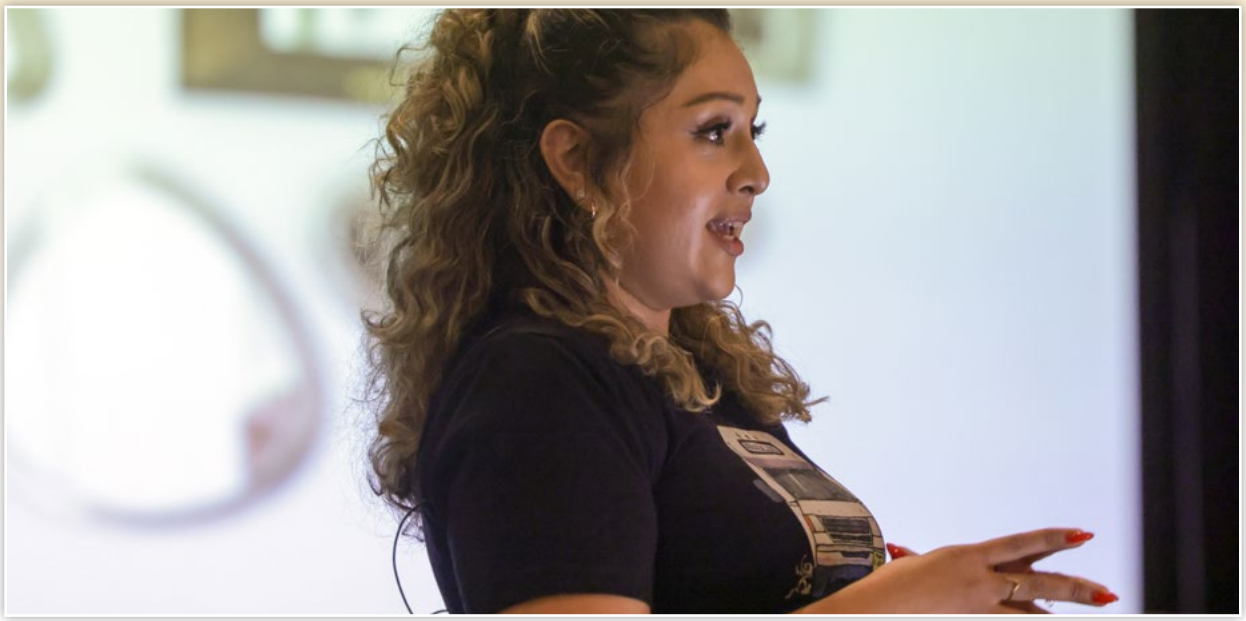
7:15 AM–7:45 AM

4 Annual Meeting Overview and Orientation

General Interest Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, East Salon C

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

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



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- Challenging and Advancing Policy and Structures in Mathematics Education
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- Equity Strand
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5 In Their Own Words: Getting the Most Out of the Lesson Objective

PreK–2 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Liberty Ballroom M

"Today we are going to learn about…" Isn't that how most lessons begin? Let's shift the paradigm to refrain from announcing the objective, and instead close with a "Math Meeting" where students debrief the lesson experience. The result is reflective students arriving at an authentic understanding of concepts expressed in their own words.

Maria Elena Amaya, Great Minds, Washington, District of Columbia
Lauren Moore, Great Minds, Washington DC, District of Columbia

6 Play-Based Learning Strategies to Enhance Numeracy for Early Learners

PreK–2 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 154AB

Brain scientists have identified that movement is essential for enhanced brain function, focus, concentration, learning, and retention. Join us for this enjoyable, energizing, and interactive training! Learn practical, easy-to-implement strategies for making math fun, boosting fluency, building number sense, and addressing unfinished learning.

Suzy Koontz, Math and Movement, Ithaca, New York
Twitter: @MathandMovement

7 Conceptual Understanding, Executive Functions, and Equity: Three Areas for Big Change in the Classroom

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Union Station

Deep conceptual understanding and complex problem-solving skills are important for students' math success. Learn how equity-centered practices infused with strategies to strengthen and support students' executive function skills come together to support powerful math learning for all students.

Adam Smith, Advanced Education Research and Development Fund, Oakland, California
Aubrey Francisco, Advanced Education Research and Development Fund, Oakland, California
Kaiulani Ivory Akpan, Independent, Hyattsville, Maryland
Megan Brunner, Advanced Education Research and Development Fund, Oakland, California

8 Creating Accessible Tasks with Codable Robots for Deep Math Learning

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Liberty Ballroom L

See how codable Pro-Bots were used as vehicles for all students to fully access and deeply explore fourth-grade standards of geometry, measurement, partial products, fractions, and basic operations. View student videos from a co-teaching setting and an intervention setting and analyze how student noticings and strategies can form the foundation for instruction. We'll also share how NCTM supported the project through funding!!

Marianne Strayton, Clarkstown Central School District, New City, New York
Twitter: @mseducateEdD
Caitlyn Dolphin, Independent, Orangeburg, New York

9 Math Problems from the Singapore Classrooms: Use of Bar Models

3–5 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 203AB

Come and enjoy solving a bunch of word problems using bar models. Learn how to scaffold students' learning in solving these problems. Compare your solutions to students' actual solutions.

Sarah Schaefer, Mathodology, Atlantic Beach, Florida
Twitter: @Mathodology
Ban Har Yeap, Pathlight School, Singapore

Start planning early and stay connected throughout the Annual Meeting with the NCTM mobile app. Learn more at **nctm.org/confapp**.

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10 Using Coding and Social-Emotional Learning to Teach Mathematics in the Elementary Classroom

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Independence Ballroom F-H

STEAM is for *all* students! This session examines how educators can use coding and strategies that support social-emotional learning to teach measurement and geometry concepts in the elementary classroom. Participants will learn basic coding techniques that will enhance students' exploration of mathematics while fostering an inclusive atmosphere.

Lindsay Gold, University of Dayton, Tipp City, Ohio
Twitter: @lindsayanngold
John Ashurst, Harlan Independent Schools (Retired), Baxter, Kentucky
Michael Houston, Riverside Beaver County School District, Ellwood City, Pennsylvania

11 Closing the Achievement Gap in Middle School Mathematics through High Expectations and Rigor

6–8 Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Independence Ballroom D

This session will cause teachers to reflect on their teaching practice in mathematics. Teachers will analyze and discuss rigor of math standards based on levels of DOK and other resources that can be used to increase rigor. The session will give space for teachers to discuss how scaffolding of material can achieve higher rigor for all.

Dr. Barbara Mayden, Annunciation Orthodox School, Houston, Texas

12 Drawing a Line from Geometry to a Physical Therapy Clinic

6–8 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Treasury

Using math is important in the field of physical therapy. Actual patient therapy prescriptions will be analyzed through the lens of a mathematician to demonstrate how geometry helps therapists understand how to manipulate angles to rehabilitate injured joints. Hands-on activities that can be used in the classroom will be shared.

Barbara Lynch, Lakewood City Schools, Ohio
Margaret Wicinski Reynolds, University of St. Augustine for Health Sciences, Florida

13 Rethinking Tier 1 Intervention: Math Learning Acceleration in Practice

6–8 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Marquis Ballroom Salon 12&13

This session will explore how anchoring new learning in real-world context and visual representations helps students address unfinished learning right alongside grade-level learning. Participants will examine how a deep understanding of the big ideas of math helps all students engage with grade-level content and reduces the need for intervention.

Jamica Craig, Zearn, New York, New York
Twitter: @Zearned
Tanaga Rodgers, Zearn, Crofton, Maryland

14 Going Beyond Notice and Wonder: Reading Data Visualizations

8–10 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 101

Learn how to go beyond notice and wonder to read data visualizations from the *NYT's* "What's Going On in This Graph"! We will engage in rich discussions about reading data visualizations, understanding relationships represented, making predictions, understanding the context behind the data, and considering our own identities within the data.

Anita Sundrani, University of Houston, Texas
Twitter: @AnitaSundrani
Travis Weiland, University of Houston, Texas

15 Is My Lesson Structure Hindering My Ability to Implement Formative Assessment Practices Well?

8–10 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 147B

This session will share evidence on the types of lesson structures high school teachers used and how those structures supported or hindered their ability to implement formative assessment practices well. Participants will leave with practical advice on how to incorporate formative assessment practices into their own classrooms in a meaningful way.

Joanne Philhower, Austin Peay State University, Clarksville, Tennessee
Twitter: @DrJoJoMath

Looking for lessons, activities, and teacher resources? Check out **nctm.org/crcc**.

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16 Multiple Representations in High School Math to Enhance ELL Experiences

8–10 Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Monument

Our high school English language learners truly excelled in their math classes not only conceptually with the math but also with their language development when we opened our minds to teaching with multiple representations.

Hattie Webb, St. Mary's County Public Schools, Valley Lee, Maryland
Lauren Runkles, St. Mary's County Public Schools, Leonardtown, Maryland

17 Modeling with Geometry: What Is It, and How Is It Used in Mathematical Modeling?

10–12 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 151A

In the Common Core State Standards for high school geometry, students are expected to "apply geometric concepts in modeling situations." But what does this mean, and how is it related to mathematical modeling? We will explore these questions and more through an interactive session.

Michelle Cirillo, University of Delaware, Newark
Twitter: @UDMichy
John Pelesko, University of Delaware, Landenberg, Pennsylvania

18 Using Dynamic Applets to Develop Statistical Thinking

10–12 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 140AB

How can we estimate the margin of error for a survey? Decide if one experimental treatment is better than another? Examine whether an association between two variables is statistically significant? There's a freely available, mobile-friendly applet for that. In this session, we'll examine how applets can be used to illuminate statistical concepts.

Daren Starnes. Retired, Hilton Head, South Carolina
Josh Tabor, The Potter's School, Oro Valley, Arizona

19 From Coaching to Confidence: Building Capacity within a School

Coaches/Leaders/Teacher Educators Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Archives

One of the primary roles of a coach is to build the capacity of the team. This session will focus on developing a collaborative relationship with *all* teachers by focusing on their unique strengths and areas of need. Participants will consider different types of teachers and how best to help individual teachers grow their practice.

Elizabeth Petty, Metropolitan Nashville Public Schools, Tennessee

20 Planning Pitfalls: Considerations for Decision-Making

Coaches/Leaders/Teacher Educators Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 150A

Many teachers and teacher candidates fall prey to planning pitfalls using resources that don't promote understanding of mathematics concepts. To help them make informed instructional decisions, we present the Mathematics Lesson Planning Protocol (MLP2). This decision-maker is great for planning and coaching conversations.

Victoria Miller Bennett, CTL (Collaborative for Teaching and Learning), Louisville, Kentucky
Twitter: @MMBMMB
Stefanie Livers, Missouri State University, Springfield

22 Challenging Our View of Disability

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, Ballroom C

The way we view disability can affect the way we think about, plan for, and interact with disabled students. Continual analysis of our own beliefs about disability and what accessible education looks like can help us provide all students with meaningful math instruction and a safe school environment.

Lara Metcalf, Mind Research Institute, Irvine, California
Twitter: @laramathcalf
Erin Curtin, Mind Research Institute, Irvine, California

23 Insider Tips for Catalyzing Change in Your State and Local Education Governance

General Interest Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 202A

Advocating for better math education can be an empowering experience for an educator, but it's not always clear how to get the right message to the right people at the right time. In this session, a panel of state supervisors of math will help you navigate bureaucracies, amplify your voice, and practice strategies to be a more effective advocate.

Raymond Johnson, Colorado Department of Education, Broomfield
Twitter: @MathEdnet
Denise Schulz, Independent, Raleigh, North Carolina
Jennifer Michalek, Independent, Hartford, Connecticut
Anne Wallace, New Hampshire Department of Education, Concord
Lisa Ashe, NC DPI, Wake Forest, North Carolina

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- Challenging and Advancing Policy and Structures in Mathematics Education
- Expanding the Narrative of Who Belongs
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24 Math Fact Fluency Interventions That Make Sense

General Interest Session
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, Ballroom B

Interventions must build on students' strengths and support their emerging number sense. This session shares ideas for explicit strategy instruction paired with effective diagnostic assessment tools. This research-based approach supports competence and confidence with math facts.

Jennifer Bay-Williams, University of Louisville, Pewee Valley, Kentucky
Twitter: @JBayWilliams

25 Using Virtual Manipulatives to Engage Students in Deep Mathematical Exploration and Discovery

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Liberty Ballroom N-P

Manipulatives can transform how students make meaning of important ideas by making abstract relationships visible, by teaching creativity and problem solving, and by allowing students to explore and discover. Learn how virtual manipulatives can mirror these effects and support more complex interactions that are not possible in the physical world.

David Poras, Mathigon Studio at Amplify, Newton, Massachusetts
Twitter: @davidporas

26 Deviations from the Common Core State Standards

Research Session
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, 146B

State mathematics standards have experienced many changes in the past decade as states have transitioned away from CCSSM. However, publicly available information regarding the changes is confusing. During this session, I will share findings from my study that systematically outline changes to K–5 mathematics standards and will discuss implications.

Ashley Schmidt, University of Central Florida, Saint Augustine
Twitter: @aschmidtmathed

26.1 Introducing Bridges in Mathematics Third Edition

3–5 Exhibitor Workshop
Walter E. Washington Convention Center, 156

The Math Learning Center develops student-centered K–5 materials based on visual models and problem solving. Our latest offering, *Bridges in Mathematics Third Edition*, was created with equity in mind so students have choice, feel included, and can be heard. Join us to see how our relevant, open-ended tasks support student sensemaking and develop positive math identities.

The Math Learning Center, Salem, Oregon

26.2 The Perfect Math Credit: NGPF's Financial Algebra

10–12 Exhibitor Workshop
Walter E. Washington Convention Center, 159AB

Imagine this: Students use percents in a 50/30/20 budget, model spending decisions with inequalities, and design a budget spreadsheet for their post-high school lives all in one unit! Come explore NGPF's free Financial Algebra course – the perfect math credit for students who crave real-world connection to make math meaningful.

Next Gen Personal Finance, Palo Alto, California

26.3 Open Questions, Open Minds with Kurt Whited, Savvas Learning Co.

General Interest Exhibitor Workshop
Walter E. Washington Convention Center, 143C

Join us for this interactive workshop on open questions and discover how open questions help all students find a seat at the math table. You'll learn how to create and implement open questions to build on that innate curiosity, giving it an openness to grow and flourish. Takeaways: By delivering open questions, teachers invite students at different stages of mathematical development to benefit and grow.

Savvas Learning Company, Paramus, New Jersey

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- Expanding the Narrative of Who Belongs
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27 Empowering All Students through Rich, Real-World Problem Solving: Equitable Strategies in K–2

PreK–2 Workshop
SESSION CONTENT LEVEL: In-Depth
Marriott, Supreme Court

Join us for an interactive workshop on rich problem-solving tasks! Learn how to help students develop their own stories and to incorporate real-world context. All students deserve the right to struggle and the aha moments when they overcome the challenge. The session emphasizes equity and access by utilizing differentiated processes and math language routines to amplify language for multilingual learners, ensuring every child has the opportunity to be successful.

Andrea Wood, Mid-Del Schools, Moore, Oklahoma
Twitter: @AWoodLovesMath
Denise McDowell, Denise McDowell Consulting, Norman, Oklahoma

28 Family Math Nights: Centering Families' Mathematical Practices in a Multilingual Space

PreK–2 Workshop
SESSION CONTENT LEVEL: Intermediate
Marriott, Independence Ballroom A-C

The workshop will explore implementing virtual family math nights that center and value families' mathematical ideas, experiences, and multilingualism. Participants will learn how to build from asset-based pedagogies to center the linguistic and mathematical practices of multilingual families and communities.

Dan Battey, Rutgers University, New Brunswick, New Jersey
Jessica Hunsdon, Independent, Highland Park, New Jersey

29 Wondering about Counting Collections? Come Discover the Benefits for All!

PreK–2 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 204AB

Young mathematicians love to collect things. Counting Collections builds on this natural curiosity, taking collections to another level. The structure of this routine will be explored and the benefits discovered. Learn how to use observation and questioning to gain an understanding of each student's number concept and flexibility with number.

Linda Melendez, Livermore Valley Joint Unified School District, California
Heather Bateson, Livermore Valley Joint Unified School District, California

30 Formative Assessment and Feedback: Inclusive and Engaging Strategies That Inform and Encourage

3–5 Workshop
SESSION CONTENT LEVEL: Intermediate
Marriott, Independence Ballroom E

All participants will be engaged in exploring everyday use of five classroom-based formative assessment techniques, with particular attention to applying the techniques and cultivating access for multilingual learners and those with disabilities to demonstrate their mathematical understandings. The critical role of planning for and facilitating powerful feedback, including type and timing of the feedback, will also be emphasized in the session.

Francis (Skip) Fennell, Past President, National Council of Teachers of Mathematics, Reston, Virginia; McDaniel College, Westminster, Maryland
Twitter: @SkipFennell
Beth Kobett, Stevenson University, Baltimore, Maryland
Jon Wray, Howard County Public Schools, Ellicott City, Maryland

31 Just Move the Decimal and Other Lies My Teacher Told Me

3–5 Workshop
SESSION CONTENT LEVEL: Intermediate
Marriott, Judiciary

Let's move beyond tricks and differentiate between digits and numbers as we help students understand what's happening in their computations! It's time to ditch the "add a zero" and "move the decimal," and shift from answer-getting to thinking and deep understanding of place value. Join me to discover new tools and ideas you can use tomorrow!

Alison Mello, Alison Mello Math Consulting, LLC, North Attleboro, Massachusetts
Twitter: @alisonmellomath

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- Expanding the Narrative of Who Belongs
- Improving Core Instruction through Deeper Mathematical Content and Pedagogical Knowledge
- Presidents' Series
- New Teacher Strand
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32 RACE: A Problem-Solving Method That Promotes Equity

3–5 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Capitol Congress

RACE is a graphic organizer and problem-solving scaffold that challenges spaces of marginality. RACE is accompanied by a rubric that helps teachers identify opportunities for differentiation and a checklist promoting student evaluation of their work.

Rita Williams, F1NE-TUNE, Smyrna, Georgia
Twitter: @F1NE_RW

33 Torres's Rights of the Learner: A Framework for Empowering All Students in Mathematics

3–5 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 209ABC

Torres's Rights of the Learner (RotL) is a framework that helps teachers create a safe, respectful, and responsive learning environment where learners have voice in the governance of a democratic learning community and discover the power of their mathematical thinking. Participants will engage in a problem-solving task in the context of RotL.

Crystal Kalinec-Craig, University of Texas at San Antonio
Olga Torres, Freelance Consultant, Tucson, Arizona

34 Be Positive and Move Students Beyond Negative Perceptions of Integers!

6–8 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Mint

Middle school is hard, but math should be a place for creativity and fun. Integers can rock students' understanding of the number system with the introduction of negative numbers, but this work should be visual and engaging! Participants will gain a solid understanding of the four operations with integers using manipulatives and visual math models.

Haley Galyean, Tomball ISD, Texas
Twitter: @haley_galyean
Kelly Reigle, Union County Public Schools, Weddington, North Carolina

35 Beyond M&M's and Cheerios: Making Data Collection and Analysis Fun!

6–8 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 149AB

Let's make statistics fun! Participants will actively engage in a variety of hands-on data-collection activities to generate data suitable for lineplots/dotplots, box-and-whisker plots, bar graphs, histograms, and other descriptive statistics. Handouts with many other activities will be included. Most activities can be modified for all grades.

Colleen Watson, James Madison University, Fishersville, Virginia

37 Using Project-Based Learning in the Classroom to Provide *All* Learners Access to Rigorous Mathematics

6–8 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 147A

Project-based learning provides an opportunity for all students to achieve, excel, grow, and explore. Through strategic groupings, students with IEPs, EL services, and varied backgrounds have a space to take risks, share ideas, be empowered, and access rigorous, standards-based curriculum. In this presentation, middle school educators will dissect and develop differentiated projects aligned with Common Core State Standards that encourage multiple entry points, solution methods, and representations as well as incorporate the diverse cultures and interests of the students.

Megan Correll, Field Middle School, Northbrook, Illinois

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- Challenging and Advancing Policy and Structures in Mathematics Education
- Expanding the Narrative of Who Belongs
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38 How Cool Is Mathematics? HS & MS Students Design Drone Light Shows and Dog Parks Using Math Modeling

8–10 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Chinatown

Students get excited about mathematics when teachers bring mathematical modeling into the classroom through real-world problems and applications. This session will show that with the motivation and desire to do so, along with some guidance and resources, teachers can engage students by integrating modeling into their mathematics classrooms.

Kayla Blyman, St. Martin's University, Lacey, Washington
Jack Picciuto, COMAP, Bedford, Massachusetts

39 Sequences and Series: Discovering Patterns from Photos of a Pyramid in the National Sculpture Garden

8–10 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 201

Using photos, we will investigate patterns in the Four-Sided Pyramid located in the Sculpture Garden to find three sequences to determine the number of blocks in the sculpture. This low-floor/high-ceiling problem, suitable for middle school and beyond, gives students an opportunity for meaningful mathematical discourse on a nonroutine problem.

Mike Koehler, Retired – Blue Valley North High School, Kansas City, Missouri

40 The Fast and the Curious

8–10 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 206

In this project-based learning session, you will experience how data collection and analysis will develop students' understanding of linear relationships and solving systems graphically, as well as how this project has been adapted to motivate quadratic functions, piecewise functions, and parametric equations.

Alison Espinosa, Salt Lake City School District, Murray, Utah
Twitter: @ASpinose
Andrew Glaze, Salt Lake City School District, Utah

41 What *Is* and what *Could* Be: Creating a More Engaging, Open-Ended Classroom Learning Experience

8–10 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 144ABC

Typical mathematics problems lend themselves to a singular, uninteresting answer. This session will take both a philosophical and practical approach to show teachers how to change these problems into richer, more engaging tasks with multiple solutions and multiple approaches.

Dan Shuster, Simi Valley USD, California
Twitter: @DanShuster
Sonali Pillai, Simi Valley USD, California

42 Hook and Assess: Bringing High School Math Tasks Full Circle

10–12 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 207A

Math tasks are a great way to introduce new topics and assess understanding. Learn how two teachers have increased mathematical understanding and discourse by opening units with task and share (hook) and closing units with corresponding performance tasks (assess). Tasks used in geometry, algebra 2, and probability and statistics classes are included.

Candice Barkley, Henrico County Public Schools, Virginia
Alicia Chilton, Deep Run High School, Glen Allen, Virginia
Holly Condon, Tucker High School, Henrico, Virginia

43 Secondary Students Are Mathematicians: Taking Noncanonical Student Ideas Seriously

10–12 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 143AB

In this workshop, we will reframe student errors as noncanonical mathematical ideas. We will explore the potential this has for supporting students' mathematical identities while deepening conceptual understanding. Participants will also consider practical, sustainable ways to work toward this shift in their own teaching contexts.

Meghan Riling, Vanderbilt University, Malden, Massachusetts
Twitter: @theriling

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Grades 3–5

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- New NCTM Publication Session
- Exhibitors Workshop

44 Using Financial Applications in an Inclusive Third/Fourth Year Math Course Accessible to All Students

10–12 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 202B

Attendees will learn about an engaging algebra modeling course set in the financial contexts of spending, banking, credit, auto and home ownership, taxes, investments, budgets, and more. This course strengthens students' reading comprehension, data interpretation, and problem-solving/posing skills as they expand their financial and mathematical vocabulary and see the value of real-world mathematics. Attendees will participate in differentiated learning, assessment, and guided discovery activities.

Richard Sgroi, Fox Lane HS, Retired, Rhinebeck, New York
Robert Gerver, North Shore Schools (Retired), Glen Head, New York

45 How Can Administrators Support Mathematics Teaching and Learning?

Coaches/Leaders/Teacher Educators Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 152B

Teachers will share their aspirations of effective support or practices perceived to make a difference in promoting mathematics education in or out of the classroom. We will explore present, practical tips to develop and enhance teacher-administrator partnerships to support mathematics education and for expanding collaboration network for mathematics education

Comfort Akwaji-Anderson, Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; Cedar Rapids Community School District, Iowa
Twitter: @ComfortMath

46 Say Goodbye to Key Words: Comprehension Strategies for Word Problems

Coaches/Leaders/Teacher Educators Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 150B

In literacy, students read to comprehend not decode, so why in math is the focus placed on computing without comprehending? Let's move away from using rote procedures and key words as shortcuts to solve word problems. Come learn instructional strategies that help students read for understanding and develop mental models to solve word problems.

Katy Flynn, Amplify Education, Brooklyn, New York
Carrie Turner, Amplify Education, Brooklyn, New York

47 Teaching Efficiently with Coherence: K–12 Progressions of Area Models

Coaches/Leaders/Teacher Educators Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 207B

Arrays and area models, frequently mentioned in K–12 math standards, are among many instructional tools that teachers may use to present (and students may use to visualize and explain) key mathematical concepts. When vertically aligned, area models provide an efficient path to coherence through the grade levels.

Lane Walker, Wake County Public Schools, Cary, North Carolina
Twitter: @LaneWalker2
Samantha Bryant, Willow Spring High School, Fuquay-Varina, North Carolina

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Thursday Morning Practice Sessions

8:00 AM–10:00 AM

48 Designing Mathematical Experiences Based on Student Assets, Empathy, Research, and Practice

3–5 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 146C

Engage with colleagues through important discussions during which you will reflect on practice, examine strategies to appropriately challenge students, engage with mathematical tasks and curricula, and examine transcripts and videos of classrooms. Most importantly, you will put these ideas into action as you consider your context.

Kathryn Chval, University of Illinois Chicago
Twitter: @KathrynChval

49 Teaching Mathematics with Heart and Soul!

General Interest Workshop
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, 151B

Balancing the high-energy expectations of work and home make it difficult to bring our best selves to work each day. By understanding how to practice intentional physical, mental, and emotional wellness routines, we maximize our daily math impact on student learning, avoid burnout, and travel a pathway that inspires our math students and colleagues!

Timothy Kanold, NCSM, Lodi, California
Twitter: @tkanold

Thursday Morning Sessions

9:30 AM–10:30 AM

50 Let's Bring Joy Back to the K–2 Math Classroom

PreK–2 Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Liberty Ballroom M

All children should learn mathematics in an environment that honors each child's efforts to grow and learn. Children do not thrive when asked to work with ideas and symbols they cannot yet understand. We maximize learning when we create equitable and joyful classrooms where each child is engaged with math that is challenging but possible for all.

Kathleen Richardson, Math Perspectives Teacher Development Center, Bellingham, Washington
Sue Dolphin, Math Perspectives Teacher Development Center, Bellingham, Washington

51 Transform Problem Performers into Problem Solvers

PreK–2 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Marquis Ballroom Salon 12&13

Come explore ways to help your students become problem solvers. We will learn how to teach students to be thinkers and focus on the problem and mathematics to achieve a solution. Five different types of problems will engage students to be problem solvers instead of just picking out numbers and trying to do something with them without understanding.

Kim Graham, Hand2mind, Red Oak, Texas

53 Helping *All* Students See Themselves as *Math People*!

3–5 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 203AB

Come learn intentional routines and strategies to help students build a positive math identify. Engaging activities will be shared with multiple entry points for all students to collaborate, build confidence, incorporate SEL strategies, and allow each and every student to see themselves as a *math person*!

Kristin Kanaskie Grotewold, Waukee Community School District, Iowa
Twitter: @KKGrotewold

54 In Their Shoes: Journey Mapping a Mathematics Lesson

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Independence Ballroom F-H

Are you prepared to meet the needs of all students, especially multilingual learners and students who need support to stay engaged? Do you ever wonder what math class feels like from the students' perspective? Through an interactive Journey Mapping exercise, explore common learning barriers and how to use the Universal Design for Learning Guideline.

Kori Morrow, Great Minds, Washington, District of Columbia
Whitney Ricker, Great Minds, Washington, District of Columbia

- Uplifting and Inspiring the Mathematics Educator
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- Equity Strand
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- New NCTM Publication Session
- Exhibitors Workshop

55 The Powerful Tool of Math Journals

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Liberty Ballroom L

Participants will learn how journals are valuable tools to both teacher and student in the math classroom. We will demonstrate how the journal builds communication and metacognitive skills in students and drives differentiated instruction for teachers.

Francoise Julien, Mathodology, Neptune Beach, Florida
Ban Har Yeap, Pathlight School , Singapore

56 Elevating Language in Our Math Classrooms

6–8 Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Liberty Ballroom N-P

We know that language is an important part of identity and not addressing it limits access. But there is a lot of math content to get to and limited time, so how do we also pay attention to our bilingual or emerging bilingual students' language development? Let's discuss ways to be intentional about this important intersection of math and language!

Annie Forest, University of Illinois Chicago, Brookfield
Twitter: @mrsforest

57 Using Meaningful Engaging Projects to Differentiate Instruction

6–8 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 151A

We will provide teachers with projects that are ready to be implemented and that help differentiate the middle school math curriculum while deepening and extending students' understanding of mathematical practices and standards. Topics include ratios, integers, algebraic expressions and equations, linear and exponential functions, and geometry.

Fanny Sosenke, The Chapin School, New York, New York
Maria Sanchez, Brooklyn Friends School, New York

58 What Do Your Black Students Need from You? Actions to Support Your Black Students in Math Class

8–10 Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Shaw/LeDroit Park

During this session, we identify what your Black students need from their math teacher. Then we discuss ways math teachers can support Black students' classroom-level needs, and we invite reflection on individual and collective questions for professional learning that inspires change.

Lateefah Id-Deen, Kennesaw State University, Kennesaw, Georgia
Rachelle Ebanks, Smyrna High School, Smryna, Delaware
Michelle Cirillo, University of Delaware, Newark

59 What If Napoleon Had Used Quadrilaterals?

8–10 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 150A

Napoleon's Triangle is a topic taught in many geometry classes. Could Napoleon have started with a quadrilateral instead of a triangle? Come learn about the original theorem and its extensions, and then discover related theorems using quadrilaterals. We will explore this using dynamic geometry software and transformational geometry.

Raymond Klein, retired (Pear School Solutions, Glen Ellyn, Illinois

60 Create Assessments with Desmos!

10–12 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 154AB

Come learn how to use create assessments using Desmos Activity Builder! Using Desmos Activity Builder for assessments can reduce student stress while giving teachers deeper insight into their students' specific content knowledge. You will learn how to create free-response, multiple-choice and graphing slides to accurately assess your students.

Julie Reulbach, Independent, Mooresville, North Carolina
Twitter: @jreulbach

Visit the NCTM Exhibits in Hall D
Grades 9–12

- Uplifting and Inspiring the Mathematics Educator
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- Exhibitors Workshop

61 Using Dynamic Geometry and CAS to Illustrate the "Most Marvelous Theorem in Mathematics"

10–12 Session
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, 152A

Dynamic geometry software (DGS) and computer algebra systems (CAS) allow the creation of virtual geometric objects and symbolic calculations that instantly update when any change is made. Linking DGS and CAS enables us to illustrate a surprising result that mathematician Dan Kalman called "the most marvelous theorem in mathematics."

Thomas Dick, Oregon State University, Corvallis

62 What Mathematics Do Students Need for College? A Data-Informed Discussion

10–12 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 101

Educators often lack clarity on the mathematical needs of students going to college, especially those not planning on a mathematics-intensive career. In this session, we will use data from a survey of university faculty from different disciplines to explore priorities in mathematical and statistical content and practices for those students.

W Gary Martin, Auburn University, Alabama
Jim Gleason, The University of Alabama, Tuscaloosa
Mariya Rosenhammer, St. Anne-Pacelli, Columbus, Georgia

63 Building a Community for Teachers to Share and Learn Together

Coaches/Leaders/Teacher Educators Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Archives

Allowing teachers to learn and grow in various methods can be daunting. Our past experiences from virtual to math institutes to new teacher support will be shared along with ideas to build teacher communities where they continue to learn from one another. Participants leave with resources to support teachers and allow them choice on how they learn.

MARY PARRISH, Newport News Public Schools, Virginia
Twitter: MARY PARRISH

64 Making the Most of edTPA: Suggestions for Teacher Candidates, Mentors, and Methods Classes

Coaches/Leaders/Teacher Educators Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Independence Ballroom D

This session will unpack the components of elementary, middle, and secondary mathematics edTPA, including the academic language of discourse and syntax as well as explanations of how conceptual understanding, procedural fluency, and math reasoning undergird the planning, instruction, and assessment tasks of the portfolio.

Leslie Suters, TN Technological University, Knoxville, Tennessee
Andrea Henrie, Vanderbilt University, Nashville, Tennessee
Jennifer Meadows, TN Tech University, Cookeville, Tennessee

64.1 What Matters Most In A Successful Mathematics Program

Coaches/Leaders/ Teacher Educators Session
SESSION CONTENT LEVEL: Intermediate
DC Convention Center, 146B

Each and every year, district mathematics leadership teams spend countless hours crafting lofty goals and monitoring plans, but struggle to recognize real gains at the end of the school year.

Join us as we outline why reporting the results of your professional development plan over the previous school year is so hard, why you might not be seeing the results you've hoped for, and how you can break the cycle to ensure your progress and reporting at the next of next year goes off without a hitch.

Kyle J. Pearce, Make Math Moments Inc., Belle River, Ontario
Jon Orr, Lambton-Kent District School Board, Sarnia, Ontario

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- Exhibitors Workshop

65 Implementing Equitable Grading Practices in the Math Classroom

General Interest Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 140AB

Looking for equitable grading practices to align with your equitable teaching practices? One math team will share their journey towards effective, equitable, and transparent grading practices. Participants will receive grading frameworks, standards-based rubrics, and other tools that can be implemented immediately in the classroom.

Alycia Donati, Amplify Education Inc, Brooklyn, New York
Twitter: @alycia_donati
Chris Ryals, Independent, Millersville, Maryland
Charlene Linkous, Independent, Ellicott City, Maryland
Stacey Spanier, Independent, Columbia, Maryland

66 Inspiration through Storytelling: Communities of Teachers Building Communities of Learners

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, Ballroom C

Isolation and a slow erosion of our passion for teaching occurs when we don't feel connected to someone or something. Come connect with fellow teachers by sharing our stories so we can learn how to elicit students' stories in math classes. Leave with resources for building community with colleagues and students through routines and networks.

Sean Nank, California State University San Marcos
Twitter: @Sean_Nank

67 Math Education Trust Grants, Scholarships, and Awards for NCTM Members

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Union Station

NCTM's Math Education Trust (MET) sponsors over 40 different grants and scholarships for teachers, students, and classroom researchers. Twice a year, in the spring (May 1 deadline) and fall (Nov. 1 deadline), MET solicits applications for grants and scholarships from NCTM members to fund needed classroom resources, classroom materials development, and professional development for teachers, as well as scholarships for further coursework and professional growth for both in-service and preservice teachers. This session will provide all the information about the MET awards and the application process.

J Michael Shaughnessy, Past President, National Council of Teachers of Mathematics, Reston, Virginia; Portland State University, Oregon

68 Stoking the Fire: Putting Your Reason for Teaching Mathematics to Work

General Interest Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 145AB

Behind every teacher is a calling to invest in the lives of others. But sometimes that calling gets lost in the daily whirlwind of teaching. Through the lens of identity, agency, and access, participants will recall, refine, and connect their call to teaching to practices that will recharge and improve their teaching to foster doers of mathematics.

Joel Amidon, University of Mississippi
Twitter: @amidonplanet

69 Top Five Reasons to Incorporate Rough Drafts and Revising in Mathematics Class

General Interest Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, Ballroom A

Why would a teacher invite students to draft and revise their thinking about mathematics? Teachers from eight states in the USA shared their reasons. One of their motivators might be yours! How might each reason support a different entry point for teachers to enact rough drafts in mathematics class? Explore your "why" for rough draft math.

Amanda Jansen, University of Delaware, Newark
Twitter: @MandyMathEd

70 Writing for *MTLT*: Let's Talk about It!

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Monument

Are you thinking about writing for *MTLT*? We will provide an overview of NCTM's journal, sharing insights into writing an article and the review process. Whether you are a classroom teacher, a university faculty member, a seasoned writer, or a novice author, this session has the information you need to write for *MTLT*. So, let's talk about it!

Angela Barlow, University of Central Arkansas, Conway
Twitter: @angelatbarlow

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Expanding the Narrative of Who Belongs
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Presidents' Series
New Teacher Strand
Equity Strand
NCTM Committee Session
New NCTM Publication Session
Exhibitors Workshop

70.1 New Functions from Old: Inverses, Transformations, and Compositions

10–12 Exhibitor Workshop
Walter E. Washington Convention Center, 143C

In this session, Steve Kokoska and Tom Dick explore AP Precalculus style problems in which new functions are created from old: stretching, shifting, and reflecting graphs, using standard arithmetic operations, and composition. Analytical and graphical questions will be considered, and technology solutions and discovery-based activities will be presented. We will also discuss inverse functions analytically and graphically. Participants are encouraged to ask and answer questions.

Texas Instruments, Dallas, Texas

70.2 Doing Right by the 8 Mathematical Practices

General Interest Exhibitor Workshop
Walter E. Washington Convention Center, 158AB

John Allen Paulos wrote in his book Innumeracy, "... mathematics has as much to do with computation as writing has to do with typing." Yet, school math mostly emphasizes computation and arithmetic, overlooking critical thinking and problem solving. What the Common Core gets right is the eight mathematical practices, encouraging teaching mathematics as a way of thinking and problem solving. Let's engage in practical ways to embed problem solving into students' everyday interaction with mathematics.

Amplify, Brooklyn, New York

70.3 Unleashing the Potential of Peer Tutoring: Practical Applications from Stanford's PeerTeach Project

6–8 Exhibitor Workshop
Walter E. Washington Convention Center, 159AB

Dive into the power of peer tutoring, one of education's most proven and underutilized interventions. This interactive workshop is based on PeerTeach's research at Stanford. Learn to train students as effective peer tutors, explore key considerations for matching tutees, and engage in hands-on activities to integrate peer tutoring into your instruction. By the end, you'll have all the tools you need to empower your students to become better leaders, helpers, and communicators in math class.

PeerTeach, Albany, California

70.4 Stern Math: Using Concrete Multisensory Tools to Teach a Foundational Understanding of Numbers

General Interest Exhibitor Workshop
Walter E. Washington Convention Center, Exhibit Hall D, Th1

All students, especially those with dyscalculia, benefit from using concrete/spatial materials with interconnected language to build mathematical understanding and skill in computation. Stern Math is a hands-on approach to learning where students actively discover math concepts and number patterns. Using colorful blocks representing the numbers 1-10, students begin to make connections from the concrete materials to the abstract representations through interactive lessons and engaging games.

Stern Math, Rochester, Vermont

70.5 Break the Forgetting Cycle with Get More Math

6 to 8 Exhibitor Workshop
Walter E. Washington Convention Center, 156

By the end of the school year, students have already forgotten many of their hard-won math concepts. How can we break the forgetting cycle and make math stick? In this session, veteran math teacher Josh Britton will share his proven model for driving long-term retention through emphasis on the pedagogy of cumulative learning and use of Get More Math spiral review software.

Get More Math!, Quarryville, Pennsylvania

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Challenging and Advancing Policy and Structures in Mathematics Education
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Presidents' Series
New Teacher Strand
Equity Strand
NCTM Committee Session
New NCTM Publication Session
Exhibitors Workshop

71 Counting Collections: Creating Opportunities for all Kids to Make Sense

PreK–2 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Independence Ballroom A-C

Looking for playful, engaging ways to work on counting, place value, communication, representation, and social-emotional learning in your classroom? Explore counting collections, a routine to leverage these things, and more. Experience the activity as a learner, investigate nuances, and unpack the mathematical opportunities for your students.

Jody Guarino, Orange County Department of Education, Costa Mesa, California
Twitter: @jody_guarino
John Drake, Newport Mesa Unified School District, Costa Mesa, California

72 No-Nonsense Number Sense

PreK–2 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 201

To foster number sense and build a strong foundation in number, students must have experiences that allow them to explore number concepts in a variety of contexts that go beyond traditional algorithms. Attend this workshop to engage in activities that use contexts such as measurement, geometry, and data to support development of number concepts.

Latrenda Knighten, EBRP School System, Baton Rouge, Louisiana
Twitter: @Latrendak

73 Opening the Doors to Equity through Building Strong Mathematics Identities

PreK–2 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 143AB

Students bring to the classroom a wide variety of mathematical knowledge and classroom experiences that combine to create each student's mathematical identity. In this session, participants engage in first-grade mathematics activities and consider how the teacher can draw on various student contributions to build strong mathematical identities.

Zack Hill, Open Up Resources, Menlo Park, Florida
Twitter: @zack_hill
Tywana Fulford, Independent, Sugar Hill, Georgia

74 Agency, Language, and Mathematics Are Interconnected; One Cannot Develop without the Other.

3–5 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 209ABC

Linguistically and culturally diverse students must make sense of the world through the lens of social justice. One key element is understanding how language and math are interconnected and mutually reinforcing. We should amplify, not simplify the language students use to communicate for academic purposes. We will discuss math language routines.

Harold Asturias, home, San Leandro, California
Twitter: @hatwitt

75 Empower or Bust in the Mathematics Classroom: Affirmations, Engagement, Content, and Relationships

3–5 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 149AB

The speaker will provide a shared vision into equitable mathematics instruction through classroom video and will showcase four strategies to further this effort: (1) communicating genuine affirmations, (2) using engaging discourse, (3) selecting meaningful content, and (4) orchestrating moves that empower students and encourage their positive identity in mathematics.

Thomasenia Lott Adams, University of Florida, Gainesville
Twitter: @TLAMath

76 Gatekeeper No More: Teaching Fact Fluency from an Equity, Access, and Sense-Making Stance

3–5 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 152B

Fact fluency and number sense are prerequisites to and outcomes of rich mathematical work, yet we've historically overemphasized the prerequisite aspect and held students back from problem solving until they "knew their facts." How might looking at fact fluency through the lenses of access, equity, and sense making change how we teach it?

Tracy Zager, Portland Public Schools/Stenhouse Publishers, Maine
Twitter: @tracyzager
Graham Fletcher, @gfletchy, McDonough, Georgia

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77 Here's a Rich Math Task: Now What?

3–5 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 207B

Have you noticed that a rich math task is not enough to create meaningful student interactions that lead to mathematical understanding? Come learn what the missing pieces are to ensure your students are authentically immersed in the task. A classroom environment that supports your students' math identity and agency is the key.

Ruby Norland, Doral Academy of Nevada, Las Vegas
Twitter: @RubyNorland
Bethany Farmer, Doral Academy of Nevada, Las Vegas

78 Breaking Down the Gatekeepers: Models and Visual Strategies for Fractions, Decimals, and Integers

6–8 Workshop
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, 204AB

We believe the math classroom can be a joyful place where students discuss their thinking and share ideas with each other. This workshop focuses on providing opportunities for reasoning and addressing common misconceptions that arise in fractions, decimals, and integer work. We provide building blocks that solidify mental images for students.

Molly Vokey, Independent, Mansfield, Massachusetts
Heidi Sabnani, Independent, Stoughton, Massachusetts

79 Centering Students as the Facilitators of Discourse

6–8 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 102AB

Discourse is an essential part of every mathematics classroom, but how do we ensure the discourse in our classrooms is mathematically meaningful, affirms student identities, and takes place among students, not just around them? Come ready to do math and experience the shift from teacher-led debriefs to student-driven dialogue.

Ann Gaffney, MIND Education, Ashland, Oregon
Twitter: @annmgaffney
Anna Roberds, MIND Research Institute, Irvine, California

80 Division by Fractions: Making It Meaningful

6–8 Workshop
SESSION CONTENT LEVEL: Intermediate
Marriott, Capitol Congress

Division by fractions is more than just using the standard algorithm. This session focuses on building students' understanding of dividing by fractions through the use of linking cubes and area models. Having students explore concrete and pictorial representations can help lead to division by fractions success!

Jennifer Tadlock, Great Minds, Lafayette, Louisiana

81 Engage and Explore! Access to Deep Mathematical Understanding for All Learners

6–8 Workshop
SESSION CONTENT LEVEL: Intermediate
Marriott, Liberty Ballroom I-K

How can we create inclusive experiences that enable all learners to notice patterns, make connections, and form big mathematical ideas? In this session, participants will explore accessible structures that support all students in the comprehension phase of the Universal Design for Learning framework through guided exploration.

Jessica Reyes, EdGems Math, Neptune, New Jersey

82 Carrying out Data Investigations about Issues of Systemic Racism

8–10 Workshop
SESSION CONTENT LEVEL: Intermediate
Marriott, Chinatown

In this workshop, we engage participants in investigations of systemic racism (traffic stops and out-of-school suspensions) using real data and technology. We share pedagogical strategies for carrying out similar investigations. Participants are provided with materials for larger instructional modules that they can use in their own classrooms.

Ksenija Simic-Muller, Pacific Lutheran University, Tacoma, Washington
Travis Weiland, University of Houston, Texas
Anthony Fernandes, University of North Carolina Charlotte

83 Elevating Student Status with Rough Draft Talk

8–10 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Independence Ballroom E

What counts as a valuable contribution to class? Who gets to make them? Teachers will reflect on their classroom culture and experience culturally responsive teaching strategies. Participants will gain strategies to support students as they become more independent learners and foster belonging in mathematics.

Astrida Lizins, CPM Educational Program, Honey Brook, Pennsylvania
Jocelyn Dunnack, CPM Educational Program, Elk Grove, California

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Equity Strand
NCTM Committee Session
New NCTM Publication Session
Exhibitors Workshop

84 Exploring Functions and Connecting Algebraic Representations through Hands-On Data Collection

8–10 Workshop
SESSION CONTENT LEVEL: Intermediate
Marriott, Mint

Inquiry-based learning coupled with technology empowers students to apply linear, quadratic, and exponential functions to real-world situations. Participants are provided with classroom-ready lessons that connect multiple mathematical representations and synthesize the Statistics, Functions, and Modeling strands of the Math Standards.

Thomas Beatini, Union City Board of Education, New Jersey
Twitter: @BeatiniTom

85 Math of the Dragon 2: How South LA Engineers Ensure a Safe Return to Earth

8–10 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Supreme Court

The Applied Mathematics Mentorship Program, funded by a Gates Grand Challenge, engages South LA students in semester-long investigations relevant to their community under the guidance of STEM mentors of color. Come engage in an AMMP algebra 1 activity (FIF.6, SID.7, SID.6) exploring how the size of the Crew Dragon's parachutes affect its speed.

Isai Lopez, The UCLA Curtis Center for Mathematics and Teaching, Los Angeles, California

86 College Football Modeling Task: Moving Toward Students' Justification Using Mathematical Reasoning

10–12 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 207A

Participants will engage in a model-eliciting activity involving ranking the NCAA College Football teams for the 2021–2022 season. Student work samples will also be shared for participants to analyze and make conjectures. A conversation about implementation, standards, and similar other tasks will also be shared.

Rachel Wiemken, Hamilton County ESC, Milford, Ohio
Twitter: @MissWiemken
Gabriel Matney, Independent, Bowling Green, Ohio

87 Dream Catchers: Weaving the Connection between Geometry and Algebra

10–12 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 202B

Through the use of the dream catcher and its weaving, students are empowered to learn about the Native American culture. Come learn how Native Americans used simple geometric ideas to create this beautiful design. Participants will learn to weave dream catchers and the connection between geometry and algebra within its design.

David Thompson, Christina School District, Elkton, Maryland

88 Integrate Prior Knowledge: A Deep Dive into Acceleration within Grade-Level Content

Coaches/Leaders/Teacher Educators Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 150B

Districts across the United States are looking at ways to help accelerate student learning within grade-level content. Connecting to prior knowledge through learning progressions is an effective way to help students gain confidence to participate in rigorous Tier 1 instruction.

Lloyd Jones, Curriculum Associates, Hendersonville, North Carolina
Twitter: Lloyd Jones

89 Mission Math: Escape the (Class)Room

Coaches/Leaders/Teacher Educators Workshop
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, 147A

Trapped with only your mathematical abilities to get you out! Add up your skills, resolve your differences, multiply your talents, and divide and conquer! Experience an escape room devoted to engaging students in collaboration and creative thinking while demonstrating an understanding in variety of math concepts. Perfect for grades 2–12.

Lisa Carlson, St. Charles School, Kettering, Ohio
Nichole Bruce, Lakoka East High School, Liberty Township, Ohio

Visit the NCTM Exhibits in Hall D
Grades 6–8

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90 Moving Beyond Interesting Problems to Mathematical Investigations of Real-World Phenomena

Coaches/Leaders/Teacher Educators Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 144ABC

Learn to move beyond relying solely on interesting problems by engaging students in mathematical investigations into real-world phenomena. Mathematical investigations mirror the types of tasks students will face as adults as they use essential math concepts to investigate, understand, and critique real-world social and natural phenomena.

Todd Hutner, University of Texas, Austin
Twitter: @toddhutner

91 New Teacher Strand Kickoff

Coaches/Leaders/Teacher Educators Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 206

Do you have questions about how to thrive as an educator? Are you wondering how to make the most out of your conference experience? We'll share some tips and ideas and learn from each other. Join other early-career teachers and those still in school to learn some strategies for addressing your most pressing problems. We'll have prizes and good ideas! All are welcome!

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

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- New NCTM Publication Session
- Exhibitors Workshop

92 Learning Trajectory Protocols: Tools to Assess and Inform Instruction for Our Youngest Learners

PreK–2 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Liberty Ballroom M

Children's early experiences predict their future success as math learners. Learn how teachers are using assessment protocols to identify children's working level on learning trajectories for early number (e.g., counting, subitizing), to plan intentional teaching that builds from children's mathematical strengths, and to monitor progress.

DeAnn Huinker, University of Wisconsin-Milwaukee
Twitter: @dh11235
Melissa Hedges, Milwaukee Public Schools, Shorewood, Wisconsin
Beth Schefelker, University of Wisconsin – Milwaukee

93 Little Minds, Big Reasoning: Engaging Young Children with the Math Practices

PreK–2 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 150A

To support the development of young children's math reasoning skills, we need to engage them in the math practices. But often, the examples of math practices we see are for older students. Let's explore tasks and instructional routines designed to engage young children in the math practices and support the development of math reasoning skills.

Katherine Marin, University of Louisville, Kentucky
Twitter: @professormarin

94 Helping All Students Build Positive Math Identities: Strategies for Equitable Math Learning

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 154AB

How can we ensure that all students can meaningfully engage in grade-level math? This session explores two principles of equitable math engagement: (1) Representing all students in math problems helps students see themselves in their daily learning, and (2) asking "friendly questions" as on-ramps to complex problems builds student engagement.

Tanaga Rodgers, Zearn, Crofton, Maryland
Twitter: @Zearned
Shaka Ané Phillips, Zearn, Brooklyn, New York

95 Join the Fun! Social Studying Makes Problem Solving Equitable, Engaging, and Successful for All!

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 152A

Disparities in classrooms disappear when students talk through rigorous math problems and share their diversity in practice and thought. Participate in a student-centered instructional pathway that embraces *Principles to Actions: Ensuring Mathematical Success for All* as it employs student discourse to comprehend the problem; compare solution plans; solve; and make sense of results.

Robyn Silbey, Independent, Gaithersburg, Maryland

96 Metacognition in the Mathematics Classroom

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 101

Ever start off a math class by saying, "What did we do in math yesterday?", only to be met with blank stares? Ever wonder how to support students in thinking about their own thinking in mathematics? In this session, we will explore instructional routines and strategies to engage students in metacognitive thinking skills.

Kyle Williams, Great Minds, Philadelphia, Pennsylvania

97 Deepening Student-Teacher Discourse with Assessments

6–8 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 147B

Join us as we discuss how to use assessments as an opportunity to extend the daily discourse between students and teachers and deepen conceptual understanding. Explore key principles of assessment design and examine multiple assessment types to understand how, at their best, assessments can serve as a valuable extension of the learning process.

Caitlin Webster, Zearn, White Plains, New York
Twitter: @Zearned
Jamica Craig, Zearn, Brooklyn, New York

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- Equity Strand
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98 Equity, Joy, and Genius: Creating Community-Responsive Mathematics Activities

6–8 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Union Station

During this presentation, two culturally responsive mathematics activities will be discussed that highlight the assets of a predominately African American community. The overall goal is to resist deficit constructions toward marginalized communities while connecting students' multidimensional identities with mathematical learning.

Jessica Forrester, University of Virginia, Charlottesville
Twitter: @JV_Forrester
Lesa Covington Clarkson, Independent, Woodbury, Minnesota

99 Make Yourself a Technology-Proof Teacher

6–8 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, Ballroom A

We may think we make tech work for us, but tech is constantly shaping our ideas about math, students, teaching, and learning. A former math teacher and current education technologist will share how this industry tries to build teacher-proof tech. We'll learn about tech that works *with* teachers instead and turn ourselves into technology-proof teachers.

Dan Meyer, Desmos Classroom @ Amplify, Oakland, California
Twitter: @ddmeyer

100 Using Number Talks Matter to Compare Fractions in Middle School Classes

6–8 Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Marquis Ballroom Salon 12&13

Developing proficiency with fractions is one of the major undertakings students and their teachers encounter during middle school. In this session, we will explore how using number talks supports students' verbal mathematical understanding when comparing fractions.

George Roy, University of South Carolina, Chapin
Twitter: @georgejroy
Matthew Cunningham, University of South Carolina, Columbia
Kristin Harbour, University of South Carolina, Columbia
Christie Martin, University of South Carolina, Columbia

101 "What's Going on in This Graph?": Students Interacting with Their World

8–10 Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Independence Ballroom F-H

Build "graph" literacy in grades 7–12 math, science, and humanities with free online "What's Going on in this Graph?" *The NY Times* and ASA offer a weekly graph that students can "see themselves" in and asks "What do you notice?", "What do you wonder?", and "What's up?" Students reply online. Teachers moderate. Stat Nuggets explain statistics.

Sharon Hessney, American Statistical Association, Brookline, Massachusetts

102 Mastery-Based Assessment in Algebra: Shifting from High-Stakes Testing and Traditional Grading

8–10 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Monument

For the past two years, I have shifted from traditional grading to mastery-based assessment in my algebra classes. This presentation will include rubrics, how to handle reassessments, assignment of end-of-term grades, high expectations with less anxiety, and strategies to keep from deconstructing a math course into a set of disconnected objectives.

Kevin Bartkovich, Phillips Exeter Academy, New Hampshire

103 Moving from Irrelevant to Relevant: Revising Tasks to Be Responsive to Students in Our Classroom

8–10 Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Independence Ballroom D

Want to design standards-aligned, culturally responsive math tasks? Come to our session, where we will share why being an anti-racist math educator matters. You will get examples of culturally responsive math tasks, and a behind-the-scenes look at how we revise math tasks to be more culturally responsive.

Nichole Campbell, Coherent Math Consulting, Andover, Minnesota
Twitter: @ncampbell_math
Barbara Beske, Coherent Math Consulting, Mullica Hill, New Jersey
Jessica Skwir, Maumelle, Arkansas

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- Exhibitors Workshop

104 Dynamic Data Modeling with CODAP and M2Studio

10–12 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Liberty Ballroom L

Proficiency in data analysis plays an important role in real-world decision-making. In this talk, we'll explore how technology supports students in developing their ability to work with data and build math models that allow them to make choices that connect to their experiences and personal interests.

Adewale Adeolu, Clarkson University, Bozeman, Montana
deoluwale@gmail.com
Benjamin Galluzzo, Clarkson University, Potsdam, New York

105 Open Doors for Students by Leveraging the Role of Technology

10–12 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 146B

Technology contributes to student success and gives students opportunities to engage in interesting and challenging mathematics. We will explore using technology to build conceptual understanding, connect representations, and motivate students, highlighting how strategic uses of technology can build students' mathematical agency and identity.

Gail Burrill, Past President, National Council of Teachers of Mathematics, Reston, Virginia; Michigan State University, Hales Corners, Wisconsin

106 Are Your Coaching Discussions Deep and Specific Enough to Shift Practice?

Coaches/Leaders/Teacher Educators Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Archives

Are you wondering what type of coaching discussion shifts teacher practice? Findings from a joint research project involving the Institute for Learning indicate that deep and specific discussions do! Join us to analyze examples of deep and specific discussions and the coaching moves that keep the focus on mathematics, pedagogy, and student thinking.

Kristin Klingensmith, Institute for Learning, University of Pittsburgh, Pennsylvania
Laurie Speranzo, Institute for Learning, University of Pittsburgh, Quincy, Massachusetts

107 Routines for Your Classroom

Coaches/Leaders/Teacher Educators Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Liberty Ballroom N-P

Try five mathematical routines you can use in your classroom to provide increased opportunities for discourse and learning. Students build agency and identity as they share their thinking and justify their solutions. Teachers gain additional formative assessment knowledge about their students as they listen to and interact with them during the routines.

Fred Dillon, Fred Dillon, Strongsville, Ohio
Twitter: @fdizzle1955

108 Creating Choice Points to Expand Reasoning

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, Ballroom C

Math shouldn't be done to students; students should do mathematics. When teachers take advantage of choice points in the classroom, students can take a more active role in what they learn. In this interactive session, we will explore choice points teachers can take advantage of that can help expand students' opportunities to reason and make sense.

Zandra de Araujo, Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; The University of Florida Lastinger Center for Learning, Gainesville, Florida
Twitter: @zdearaujo

109 Empowering Teachers and Leaders to Design Equitable Structures

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 151A

Too often, well-intended structures and policies actually inhibit students' access to powerful mathematics. Let's explore ways to empower teachers and leaders to change that and provide students with equitable access to meaningful mathematics.

Paul Gray, NCSM: Leadership in Mathematics Education, Provincetown, Massachusetts
Twitter: @Dr_PaulGray

110 Federal STEM Resources for You and Your Students

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 140AB

Have you ever wondered what opportunities exist within the federal government for your students to flex their mathematical thinking and skills? Are you trying to point your students to STEM careers but unsure where to turn? Learn from this session what federal authentic STEM learning opportunities exist for students and teachers.

Cindy Hasselbring, NASA Headquarters, Frederick, Maryland
Twitter: @chasselbring321

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110.1 Building Mathematical Language Routines

General Interest Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 145AB

All students, including second language learners, can benefit from building and using mathematical language routines. Come learn how to use routines to support mathematics learning.

Crystal Gonzalez, English Learners Success Forum, Albuquerque, New Mexico

111 Three Keys for Unlocking the Hearts and Minds of Math Students

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 202A

Helping students learn math deeply and whole-heartedly requires 3 keys: (1) genuine kindness to connect with students, (2) a growth mindset for students to model, and (3) a positive learning environment where students feel safe to engage openly and intellectually. This session inspires you to transition from being a nice teacher to a kind teacher.

Kien Lim, University of Texas at El Paso

112 Three Proven Questions for Diversity to Drive Design

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, Ballroom B

Students of color need education technology that embraces their mathematical brilliance, cultivates identity, and highlights contributions of people who look like them. We recruited educators, students, and parents to co-design a curriculum to push against the status quo. The result: a new way to make students powerful problem solvers.

Charles Bowman, MIND Education, Irvine, California
Twitter: @DrcbowmanJr

112.1 Get Rich Quick! Integrating Rich Tasks with Ease

8–10 Exhibitor Workshop
Walter E. Washington Convention Center, 143C

Everyone is talking about thinking classrooms and rich tasks. Still, many teachers find themselves asking, "What now?"

Join Mathspace's US Curriculum Lead, Victoria Lowery, to learn strategies for integrating rich tasks into your instruction (no matter what your instruction looks like). We will share some resources to take back to your classroom and discuss why rich tasks aren't all or nothing. A few steps in the right direction can still have a transformative effect in your classroom.

Mathspace, New York, New York

112.2 Promoting Success in AP® Statistics with TPS 7e

10–12 Exhibitor Workshop
Walter E. Washington Convention Center, 158AB

Come learn from expert AP® educators Daren Starnes and Josh Tabor! They're excited to show you all the amazing new updates and features in the upcoming 7th edition of The Practice of Statistics. Plus, they'll share some helpful tips on using the program effectively. Don't worry if you're not already using TPS—this session is still packed with valuable insights for all AP® Statistics educators.

BFW Publishers, Hamilton, New Jersey

112.3 Be Inspired by CPM's New Curriculum Inspiring Connections!

10–12 Exhibitor Workshop
Walter E. Washington Convention Center, 159AB

CPM has taken the latest research and created a new curriculum, *Inspiring Connections*. The innovative multimodal course fosters a more dynamic learning experience for students, featuring increased mobility, exposure to diverse perspectives, and enhanced ownership of their education. Students will utilize technology and print in tandem, in a student-centered, problem-based classroom.

CPM Educational Program, Elk Grove, California

112.4 Before Coding & Beyond Coding

General Interest Exhibitor Workshop
Walter E. Washington Convention Center, Exhibit Hall D, Th1

Presenters will demonstrate how to use Wolfram technologies in the classroom. By using natural language input in Wolfram technologies, students will be able to use their existing critical thinking and language skills to access computational tools immediately, focusing more on discovery, problem-solving, and understanding than rote repetition. We'll also introduce built-in mathematical demonstrations, starting point notebooks, and further resources to help students see the power of mathematics.

Wolfram Research, Inc., Champaign, Illinois

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- Challenging and Advancing Policy and Structures in Mathematics Education
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113 Build a Perch for Harry: Using Engineering Design Challenges in PK–2 Math Class

PreK–2 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 202B

Engineering challenges are a fun way to integrate content and elicit critical thinking and problem solving for all learners. In this session, you will engage in hands-on engineering challenges that integrate math, literacy, and social-emotional learning. We will share how to design integrated challenges using materials you have in your classroom.

Lisa King, Chandler Unified School District #80, Gilbert, Arizona
Twitter: @KsZ228893
Kerri Zitar, Chandler Unified School District #80, Gilbert, Arizona

114 Little Kids, Big Opportunities with Technology

PreK–2 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 152B

Having little kids on devices can seem intimidating at first, but the digital space can provide opportunities for young learners to go deeper into mathematical concepts. You will experience digital activities designed for young learners and discuss principles and questions to ask when deciding when and how to go digital.

Endeara Campbell, Amplify Education, Brooklyn, New York
Nicole Beirne, Austin, Texas

115 Now Serving Stone Soup: An Adventure in Search of Deeper Mathematical Learning

3–5 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 151B

Using the classic story "Stone Soup" to establish context for the mathematics that will follow, take a journey with us to a local vegetable market. Our simulated excursion and classroom-ready tasks will invite opportunities to support deeper conceptual knowledge while making mathematics relevant to a student's daily life experience.

Martha Parrott, Northeastern State University, Broken Arrow, Oklahoma
Twitter: Dr. Martha Parrott

117 Times 10/Divide by 10: The Decimal Doesn't Move!

3–5 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 147A

We'll elevate conceptual understanding of multiplying and dividing by tens or tenths from concrete to pictorial to abstract so students recognize that the place value of the digits shift, but the decimal point doesn't move! Teachers will practice building understanding using manipulatives and ideas they can take to their classrooms.

Ricky Mikelman, Great Minds, Lewes, Delaware

118 Using Invented Strategies to Promote a Mathematician Identity

3–5 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 206

Do you want your students to see themselves as mathematicians? In this session, participants will be provided with nonroutine problems that have been used to promote the use of invented strategies. Students who have engaged in solving these problems begin to see themselves as mathematicians as they define their own ways of solving the problems.

Rebecca Robichaux-Davis, Mississippi State University, Starkville
Twitter: @Rhombi_Doc
Clayton Edwards, Grundy Center Middle School, Iowa

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- Expanding the Narrative of Who Belongs
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- NCTM Committee Session
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119 Fostering Metacognition and Assessment in a Mathematics Classroom

6–8 Burst
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 207A

Fostering metacognition must be intentional. Students learn to self-assess. Teachers provide resources such as materials, peers, and information to promote students' agency. Learner-centered environments begin with purposeful learning activities and assessment as learning. Strategies used to foster metacognition and assessment will be discussed.

Low Leng, Ministry of Education, Singapore

120 Growing Triangle/Rectangle: A Desmos Task for Diving Deeply into Linear and Nonlinear Relationships

6–8 Burst
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 207B

We present the Growing Triangle/Rectangle task. Situated in Desmos, the task is designed to support students exploring nonlinear and linear relationships. Students reason about various inequality relationships (e.g., when one area is >, <, = another area) and consider how these relationships should be reflected in their graphical representations.

Allison Gantt, University of Delaware, Newark
Twitter: @AllisonGantt
Teo Paoletti, University of Delaware, Newark
Srujana Acharya, Newark, Delaware
Kayla Grant, University of Delaware, Newark
Elizabeth Bieryla, Cheltenham, Pennsylvania

121 High Tech Goes Low Tech: Pairing the Desmos Curriculum with Building Thinking Classrooms

8–10 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 201

What happens when you combine two highly effective but different teaching styles? In this burst, participants will learn how one school paired the digital Desmos algebra 1 curriculum with hands-on strategies from Building Thinking Classrooms. The result is high engagement, deep thinking, and more independence in students.

Carla Bidwell, East Hartford Public Schools, Connecticut
Twitter: @carla_bidwell
Robert Janes, East Hartford Public Schools, Wethersfield, Connecticut

122 Who Takes the Stage?: Positioning Students as Mathematical Experts

8–10 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 150B

Equitable math instruction should position students as mathematical experts to develop their math identities. We will explore and discuss teaching moves through video examples of two students engaging in a technology-enhanced math task as we consider how all students can be positioned to meet the challenge of being active explorers of math.

Samantha Fletcher, Middle Tennessee State University, Nolensville
Kristen Fye, University of North Carolina at Charlotte
Purity Muthitu, North Carolina State University, Raleigh

123 Math Journals: How to Use Daily Math Journals to Increase Student-Teacher Feedback and Communication

10–12 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 144ABC

In this session, we will explore how to incorporate a daily math journal into your class. We will talk about how to use them to give daily, personalized feedback to all students, how we can use them for student self-assessments, and how we can use them as a tool for students to reflect on their understanding of the content.

Jill Jacobs, Kent School District, Washington
Twitter: @Mathiskewl

125 The Financial Life Cycle: Centering a Math Curriculum on Financial Applications

10–12 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 143AB

Do you want to incorporate meaningful applications of math into your curriculum? Finance is an application all students know is valuable. This session shows how you can create a coherent curriculum for a high school math course that teaches the central precepts of personal finance. It is based on the Nobel Prize–winning life cycle hypothesis.

Jack Marley-Payne, FiCycle, New York, New York
Philip Dituri, FiCycle/Dituri Consulting, Brooklyn, New York
Andrew Davidson, Financial Life Cycle Education, New York, New York

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- Challenging and Advancing Policy and Structures in Mathematics Education
- Expanding the Narrative of Who Belongs
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- Exhibitors Workshop

126 Coalition of the Willing: Funding Math Leaders with No "Moo-lah"

Coaches/Leaders/Teacher Educators Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Liberty Ballroom I-K

How do we develop the math capacity of teachers and grow math leaders when we have little to no funding to do it? Mrs. DeNote will discuss the development and installation of Math Leadership teams at the school and district levels. Attendees will walk away with actionable steps to starting and sustaining teams of their own.

Carrie DeNote, Hernando County School District, Inverness, Florida
Twitter: @momentum79

127 Practice What We Preach: Encouraging Dialogue among the Math Education Community

Coaches/Leaders/Teacher Educators Burst
SESSION CONTENT LEVEL: Intermediate
Marriott, Chinatown

As math educators, we encourage students to dialogue and disagree. Sometimes there may not be consensus. And yet when discussing pedagogy, as a whole, we have become polarized. This session will focus on ways to dialogue about what we disagree on in a productive way and focus on balance instead of pointing fingers and passing blame.

John Seelke, Montgomery County Public Schools, Rockville, Maryland
Twitter: @john_seelke

128 Reassessment as Learning: Fostering Assessment-Capable Learners

Coaches/Leaders/Teacher Educators Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Capitol Congress

Are your middle schoolers experiencing unfinished learning? This math team will summarize their journey, including the processes by which students participate in their Reassessment as Learning program for a second chance at demonstrating their understanding. The tenets here transcend the math classroom, fostering assessment-capable learners.

Isabel Cabales, Farmingdale School District, New York
Virginia Dalton, Farmingdale School District, New York
Marissa Puleo, Farmingdale School District, New York
Jacqui Merlo, Farmingdale School District, New York

129 Beyond "Find *x*": How to Champion De-Ritualization and Exploration through a Commognitive Lens

General Interest Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Mount Vernon

The math joke "Find *x*," and a student's circle around *x* on a triangle is classic. Who normalized such common math rituals? Sfard posits, "Ritual for ritual and exploration for exploration." What we tell students, they tell us back. With a commognitive lens, we learn how to support gradual de-ritualization so that students move on to exploration.

Madeleine Chowdhury, Mesa Community Collebe, Arizona

130 NCTM's Resources for the Elementary Classroom

General Interest Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 102AB

As busy teachers, it can be hard to find the best resources for your classroom. NCTM offers members a wealth of high-quality resources from online interactives and instructional plans to a new library of Notice and Wonder lessons. Come learn about NCTM's online Classroom Resources collections for the elementary classroom.

Mario Valdez, Alpaugh Unified School District, Porterville, California
Twitter: @mvaldez_mario
Tiffanie Nealy, Clayton County Public Schools, Jonesboro, Georgia

131 Student Work: A Pathway to Teacher and Student Learning

General Interest Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Supreme Court

In this session, we will present and engage with a framework that encourages teachers to take a strengths-based examination of student work. The framework leads teachers to focus on mathematics content, student thinking, and instruction. We believe that this type of engagement can lead to increased student learning and expanded teacher knowledge.

Stacey Zimmerman, Western Carolina University, Cullowhee, North Carolina

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- Presidents' Series
- New Teacher Strand
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- NCTM Committee Session
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132 From Fear to Flourish: Dissecting and Addressing Math Anxiety in Our Schools

Research Burst

SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Judiciary

Are we sabotaging our students' success in mathematics? Explore the compelling world of math anxiety research in this eye-opening talk that will change how you view math education. Learn about the hidden barriers that prevent our students from achieving their full potential, and explore innovative solutions to create a more inclusive, empowering learning environment centered on student joy, not anxiety.

Daniel Roeder, Winston Preparatory School, New York, New York

133 Scratching Beneath the Surface: Coding to Create Community and Foster Mathematical Identity

Research Burst

SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Independence Ballroom A-C

The coding program Scratch was used with a class of fifth graders to create mathematics game-based instruction for kindergartners. Students were highly engaged and took ownership and agency of their learning. Mathematical interest and habits of mind increased as well as students' social and emotional well-being.

Wendy Gibson, Baltimore County Public Schools, sparks, Maryland
Twitter: @wgibso1
Rachel Kovel, Baltimore County Public Schools, Maryland

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- Challenging and Advancing Policy and Structures in Mathematics Education
- Expanding the Narrative of Who Belongs
- Improving Core Instruction through Deeper Mathematical Content and Pedagogical Knowledge
- Presidents' Series
- New Teacher Strand
- Equity Strand
- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

134 Math Lab: Routines for Developing Procedural Fluency for Students with Disabilities

PreK–2 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 154AB

Procedural fluency development for students with disabilities is often centered more on procedures and less on fluency. Literature and problem-solving links are also frequently left out of this practice for students with disabilities. The focus of this session will be how to implement popular procedural fluency routines for kindergarten through grade 5, while also meeting the unique needs of the special education population.

Andrew Gael, Cooke School and Institute, New York, New York
Twitter: @bkdidact
Molly Samuel, Cooke School and Institute, New York, New York

135 We Need to Talk: How to Increase Student Engagement in Mathematical Discussions

PreK–2 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Marquis Ballroom Salon 12&13

This presentation centers on ways to engage students in meaningful discussions during mathematics instruction. Students thrive when they are given opportunities to describe and defend their thinking. They need structured support to do this well. Learn specific strategies to foster a sense of belonging and community in your elementary classroom.

Lisa Brooks, UCF, St. Cloud, Florida
Twitter: @drbrooksla

Visit the NCTM Exhibits in Hall D
PreK–2

136 Mathematical Strategies: To Tackle Problem Solving in an Urban Community

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 101

Rosalyn Yalow Charter School has established a school-wide, teacher-led collaborative learning community to effectively teach math lessons through lesson study in the NYC urban area. Presenters will share four research lessons to show the teachers' improvements using the research lesson proposals, student data, lesson records, and outcomes.

Naomi Ishida, Rosalyn Yalow Charter School, New York, New York
Twitter: Naomi Ishida
Kristin Balbi, Rosalyn Yalow Charter School, Bronx, New York
Kevin Amatulli, Rosalyn Yalow Charter School, Bronx, New York
Bridget Sickles, Rosalyn Yalow Charter School, Bronx, New York
Lisa Lugo, Rosalyn Yalow Charter School, Bronx, New York

136.1 Measuring What Matters: Using IEP Goals Aligned to Conceptual Understanding of Math

3–5 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center: 202A

How do we shift IEP goals from memorization to prompts that help develop deep math conceptual understanding? This session explores how teachers can go beyond fluency practice to adopt equitable teaching strategies and support students with disabilities to solve real world problems using multiple strategies and representations.

Brett Barnes, Zearn, New York, New York
Shaka Phillips, Zearn, New York, New York

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- Equity Strand
- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

138 Using Asynchronous Assignments to Differentiate Learning for Any Environment

6–8 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 151A

Participants will learn how to design asynchronous lessons for grades 6–12 math classes. They will also learn how to incorporate a high-quality math curriculum, a learning management system, and online teaching tools in supporting students in asynchronous learning. This content can be adapted to both a virtual or in-person teaching setting.

Frank Wapole, Great Minds Virtual, Crystal Lake, Illinois
Twitter: @frank_wapole
Jaclyn Wood, Great Minds Virtual, Chicago, Illinois

139 How Do I Start? Using Dynamic Math Tech to Position Your Students as Powerful Math Explorers

8–10 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Independence Ballroom F-H

So many decisions go into using dynamic math tech to support students' learning: whether to use it, what to use, and how to use it to name a few. Come hear advice from tech-using math teachers on how to decide when using tech makes sense and all of the other decisions we make along the way to position students as powerful doers of mathematics.

Allison McCulloch, UNC Charlotte, North Carolina
Twitter: @awmcculloch
Jennifer Lovett, Middle Tennessee State University, Murfreesboro
Lara Dick, Bucknell University, Lewisburg, Pennsylvania

140 Practical and Provocative Thoughts on Finally Redesigning High School Math

8–10 Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Shaw/LeDroit Park

This fast-paced and example-laden discussion will make the case that, for far too many students, high school math is an inequitable, underperforming mess and that the status quo is simply no longer acceptable. We will look at a range of specific suggestions for making long overdue changes in what and how we teach these four years of mathematics.

Steven Leinwand, American Institutes for Research, Washington, District of Columbia
Twitter: @steve_leinwand

141 Can We Build It (Even for AP Calculus)? Yes, We Can! How to Build an AP Calculus Thinking Classroom

10–12 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 150A

Drawing from Liljedahl's "B.T.C. in Mathematics" and James Clear's "Atomic Habits," as well as from three decades of teaching experiences, we will consider strategic moves for teaching AP Calculus AB and BC (including use of space, time, and tasks) that increase student engagement with math, with each other, and with their reflective selves as learners.

Brent Ferguson, Princeton High School, New Jersey
Twitter: @BAFerg

142 Designing High School Math Pathways for Equity

10–12 Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Union Station

Recent publications emphasize the need for high school math pathways that are relevant, rigorous, and engaging, but it can be difficult to contend with outside pressures including college readiness and high-stakes assessments. This session will focus on one district's redesigned pathways and their effect on student attitudes and college readiness.

Robert Janes, East Hartford Public Schools, Wethersfield, Connecticut
Twitter: @MrJanesMath
Carla Bidwell, East Hartford Public Schools, Connecticut

143 Modeling and Solving Problems with GeoGebra in Multilingual Classrooms

10–12 Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Liberty Ballroom L

We will illustrate how all learners can use GeoGebra as a strategic tool to gain insights into modeling and solving geometric problems. GeoGebra is a free software with multiple languages giving access to all students regardless of language background. Participants will explore two classic problems: The Buried Treasure problem and the Picnic, or Viviani's, problem. We will discuss and justify some of the conjectures suggested by GeoGebra via mathematical proof.

Jose Contreras, Ball State University, Muncie, Indiana
Armando Martinez-Cruz, CSU Fullerton, Buena Park, California

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- Exhibitors Workshop

144 The Many Rich Meanings of the Geometric Mean

10–12 Session
SESSION CONTENT LEVEL: In-Depth
Marriott, Treasury

The geometric mean is a beautiful mathematical topic. Its multiple concepts connect number sense, algebra, measurement, geometry, and data analysis. In this session I will show numerous characterizations (most are visual) of the geometric mean, with the goal of building students' conceptual understanding and mathematical reasoning.

James Olsen, Western Illinois University, Macomb
Twitter: @DrOlsen314

145 Examining How Power Dictates Policies and Reforms in Mathematics Teaching and Learning

General Interest Session
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, Ballroom A

This talk offers contrasting narratives between policy intentions and policy enactment, highlighting how the language of mathematics policies positions historically excluded learners. This talk uses an interest convergence lens to make a case that policies are often designed and enacted to protect economic, technological, and social interests.

Robert Q. Berry, III, Past President, National Council of Teachers of Mathematics, Reston, Virginia; University of Arizona, Tucson
Twitter: @robertqberry

146 Flexibility through Facts

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, Ballroom B

Let's explore the heart of flexible strategic thinking for each of the four operations. We will learn how to interview students to discover where to begin and then discuss how we can facilitate flexible thinking, starting with basic facts and then naturally applying them to various sets of numbers students will encounter on their K–5 math journeys.

Ann Elise Record, Ann Elise Record Consulting LLC, Concord, New Hampshire
Twitter: @AnnEliseRecord

147 President Address: Increasing Opportunities for Students in Mathematics

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 145AB

What policies, processes, and practices need to be examined to increase student opportunities during and after their PK–12 education? Let's identify the purposes of learning math, consider the existing structures and what changes should be made, examine how to equitably teach mathematics, and help our students see themselves as capable of learning mathematics.

Kevin Dykema, President, National Council of Teachers of Mathematics, Reston, Virginia; Mattawan Middle School, Michigan

148 Unbridled Math Adventures with Exploding Dots

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, Ballroom C

A playful demonstration to show how Exploding Dots can be implemented across all grade levels to give students a joyful experience with mathematics that can lead to true, deep understanding. We will see how "advanced" algebra with polynomials is no different or harder than grade school arithmetic and get a deep understanding of different bases.

Nicholas Johnson, University of Wisconsin Milwaukee
Twitter: @MathIsHappiness

149 We Need More Math Teachers! Repairing the Reputation of the Teaching Profession

Higher Education Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Liberty Ballroom N-P

The United States faces a serious shortage of mathematics teachers, due in part to an inaccurate narrative about the profession. This session addresses common misperceptions using data about salary, benefits, diversity, and career satisfaction developed by Get the Facts Out, a national project encompassing multiple STEM organizations.

Jean Lee, University of Indianapolis
Twitter: @JeanLeeGalindo
W Gary Martin, Auburn University, Alabama
Glenn Waddell, University of Nevada, Reno

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149.1 Conceptualize it! With Calculus for the AP® Course 4e

10–12 Exhibitor Workshop
Walter E. Washington Convention Center, 143C

Join expert AP® Calculus educator and co-author of the Teacher's Edition for Calculus for the AP® Course 4th edition, Karen Hyers, for an informative session about teaching important skills for AP® Calculus. The session will showcase student and teacher materials from the Sullivan and Miranda, Calculus for the AP® Course 4e program that provide a hands-on approach to the topic - helping students to "Conceptualize it!" Recommended for all AP® Calculus teachers, regardless of textbook in use.

BFW Publishers, Hamilton, New Jersey

149.2 Teaching Problem Solving to ALL Students

3–5 Exhibitor Workshop
Walter E. Washington Convention Center, 156

Teaching students to reason and problem solve is the cornerstone of quality math instruction. This session will highlight several engaging strategies such as Three Reads, Numberless Word Problems, and more that will provide multiple entry points for all students to engage in the math and ignite a passion for problem solving in your classroom!

Presenter: Pamela Richards, STEMscopes Regional STEM coach and expert in K-8 Math and Science content and master teacher with 30+ years of experience.

STEMscopes Math & Math Nation, Houston, Texas

149.3 What Happened When PGCPS Made Math Literacy a Top Priority

6–8 Exhibitor Workshop
Walter E. Washington Convention Center, 158AB

Since 2019, Prince George's County Public Schools has focused on developing math literacy as a way to boost performance among more than 27,000 middle graders. PGCPS' Math Supervisor (Gr. 6-8) will examine the district-wide impact of this 4-year effort on Title 1 and multilingual learners and share generalizable takeaways. Participants will also explore math literacy strategies that PGCPS implemented in nearly 1,600 classrooms this year using Speak Agent's Math+Language blended learning program.

Speak Agent, Inc, Rockville, Maryland

149.4 NBA Math Hoops – Creating the Next Math Champion

6–8 Exhibitor Workshop
Walter E. Washington Convention Center, Exhibit Hall D, Th1

NBA Math Hoops leverages the game of basketball and the NBA/WNBA to engage students with math and social-emotional learning skills through a board game, curriculum, mobile app, and community program. The workshop is fully hands on. The educators will get to learn the program and strategies of the game through interactive game play. Educators will draft their own NBA/WNBA team, dice will be rolled, and spinners will be spun. All resources for the program are completely free of cost for educators.

LearnFresh, Philadelphia, Pennsylvania

149.5 There's Beauty in Modeling with Mathematics

10–12 Exhibitor Workshop
Walter E. Washington Convention Center, 159AB

How do we turn the phrase "Exploring our world through math" on its head? By exploring math throughout the world, we give students opportunities to engage with the questions they have about the world. Join us for this exciting session where we'll explore the joy and beauty of modeling with mathematics and consider ways to pass on a legacy of curiosity to our students.

Texas Instruments, Dallas, Texas

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150 Building a Community That Embraces Productive Math Struggle

PreK–2 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 201

Have you ever thought about how community contributes to students' productive math struggle? We'll explore 10 big ideas that strengthen classroom community and foster students' positive mathematical identities. Join us for engaging tasks and discussions. Leave with practical ideas and resources to build community and promote productive struggle.

Susan Katt, Lincoln Public Schools, Nebraska
Twitter: @susiekatt
John SanGiovanni, Howard County Public Schools, Baltimore, Maryland

151 Nurturing Belonging in the Math Classroom

PreK–2 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Independence Ballroom A-C

Teachers have the responsibility to create and nurture a cohesive class community where all students feel a sense of belonging and see themselves as capable mathematicians. This workshop will focus on the creation of this cohesive classroom through intentionally designed instruction that provides all students access to grade-level mathematics.

Ashley Marlow, All Learners Network, Burlington, Vermont
Twitter: @MarlowMathVT
Chris Farnham, All Learners Network, Burlington, Vermont

151.1 Line Dance – The Fundamentals of Using Number Lines

PreK–2 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 152B

Number lines are a lovely sense-making tool, from early elementary to secondary mathematics domains. Sounds simple? Often the building and understanding of them are a bit elusive to students and educators! Join us for hands-on learning that brings to life the February 2022 MTLT article and lays the foundation for upper elementary computation.

Elizabeth Peyser, Educator in Kansas, Wichita
Twitter: Elizabeth Peyser

152 Fun with Fractions

3–5 Workshop
SESSION CONTENT LEVEL: Intermediate
Marriott, Judiciary

Discover the conceptual understanding of fractions and use reasoning strategies to solve problems in a variety of ways. Participants will participate in hands-on exploration that can easily be replicated in the classroom.

Kim Jones, Region 10 ESC, Richardson, Texas
Twitter: @kimjhand2mind
Julie Frizzell, Region 10 ESC, Richardson, Texas

153 Making Math Questions into Good Questions!

3–5 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 207B

In this workshop, teachers will analyze, create examples, and take away the components to make good math questions within their curriculum that is being used. These components will allow our teachers to get our students to think, learn, analyze, and critique specific problems given in math classrooms.

Dr. Alysha Madanat, Washington Elementary School District and ASU, Phoenix, Arizona
Ashley Bernal, Washington Elementary School District , Phoenix, Arizona
Karen Creel, Washington Elementary School District, Phoenix, Arizona

154 Mathematical Language Routines: Cultivating Conversation in Elementary School Classrooms

3–5 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Capitol Congress

Come learn how math language routines simultaneously support sense making and language development. We'll experience these routines to see how math ideas take shape through language, and we will look at student responses to see how discourse can support understanding and develop community, giving all students access to high-quality math instruction.

LaToya Byrd, Illustrative Mathematics, Conyers, Georgia
Twitter: @byrdteaching
Jennifer Wilson, Illustrative Mathematics, Black Mountain, North Carolina

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- Challenging and Advancing Policy and Structures in Mathematics Education
- Expanding the Narrative of Who Belongs
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Upcoming 2024 NCTM Events

INTERACTIVE INSTITUTE

Engaging Students who Struggle: Tools for Effective Instruction

Nashville, TN | Jan. 22–23

REGIONAL CONFERENCE & EXPOSITION

Seattle, WA | Feb. 7–9

VIRTUAL CONFERENCE

Virtual | Apr. 10–13

ANNUAL MEETING

Chicago, IL
Sept. 25–28

www.nctm.org/events

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155 Instructional Routines to Give Grade-Level Access to All Students

6–8 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 206

This workshop session will focus on instructional routines that can be implemented in any math classroom. The routines are designed to increase engagement, give student voice, and enhance access to grade-level content.

Daniel Kaufmann, Wilson School District, West Lawn, Pennsylvania
Twitter: @kaudan721

156 Operating in the Positive and Negative: Strategies for Teaching Integer Operations

6–8 Workshop
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, 149AB

Why are integer operations so hard for students? In this workshop, we will explore concrete ways to provide students with conceptual learning. Participants will experience hands-on activities for teaching integers to students and leave with resources and routines for their classrooms.

Heidi Sabnani, Independent, Stoughton, Massachusetts
Twitter: @hlsabnani
Molly Vokey, Independent, Mansfield, Massachusetts

157 Say Cheese: DOK and AOR through a New Lens

6–8 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 204AB

Math apps can be used as a new lens to examine cognitive complexity in our teaching and learning practices. DOK can give us a picture, but Aspects of Rigor lets us zoom in how we assess and attend to teaching the full breadth of the standards.

William Nolan, NWEA, Middlegrove, New York
Twitter: William D Nolan

158 Experience Flexible, Dynamic Grouping: A Doorway to Student Confidence and Equal Status for All

8–10 Workshop
SESSION CONTENT LEVEL: Intermediate
Marriott, Independence Ballroom E

Using four sets of algebra data, openers, closers, and monitoring a class, we'll discuss how different grouping configurations of the data can support different students' individual strengths and needs in a way that each student can take on different roles throughout the period as a whole. Those roles support status and build confidence.

Allan Bellman, University of Mississsippi, Oxford, Mississippi
Jessica Norris, Biluxi Schools, Mississippi

159 Justice-Centered Mathematical Making in Three Activities

8–10 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 143AB

Justice-centered mathematics activities (JCMAs) are problem-based tasks that center social justice. This workshop will engage participants in three hands-on tasks that demonstrate how to integrate making and JCMAs, including exploring the bias of our national monuments (3D design) and inequitable access to grocery stores (coding, robotics).

Kimberly Corum, Towson University, Maryland
Lynn Nichols, Gilman School, Baltimore, Maryland
Sarah Mamaril, Towson University, Maryland
Rachael Miles, Howard County Public School System, Fulton, Maryland

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- Creating Inclusive, Engaging, and Rigorous Mathematics for All
- Challenging and Advancing Policy and Structures in Mathematics Education
- Expanding the Narrative of Who Belongs
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- New Teacher Strand
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160 Routes Reimagined: Bringing Community into Mathematics through an Entrepreneurial Pitch Competition

8–10 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Mount Vernon

Learn how the Design and Pitch Challenges in STEM engage and empower students through entrepreneurship. This session focuses on Routes Reimagined, a challenge in which students design a navigation app that reflects the needs and values of a community. This challenge captures students' interest while supporting rich learning of linear functions.

Erin Krupa, North Carolina State University, Raleigh
Robin Anderson, North Carolina State University, Raleigh
Michael Belcher, North Carolina State University, Raleigh
Margaret Borden, North Carolina State University, Raleigh
Ashley Loftis, North Carolina School of Science and Mathematics, Durham

161 Sharing Skepticism and Arguing Constructively in Math Class

8–10 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Chinatown

Do you want students to argue in class and build their capacity to construct and critique mathematical arguments? In this workshop, we will experience the Sharing Skepticism instructional routine designed to inclusively develop *all* students' ability to argue mathematically. We will unpack the routine together and prepare to enact it ourselves.

David Wees, DreamBox Learning, Courtenay, British Columbia
Twitter: @davidwees

162 Building Community through Math Modeling and Tech Tools in High School

10–12 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 147A

Modeling tasks and online collaborative tools can engage each and every student and help us foster a sense of belonging. These tasks and tools give us a way to honor students' ideas and contributions to the problem-solving process and help us support students' identity and agency. Come explore a relevant real-world problem and tech tools with us.

Laurie Cavey, Boise State University, Idaho
Maria Hernandez, NC School of Science & Mathematics, Durham, North Carolina

163 Designing Data Investigations of Sociopolitical Issues to Support Multilingual Learners

10–12 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Liberty Ballroom I-K

Looking for ways to engage your students in exploring issues of interest to them in the mathematics classroom? In this workshop, we will discuss how you can design data investigations of sociopolitical issues using research-based practices for supporting multilingual learners. This will include how to use multiple representations in such investigations and how to use a free online and dynamic data analysis tool in inclusive ways to support your students in learning statistics and data science.

Travis Weiland, University of Houston, Texas
Anita Sundrani, University of Houston, Texas
Melissa Gallagher, University of Houston, Texas

164 Mathematics, a Second Language for *All* Students

10–12 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 202B

This session will help teachers understand how to support all students in developing more mathematically precise ways of communicating the language of mathematics. We will experience how vocabulary can be situated within a task so that a need for naming the new word arises from the work students are doing and how those definitions can be refined.

Janet Sutorius, Mathematics Vision Project/ Open Up Resources, Nephi, Utah
Twitter: Janet M Sutorius

164.1 Using Argument-Driven Inquiry to Help Students Understand and Critique Their Own World

Coaches/Leaders/Teacher Educators Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center: 209ABC

This workshop engages participants in an Argument-Driven Inquiry (ADI) mathematical investigation designed to broaden the purpose of learning mathematics. Participants will engage in an ADI investigation into wages paid to public employees in Texas, demonstrating how ADI structures learning experiences to support students using mathematics to understand, critique, and change their world.

Ana Kenessey, Argument-Driven Inquiry, Austin, Texas
Todd Hutner, University of Texas, Austin

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- Creating Inclusive, Engaging, and Rigorous Mathematics for All
- Challenging and Advancing Policy and Structures in Mathematics Education
- Expanding the Narrative of Who Belongs
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- Presidents' Series
- New Teacher Strand
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- New NCTM Publication Session
- Exhibitors Workshop

168 Cultivating Belonging, Empathy, and Justice with Culturally Responsive Mathematical Modeling

3–5 Workshop
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, 207A

This workshop focuses on culturally responsive mathematical modeling routines and tasks that cultivate belonging, empathy, and justice. Participants will experience these modeling activities as modelers and design similar modeling activities for their own classrooms. Topics include clean water, library representation, and welcoming refugee families.

Julia Aguirre, University of Washington Tacoma
Holly Tate, FCPS, Fairfax, Virginia
Jennifer Suh, Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; George Mason University, Fairfax, Virginia
Elzena McVicar, University of Washington, Seattle
Erin Turner, University of Arizona, Tucson

169 The Art of Annotation: A Critical Support for Engaging All Students in Meaningful Math Discourse

6–8 Workshop
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, 146C

Annotation, a key aspect of providing access to and supporting the engagement of exceptional learners in math discussions, takes practice. Build your annotating muscle by practicing offline and in real time. Learn features of effective annotation and implementation. Leave ready to weave annotation into your classroom discourse.

Grace Kelemanik, Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; Fostering Math Practices, Natick, Massachusetts
Twitter: @GraceKelemanik

170 Public Math Pop-Up: Build Your Own Math Installation

Coaches/Leaders/Teacher Educators Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Supreme Court

In this workshop, we will dream up, design, and install place-based math provocations. Although our experience will be anchored in the place we are in, Public Math design principles are portable. Enter with a desire to spark math curiosity in others; leave with ideas, inspiration, and tools to enact public math in your own community.

Chris Nho, Desmos Classroom, San Diego, California
Twitter: @nhoskee
Christopher Danielson, Desmos Classroom @ Amplify, Saint Paul, Minnesota
Molly Daley, Education Service District 112, Vancouver, Washington
Lara Jasien, CPM Educational Program, Nashville, Tennessee

Uplifting and Inspiring the Mathematics Educator
Creating Inclusive, Engaging, and Rigorous Mathematics for All
Challenging and Advancing Policy and Structures in Mathematics Education
Expanding the Narrative of Who Belongs
Improving Core Instruction through Deeper Mathematical Content and Pedagogical Knowledge
Presidents' Series
New Teacher Strand
Equity Strand
NCTM Committee Session
New NCTM Publication Session
Exhibitors Workshop

172 Assessment for All! Creating a Culturally Responsive Assessment Experience for Your Students

3–5 Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Archives

How can we make sure that the assessment experiences that we design for students are culturally responsive? NWEA posed this question to leaders in the field in a panel discussion that we held in 2022. This session is an opportunity to learn from them and to learn more about how to create assessments that center and validate students.

Sarah Whitney, NWEA, Los Angeles, California

173 Catching Up and Moving Forward: New Research on Accelerating Math Learning for Every Student

3–5 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 152A

What strategies help all students catch up and move forward in math? A national research study conducted over two years of pandemic learning found that when struggling students engaged in learning acceleration, they struggled less and completed more grade-level lessons than when they were remediated. Join us to see learning acceleration in action.

Shaka Ané Phillips, Zearn, Brooklyn, New York
Twitter: @Zearned
C Kyle Falting, Zearn, New York, New York

174 Creating Inviting Tasks: Welcoming Learners to the Problem-Solving Experience

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Treasury

High-quality mathematics tasks provide greater student access to mathematical problem solving and conceptual understanding. In this session, we will explore tasks of all levels and examine ways to modify them for accessibility, engagement, and rigor. Join us as we discuss ways to open a welcoming door to mathematics for all learners.

Jennifer Caton, University of Central Florida, Edgewater
Twitter: Jennifer Caton
Juli Dixon, UCF, Indialantic, Florida

174.1 Reasoning Statistically in Elementary Grades Through Social Studies: The Civil Rights Movement

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Liberty Ballroom M

How can we engage elementary students in statistical reasoning using equitable practices? Participants will explore statistical reasoning strategies while engaging fifth grade standards addressing the Civil Rights Movement.

Amarius Reed, Atlanta Public Schools, Georgia
Twitter: @AmariusR
Warren Edwards, Atlanta Public Schools, Georgia
Lindiwe Ngubeni, Atlanta Public Schools, Georgia
Felicia Pratt, Atlanta Public Schools, Georgia

175 Recommendations for Effective Interventions for Students with Special Needs in Mathematics

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 146B

Explore effective practices to support students struggling with mathematics. This session will examine the importance of precise language, multiple representations, strategies for word problems, and systematic instruction as key components of successful interventions.

Karen Karp, Johns Hopkins University, Baltimore, Maryland
Twitter: @ksquaredmath1
Barbara Dougherty, The Villages, Florida

176 ANALYZE THIS! Digitally Creating and Exploring Data Displays in the Middle Grades

6–8 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Union Station

At the middle school level, valuable classroom time is dedicated to having students create displays for sets of data. Come explore how technology tools, such as Desmos, can be used to make it easier for students to create displays, make observations, and build statistical thinking. Bring your device to be fully immersed in this interactive session.

Nickolas Corley, Northfield Community School, New Jersey
Twitter: @mrcorleymath
S Leigh Nataro, Moravian University, Easton, Pennsylvania

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- Challenging and Advancing Policy and Structures in Mathematics Education
- Expanding the Narrative of Who Belongs
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- Presidents' Series
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- Equity Strand
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- Exhibitors Workshop

177 Reimagine Algebra Problem Solving with Different Learners

6–8 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 147B

Participants will experience good problems that focus on expressions and equations that illustrate strategies for diverse populations. They will leave with classroom-ready problems and a tool to construct and analyze robust lessons.

Shelley Kriegler, Center for Mathematics and Teaching, Sherman Oaks, California
Twitter: Shelley Kriegler
Cynthia Raff, Center for Mathematics and Teaching, Pasadena, California

178 STEM and Our Military: Connections to Teach Math Concepts and Context to Motivate Student Learning

6–8 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Marquis Ballroom Salon 12&13

Connect math concepts (e.g., Area, Ratios, Graphing, Functions) to STEM innovation within our military (e.g., combat vehicles, SONAR, GPS, drones, aircraft). Discover scenarios from the presenter's immersive experience with outreach from the Department of Defense. Acquire classroom activities to enhance instruction, inspire learning, and promote opportunities for students.

Kelly Remijan, Illinois Math & Science Academy (IMSA), Belleville
Twitter: teachers4steam

178.1 Math Narratives: How Can Teachers Help Change the Way Students Feel about Math?

6 to 8 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 101

Have you ever heard a student say, "I'm just not a math person?" Students' math experiences are impacted by narratives that society, parents, teachers, and peers hold. As teachers, we can shape positive narratives that affirm students' math identities. This session will share insights from research on math identity among 6–9 graders, parents, and teachers. In groups we will workshop messaging interventions that support teachers changing problematic narratives and fostering positive math experiences.

Michaela Leslie-Rule, Wonder: Strategies for Good, San Francisco, California

179 Building on Strengths in Student Work

8–10 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 203AB

Often, when looking at student work, teachers categorize students into ability groups. In this session, we will use the strengths of student work to form heterogeneous groupings where each student can (1) have access to the conversation by sharing their strengths and (2) learn rigorous mathematics from the strengths of their peers.

Tierra Fender, Charlotte Mecklenburg Schools, North Carolina

180 Creating Coherence: A Case Study on Collaborative Curriculum Design

8–10 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 154AB

Before writing standards-aligned anti-racist curricula, one must first evaluate one's identity, knowledge, and purpose. In this session, we will explore the process behind writing a math curriculum; Share resources that influence the curriculum development process and product; and engage in experiential learning through a case study.

Shakiyya Bland, Just Equations, Berkeley, California
Barbara Beske, Coherent Math Consulting, LLC., Mullica Hill, New Jersey

181 Mandalas, Mudéjar Tiles, and Sangaku: Sacred Geometry from around the World

8–10 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 150A

Geometry has been a source of inspiration and design throughout the world in many different cultures and time periods. We will explore the Moorish tile work from southern Spain, Sangaku from Japan, and mandalas from India, and how each of these can be integrated into a high school geometry curriculum. Student work and projects will also be highlighted.

Jonathan Osters, The Blake School, Minneapolis, Minnesota
Twitter: @callmejosters

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Creating Inclusive, Engaging, and Rigorous Mathematics for All
Challenging and Advancing Policy and Structures in Mathematics Education
Expanding the Narrative of Who Belongs
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Presidents' Series
New Teacher Strand
Equity Strand
NCTM Committee Session
New NCTM Publication Session
Exhibitors Workshop

182 Reignite Students' Passion for Math with Culturally Responsive Teaching and Project-Based Learning

8–10 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Independence Ballroom D

Learn from the efforts of teachers to (re)ignite students' passion for math while creating more inclusive and accessible classrooms through the use of culturally responsive mathematics teaching and project-based learning. Examine ways to allow students to connect their interests and passions to math to strengthen their mathematical identities.

Mark Ellis, CSU Fullerton, California
Twitter: @EllisMathEd
Susie Min, Irvine, California

183 Connecting Students to the Community with Culturally Relevant Mathematical Modeling Tasks

10–12 Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Monument

Mathematical modeling (MM) is an engaging way for students to explore connections to the real world. Combining culturally relevant tasks with MM can give students the opportunity to further understand their community, culture, and lives. This presentation will feature different approaches to implementing culturally relevant modeling tasks.

Kathryn Early, Auburn University, Alabama
Elizabeth Barlow, Auburn University, Alabama
Ronnie Hall, Opelika, Alabama

184 Social Choice Theory = Empowerment

10–12 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Independence Ballroom F-H

What does math have to do with elections? More than counting votes! As we enter an election year, let's reflect on social choice theory. The session will cover methods other than plurality, how students in a discrete math class changed their own school election procedure, and the impact of Electoral College methods on who becomes president.

Julien Meyer, Severn School, Severna Park, Maryland

185 The New AP Precalculus Course

10–12 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Liberty Ballroom N-P

Welcome to AP Precalculus, the newest AP mathematics course! Learn why and how the course was designed, the content knowledge and skill fluency students will develop, and other benefits of offering this course at your school. Find out how you can become a part of the inaugural AP Precalculus Reading.

Jason VanBilliard, College Board, New York, New York

186 Ethnomodeling as a Vehicle for Catalyzing Change in Teacher Education

Coaches/Leaders/Teacher Educators Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 202A

NCTM's Catalyzing Change series has made four key recommendations for reframing the future of mathematics education. In this session, we share how we have integrated an ethnomodeling approach to enact these recommendations in teacher education courses to focus on both deep and meaningful mathematics content and equitable teaching and cultural relevance.

Siddhi Desai, Fairleigh Dickinson University, Teaneck, New Jersey
Twitter: SiddhiDesai311
Trena Wilkerson, Past President, National Council of Teachers of Mathematics, Reston, Virginia; Baylor University, Waco, Texas
Sarah Bush, University of Central Florida, Orlando
Farshid Safi, University of Central Florida, Orlando

Uplifting and Inspiring the Mathematics Educator
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Improving Core Instruction through Deeper Mathematical Content and Pedagogical Knowledge
Presidents' Series
New Teacher Strand
Equity Strand
NCTM Committee Session
New NCTM Publication Session
Exhibitors Workshop

188 Supporting Challenge: Working Alongside Teachers to Interrogate and Challenge Inequity

Coaches/Leaders/Teacher Educators Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 151A

Learn how to support teachers to acknowledge, act, and account (AAA) as they interrogate inequity in classrooms, schools, or districts. In this session, attendees will engage with resources on how to facilitate AAA cycles in which teachers learn strategies, create plans, and hold one another accountable to enact change.

Robin Anderson, North Carolina State University, Raleigh
Twitter: @RobinKeturah
Melissa Troudt, University of Wisconsin – Eau Claire
Lisa Skultety, University of Central Arkansas, Little Rock
Candace Joswick, The University of Texas at Arlington

189 Creating Inclusive, Engaging, and Rigorous Mathematics Instruction through Co-Teaching

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, Ballroom B

Co-teaching is a powerful approach in meeting the unique needs of each and every learner in inclusive mathematics classrooms. We highlight the building blocks of co-teaching and collaborations, including relationship building, planning considerations, and equitable instructional practices.

Stefanie Livers, Missouri State University, Springfield
Twitter: @LiversStefanie
Kristin Harbour, University of South Carolina, Columbia

190 Enhancing the Math Experience for Exceptional Learners: Essentials for Instruction

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 140AB

Equitable instructional practices demand all learners have access to effective math instruction. We highlight five essential practices for exceptional learners. We discuss the evidence-based practices of modeling and practice with feedback, use of precise mathematical language, use of multiple representations, fluency, and word-problem solving.

Sarah Powell, The University of Texas at Austin
Twitter: @sarahpowellphd
Tasia Brafford, The University of Texas at Austin
Zhina Shen, The University of Texas at Austin
Jess Mao, The University of Texas at Austin

191 President Series: Indigenous Perspectives on Rehumanizing Mathematics Teaching and Learning

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Shaw/LeDroit Park

There is a concept of "We are all related" within many Indigenous nations' worldviews. In this session, we will explore this concept alongside teaching and learning mathematics. You will be invited to re-story mathematics education through this concept as a way to enact "rehumanizing mathematics" in respectful, reciprocal, relevant, and responsible ways.

Florence Glanfield, TODOS: Mathematics for ALL/University of Alberta, Edmonton AB, Canada
Twitter: @FGlanfield

192 Inviting, Listening to, and Leveraging Students' Ideas: It All Starts with Noticing and Wondering

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, Ballroom A

Assessment involves welcoming and striving to understand students' mathematical thinking and using what you learn to inform your instructional choices. We'll hear how Noticing and Wondering developed for one teacher from a lesson "hook" into an essential part of her daily routine to assess her students' mathematical understanding.

Annie Fetter, 21st Century Partnership for STEM Education, Rutledge, Pennsylvania
Twitter: @MFAnnie
Claire Verti, Bonita High School, La Verne, California

193 More Than Show and Tell: Using Student Work and Purposeful Questions to Deepen Students' Mathematical Thinking

General Interest Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, Ballroom C

Want your students to engage in powerful mathematical conversations and deepen their conceptual understanding? This session will focus on using student solution paths to spur student conversations that deepen mathematical thinking and reasoning. Come learn how to plan for those solutions and then execute a productive discussion in your math class.

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

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- Expanding the Narrative of Who Belongs
- Improving Core Instruction through Deeper Mathematical Content and Pedagogical Knowledge
- Presidents' Series
- New Teacher Strand
- Equity Strand
- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

194 NCTM's Membership and Affiliate Relations Committee (MARC) Is Here for You!

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 145AB

Come learn with your representatives on NCTM's Membership and Affiliate Relations Committee (MARC). You will learn about available resources to support your Affiliates and how active participation as an Affiliate improves mathematics education for your members and their students.

Marci Ostmeyer, Educational Service Unit 7, Osceola, Nebraska

194.1 Modifying Tasks to Engage All Students in Doing Math, Jennifer Mossgrove, Ed.D.

8–10 Exhibitor Workshop
Walter E. Washington Convention Center, 143C

We want to ensure that all students in our classrooms are engaged as doers of mathematics, not just those that are traditionally perceived as being "good at math." We will consider features of mathematical tasks that support doing math and develop modification strategies that provide more access to more students. Participants will leave with specific tools and strategies to apply to their own lessons to engage more learners as doers in their classrooms

Knowles Teacher Initiative, Moorestown, New Jersey

194.2 Let's get physical... with mathematics

8–10 Exhibitor Workshop
Walter E. Washington Convention Center, 156

Engaging students through hands-on explorations is a powerful way to facilitate the connection of ideas. Join us as we engage with data collection activities that can bring everyday mathematics to life and shed light on the underlying mathematical concepts.

Texas Instruments, Dallas, Texas

194.3 Class Openers and Quick Games to Foster Numeric, Algebraic, and Geometric Thinking

General Interest Exhibitor Workshop
Walter E. Washington Convention Center, 158AB

Come learn some new class openers, games, and puzzles to spark student engagement. We will play a variety of games, openers, and puzzles that can be used to foster numeracy skills, algebraic thinking, and geometric understanding with students of all ages. We will explore some activities that will require 1-1 devices and some that will not.

Amplify, Brooklyn, New York

194.4 Elevate Instruction with Math Workshop Approaches for Differentiated Inquiry-Based Learning

General Interest Exhibitor Workshop
Walter E. Washington Convention Center, 159AB

Build mastery and bring joy to the classroom with active approaches to differentiate inquiry-based learning. Highlights include ways to inspire creative instruction with flexible and informative frameworks. Plus, learn why implementation transforms schools and makes an impact, from instruction and intervention to assessment and progress monitoring. Can't make this session? Visit the Heinemann Publishing booth (#205) for more Math Workshop information and other inquiry-based support.

Heinemann Publishing, Portsmouth, New Hampshire

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Presidents' Series
New Teacher Strand
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NCTM Committee Session
New NCTM Publication Session
Exhibitors Workshop

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Introducing Bridges in Mathematics Third Edition

Friday, October 27th — 8:00–9:00 am in Room 156
Same & Different: What's New in Bridges in Mathematics Third Edition

Then visit us at Booth #212 to learn about piloting Bridges Third Edition.

The MATH LEARNING CENTER

www.mathlearningcenter.org

195 Beyond Literature Connections: Storytelling in Math

PreK–2 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Mount Vernon

In the last decade, math in literature has exploded! Children's books address all areas of the curriculum with engaging stories, whimsical illustrations, and detailed lesson plans. Can math *be* literature? What if we "storify" math itself? Explore ways for students to engage with math as storytellers and the transformative power of this approach.

Teresita Cuesta, Indian Creek School, Crownsville, Maryland

196 Making Mathematics Meaningful with Community-Connected Tasks

PreK–2 Workshop
SESSION CONTENT LEVEL: In-Depth
Marriott, Independence Ballroom A-C

How fun is it when students see their community as the context for their math tasks? Let's experience some tasks, notice and analyze strategies while guided by a learning trajectory, explore a learning template to help plan future tasks, and collaborate to create a resource bank for additional community-connected ideas.

Becky Holden, Trinity School, Atlanta, Georgia
Twitter: @bholden86

197 Using Learning Progressions to Analyze Student Work and Accelerate Early Math Learning

PreK–2 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 143AB

What does it mean to accelerate rather than remediate student learning? This interactive session focuses on how to use learning progressions to analyze student work and make instructional decisions that help move student learning forward. Participants will develop an understanding of how to meet the diverse needs of learners on an ongoing basis.

Caroline Ebby, University of Pennsylvania, Philadelphia
Twitter: @cbebby
Elizabeth Hulbert, OGAP, Essex Jct, Vermont
Jessica Tilli, Philadelphia School District, Haddonfield, New Jersey

198 What's the Difference? Modeling Addition and Subtraction Based on Comparison Relationships

PreK–2 Workshop
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, 204AB

Seeing differences through comparing quantities of volume, area, and length can serve as a starting point for modeling addition and subtraction on number lines and in equations. In this session, we will represent quantitative relationships in ways that can enhance student understanding of addition and subtraction.

Seanyelle Yagi, State of Hawaii, University Of Hawaii, Honolulu
Linda Venenciano, Pacific University, Eugene, Oregon

Visit the NCTM Exhibits in Hall D
Higher Ed

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- Challenging and Advancing Policy and Structures in Mathematics Education
- Expanding the Narrative of Who Belongs
- Improving Core Instruction through Deeper Mathematical Content and Pedagogical Knowledge
- Presidents' Series
- New Teacher Strand
- Equity Strand
- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

199 Get Curious! Everyday Assessment Strategies That Reveal Student Thinking

3–5 Workshop
SESSION CONTENT LEVEL: In-Depth
Marriott, Independence Ballroom E

Get curious about student thinking! Dig in deeper! Observations, interviews, and student work samples complement your digital data and offer information that describes what students *do* know. Learn three research-informed shifts you can make in your routine that can make assessment less stressful, more student-centered, and highly informative.

Kimberly Morrow Leong, The Math Learning Center, Fairfax, Virginia
Twitter: @kmorrowleong

200 Purposefully Using Problem-Based Lessons to Support Young Mathematicians

3–5 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 152B

Do you want to encourage your young mathematicians to reason and problem solve? Join this session to experience a problem-based lesson using a three-phase format and worthwhile tasks. Walk away with a list of resources as well as knowledge of how to use your own curriculum to create opportunities for your young learners to think like mathematicians.

Brandy Crowley, Emporia State University, Kansas
Twitter: @TXMathEducator
Meghan Shave, Emporia State University, Park City, Kansas
Amanda Neff, Emporia State University, Kansas
Emily Cline, Emporia State University, Kansas

201 Using Data Science to Tell Stories in the Elementary Classroom

3–5 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 207B

Data is all around us. The elementary classroom is an optimal space where students can begin to develop data literacy and examine the stories told by the data they find. Learn how to use routines and create rich authentic tasks that allows students to collect, organize, and make sense of information in their community and in their world.

Stephanie Holloway, Lake Elsinore Unified School District, California
Twitter: @mrs_sdholloway

202 We All Belong: Broadening Notions of Discourse to Be Inclusive of Individuals' Mathematical Writing

3–5 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 202B

Participate in this hands-on workshop introducing the mathematical writing process that embraces individuals' mathematical identities. Apply the MWP that broadens students' opportunities to engage in reasoning-based discourse inclusive of talk and writing. Have students decide the words, symbols, and visuals that expresses their brilliant ideas.

Tutita Casa, University of Connecticut, Storrs Mansfield
Madelyn Colonnese, University of North Carolina Charlotte

203 Fall in Love with Fractions

6–8 Workshop
SESSION CONTENT LEVEL: In-Depth
Marriott, Capitol Congress

Participants will learn how to help middle school students rebuild their conceptual understanding of fractions. Using manipulatives and visuals, teachers will engage in hands-on learning activities geared to the middle-level learner. This deeper understanding will provide more equitable access to grade-level content for all middle-level learners.

Tara Sharkey, Colchester School District, Vermont
Twitter: @taramsharkey

204 What's It All About? Deepening Understanding of Multiplication and Division of Fractions

6–8 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 206

Traditionally multiplication and division of fractions have been taught using rules without context or meaning. Move away from "KFC" to making connections between the meaning of these operations with whole numbers to fractions using concrete, visual, and contextual representations. Deeper understanding for you and your students is guaranteed!

Linda Gojak, Past President, National Council of Teachers of Mathematics, Reston, Virginia; Independent, Willowick, Ohio
Twitter: @lindagojak

- Uplifting and Inspiring the Mathematics Educator
- Creating Inclusive, Engaging, and Rigorous Mathematics for All
- Challenging and Advancing Policy and Structures in Mathematics Education
- Expanding the Narrative of Who Belongs
- Improving Core Instruction through Deeper Mathematical Content and Pedagogical Knowledge
- Presidents' Series
- New Teacher Strand
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- NCTM Committee Session
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205 Where Are the Words? Reducing Barriers without Reducing Rigor

6–8 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 102AB

Let go of the key words and make the mathematics more accessible through different modalities. For many students, *words* are the problem with word problems. In this session, learn how to reduce the barrier written word problems can present while increasing relevance and engagement with meaningful contexts.

Kevin Davis, Great Minds, Washington, District of Columbia
Twitter: mr_davis_math

206 A Math-First Approach to Data Science

8–10 Workshop
SESSION CONTENT LEVEL: Intermediate
Marriott, Judiciary

Are you curious about data science but want to focus on math instead of tech? This hands-on workshop will model lessons that were explicitly designed to elevate math over programming, with guidelines to help you choose tools appropriately. Find out which content can be integrated into specific math classes in middle and high school, including algebra 2!

Emmanuel Schanzer, Bootstrap, LLC, Alexandria, Virginia
Twitter: @BootstrapWorld

207 Imagine a World: Teaching Writing, Solving, and Graphing Linear Equations through Projects

8–10 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 151B

Come experience a project in which students learn writing, solving, and graphing linear equations through imagining a better world. Explore how to teach linearity through modeling and a project that supports students to advocate for a real-world issue they care about, using mathematics. We'll do parts of the project and look at real students' work.

Rachelle Ebanks, XQ Institute, Oakland, California
Lennex Cowan, XQ Institute, Oakland, California

208 Sliding into Transformations of Quadratics: Choosing the Right Activity

8–10 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 201

Using Desmos to understand transformations of functions families allows students to explore before formalizing the rules. Desmos provides several different ways (e.g., sliders or Marbles Slides). We will examine the affordances and constraints of different activities and share student videos to help you choose which task is best for your students.

Nina Bailey, University of North Carolina at Charlotte
Demet Yalman Ozen, Middle Tennessee State University, Murfreesboro
Samantha Fletcher, Smithville, Tennessee

209 Using Interesting Ideas, Activities and Manipulatives to Engage Students for Success in Geometry

8–10 Workshop
SESSION CONTENT LEVEL: In-Depth
Marriott, Chinatown

Have fun and challenge yourself to use a variety of strategies, tools, and resources to investigate new ideas, solve problems, and share mathematical ideas that can be used throughout the study of geometry. Participants will use household items with engaging problems to explore, develop, and apply geometric concepts and review geometry vocabulary.

Erin Schneider, CPM Educational Program, Louisville, Kentucky
Twitter: @MsSchneider018

210 Arguing about the Math to Argue with the Math: A Way to Focus on Justification and Proof

10–12 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 147A

Learn about how mathematical argumentation can support student learning of essential concepts and mathematical practices. This session will introduce participants to an instructional approach in which students argue about math (i.e., is this mathematically correct) to then argue with math as they understand and critique the world around them.

Victor Sampson, The University of Texas at Austin
Twitter: Victor Sampson, Ph.D.

- Uplifting and Inspiring the Mathematics Educator
- Creating Inclusive, Engaging, and Rigorous Mathematics for All
- Challenging and Advancing Policy and Structures in Mathematics Education
- Expanding the Narrative of Who Belongs
- Improving Core Instruction through Deeper Mathematical Content and Pedagogical Knowledge
- Presidents' Series
- New Teacher Strand
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- New NCTM Publication Session
- Exhibitors Workshop

211 Increase Student Agency by Healing Math Trauma

10–12 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 149AB

No amount of good math pedagogy or experiences are more powerful than one moment of math trauma. It haunts, disables, and discourages students from even believing that they can or should try at math. This session will explore the causes of math trauma and give teachers actual practices to help students understand and heal from their trauma.

Joshua Bean, HBUHSD, Huntington Beach, California
Twitter: @MrJoshuaBean

212 Introducing R/Python for Data Science

10–12 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Liberty Ballroom I-K

Do you want your students to use more data in the classroom but are fed up with hacking a path through the spreadsheet jungle? Packed with examples of classroom-proven technology, tips, and easy-to-use software tools, this show-and-tell session will give you a road map to the best data analysis software available for mathematics education today.

Hamid Sanei, North Carolina State University, Raleigh
Mahmoud Harding, North Carolina School of Science and Mathematics, Durham

213 Problem Solving Plus Problem Posing: Opening Access and Opportunities for All with Deeper Instruction

10–12 Workshop
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, 150B

Engage in problem solving, pose significant questions, learn different approaches, adapt instruction, and use technology (GeoGebra and Desmos). We illustrate various techniques to blend problem solving, problem posing, and access that are based on CRMT. Content includes functions, polygons, congruence, similarity, Pythagorean theorem, and other topics. BYOD.

Armando Martinez-Cruz, CSU Fullerton, Buena Park, California
Jose Contreras, Ball State University, Muncie, Indiana

214 Using Trigonometry to Introduce Students to the World Water Crisis

10–12 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 209ABC

This is an outline of a full unit in trigonometry that covers right triangle trigonometry, the law of sines, and the law of cosines. During the unit, students are introduced to the world water crisis and how it affects women and children. Throughout the unit and related activities, students develop critical thinking skills and global awareness.

Courtney Fox, Cincinnati Public Schools, Ohio

215 Putting Student Knowledge to Work: Using an Assets-Based Approach to Drive Instructional Decisions

Coaches/Leaders/Teacher Educators Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 144ABC

How does orienting around what students know instead of what they don't know invite all students to engage in rigorous, inclusive learning? This session will model using asset-based formative practices to center student thinking and explore employing rich mathematical tasks to activate and leverage students' experience and funds of knowledge.

Mary Resanovich, NWEA, New City, New York
Tammy Baumann, NWEA, Portland, Oregon

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- Expanding the Narrative of Who Belongs
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- New Teacher Strand
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- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

216 How to G.R.O.W. Enthusiastic Mathematicians

PreK–2 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Marquis Ballroom Salon 12&13

Reaching every student requires an intentional, thoughtful, and flexible approach. Universal Design for Learning (UDL) provides a powerful framework to ensure learning experiences are implemented in a way that helps all students to be successful. This session will bridge UDL theory with practical strategies to increase engagement authentically.

Naomi Church, Growing Minds Consulting, LLC, Deerfield Beach, Florida
Twitter: @growingmindsk12

217 Transforming Mathematics Teaching and Learning in Egypt

PreK–2 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 154AB

You probably think of Egypt as the birthplace of algebra–the pyramids as mathematical marvels of the ancient world. Join former teachers, district administrators, and instructional coaches from around the world to take an in-depth look at the incredible math transformation going on in current-day Egypt. From resource curation to consultation to curriculum creation, we share the grounding principles that shaped our instructional approach and describe our strategies for increasing the diversity of culture, practice, and thought. We discuss our evolving collaboration with our counterparts and colleagues in Cairo as we worked to increase rigor in math instruction. Join us to see the impact our work has had on student achievement!

Michelle Hunt-Laubach, Discovery Education, Inc., Charlotte, North Carolina
Twitter: @MHL_Ed
Camsie McAdams, Discovery Education, Inc., Charlotte, North Carolina
Beth Morris, Discovery Education, Inc., Charlotte, North Carolina

218 Happy Little Accidents: Using Technology to Give Access to All Students to Examine Purposeful Mistakes

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 140AB

Mathematics is the study of patterns, and modern mathematicians use technology to test thousands of trials before identifying patterns in the world. Engage as students to explore mathematical patterns as you observe, make, and test conjectures about mathematical relationships. Learn how technology can be used to challenge our practices and structures to bring access to all learners.

Theresa Wills, George Mason University, Fairfax, Virginia
Twitter: @theresawills
Molly Rawding, Chelmsford, Massachusetts

219 Key Features of Elementary Mathematics Games That Promote Rigorous Learning for All

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Liberty Ballroom L

When we asked elementary students-and teachers what class activities they most enjoyed, they answered, "Games." But which games? Why? What makes a game a productive, inclusive learning tool? We studied over 100 students' and teachers' experiences across multiple weeks and activities to identify what makes a math game inclusive, rigorous, and fun.

Jill Neumayer DePiper, WestEd, East Falmouth, Massachusetts
Twitter: @jmndp
Maria Salciccioli, WestEd, Washington, District of Columbia
Brent Jackson, WestEd, Los Alamitos, California

220 Let's Start Talking! Math Discourse 101

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 101

Come engage in discourse structures that will transform your mathematics instruction! Focus on specific talk moves and structures that get students talking about mathematics. Walk away with ready-to-use resources and a vision of how to facilitate math conversations in your classroom that are connected to the mathematical practice standards.

Kimberly Rhodes,Salt Lake City School District, Utah
Jacquelyn Goodsell, Salt Lake School District, Farmington, Utah

221 Math Games: No Seriously... These Are Games—Winners and Learners

6–8 Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Union Station

Connecting the Eight Effective Math Practices 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 Math Practices.

Susan Chadaz, Box Elder School Distirct, Tremonton, Utah
Twitter: Susan Chadaz

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- Creating Inclusive, Engaging, and Rigorous Mathematics for All
- Challenging and Advancing Policy and Structures in Mathematics Education
- Expanding the Narrative of Who Belongs
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- New Teacher Strand
- Equity Strand
- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

222 Disrupting Injustice: Navigating Critical Moments in the Classroom

General Interest Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Independence Ballroom D

Many mathematics teachers are learning more about social justice philosophy, policy shifts, and curriculum. Still, they don't have examples of how to practice their philosophy in the classroom, particularly when facing resistance. The purpose of this session is to attend to participants' identities, beliefs, and assets through our book *Disrupting Injustice*. We are moving away from dehumanizing "copy-paste" models of education reform and toward empowering individuals to form creative responses with their communities.

Lateefah Id-Deen, Kennesaw State University, Kennesaw, Georgia
Esther Song, Chicago Public Schools, Illinois
Tandrea Fulton, Georgia State University, Atlanta

223 Not Enough Time for Remediation, Acceleration, and Extension? The Missing Variables to Your Math Block

6–8 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 151A

The expectations to "fit it all in" can weigh heavily on teachers. Is there enough time in the day to provide instruction for remediation, acceleration, and extension in the classroom? Shifting your mindset and framework to a math workshop model will allow you to move through curriculum faster and meet with differentiated small groups! The gift of time!

Meghan McGuire, Foxborough Public Schools, Massachusetts
Alison Mello, Alison Mello Math Consulting, LLC, North Attleboro, Massachusetts

224 Strategies to Enhance Long-Term Learning

6–8 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 147B

Do your students forget what they have learned? Are you interested in strategies that will boost student learning and can be implemented in your limited class time? In this session, explore powerful strategies to improve learning retention and to develop a process to include these strategies in your classroom.

Monica Clark, Great Minds, Washington, District of Columbia
Jennifer Tadlock, Great Minds, Lafayette, Louisiana

225 Math with Bad Words (and Phrases)

8–10 Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Shaw/LeDroit Park

Teachers sometimes use language that inhibits students developing deep mathematical understanding of concepts. These "bad words" are used with good intentions, but their impreciseness about the mathematics can lead to confusion. Let's discuss some "bad words" (and phrases) and the better choices to clean up the classroom mathematics language.

Daniel Ilaria, Daniel Ilaria, Chester Springs, Pennsylvania
Twitter: @drilaria

226 Using Graspable Math to Support Procedural Fluency and Make Conceptual Connections in Algebra

8–10 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 150A

Graspable Math (GM) serves as a powerful interface to help students conceptually develop procedural fluency with algebra. Its fluid and playful algebra notation helps students simplify expressions, solve equations, and more. We will learn how to create engaging GM activities where teachers can formatively assess all students' work in real time.

Timothy Brzezinski, New Haven Public Schools, West Haven, Connecticut
Twitter: @TimBrzezinski

227 Can Data Science Improve Students' Learning of Algebra? How Modeling with Functions Serves a Purpose

10–12 Session
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, Ballroom B

Data science can be a more engaging alternative to advanced algebra. But it can be much more. Data science can bring algebra to life. With examples from real classrooms, we show how data science motivates students' learning of algebraic functions to model real-world phenomena. Students use algebra with purpose instead of as a useless chore.

Philip Daro, Independent, Berkeley, California
Jinna Hwang, San Mateo High School, California
Ji Son, California State University, Los Angeles
James Stigler, UCLA, Los Angeles, California

Uplifting and Inspiring the Mathematics Educator
Creating Inclusive, Engaging, and Rigorous Mathematics for All
Challenging and Advancing Policy and Structures in Mathematics Education
Expanding the Narrative of Who Belongs
Improving Core Instruction through Deeper Mathematical Content and Pedagogical Knowledge
Presidents' Series
New Teacher Strand
Equity Strand
NCTM Committee Session
New NCTM Publication Session
Exhibitors Workshop

228 Empowering Students and Building Community through Co-Generative Dialogues in STEAM Classrooms

10–12 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Independence Ballroom F-H

In our math classrooms, we strive to prepare our students to become college and career ready for the 21st century. Yet students often lack the opportunity to offer their input or chart their own learning journey in the classroom. Let's explore how co-generative dialogues can empower students to become leaders in our STEAM classrooms and beyond.

Zuobin Tang, New York City Department of Education, Brooklyn
Twitter: @zbtang
Jennifer Flores, New York City Department of Education, Brooklyn

229 So, You're Teaching Precalculus

10–12 Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Liberty Ballroom N-P

With the College Board's new Advanced Placement Precalculus course on the horizon, a lot of math teachers will be teaching a brand new course in 2023. What are the big ideas in AP Precalculus? And how might AP Precalculus differ from the courses already taught at your school? In this session, we'll look at the themes that define the AP Precalculus course.

Gary Rubinstein, Stuyvesant High School, New York, New York
Twitter: @garyrubinstein
Patrick Honner, NYC DOE, Brooklyn, New York

229.1 5 Practices for Orchestrating Intentionally Equitable Mathematical Discourse

10–12 Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Archives

The *5 Practices for Orchestrating Productive Mathematics Discussions* is a powerful framework for teaching mathematics. Coupled with a coherent curriculum, it forms a strong foundation for learning. In this session we will discuss how to use the 5 Practices with intentional equity strategies to build a mathematics community to benefit all students.

Barbara Kuehl, Mathematics Vision Project | Open Up High School Mathematics

230 Building Confidence: The Power of Mediated Field Experience

Coaches/Leaders/Teacher Educators Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Monument

The Mediated Field Experience (MFE) model involves on-site content pedagogy courses in K–12 schools with embedded teaching experiences. Attendees will learn about the design of MFEs and how they decreased preservice teacher anxiety and increased efficacy in teaching mathematics.

Ryan Zonnefeld, Dordt University, Sioux Center, Iowa
Valorie Zonnefeld, Dordt University, Sioux Center, Iowa
Luralyn Helming, Dordt University, Sioux Center, Iowa

231 Leading Learners to Level Up: Empowering Students to Deepen Understanding of Mathematical Practices

Coaches/Leaders/Teacher Educators Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 202A

Empowered learners ask bold questions. What happens if we offer feedback and show growth over time? How might we make our thinking visible to empower our young learners to become self-correcting, self-reliant, and independent? How do we coach—what strategies do we use—to help learners to embrace the Standards for Mathematical Practice?

Jill Gough, Trinity School, Atlanta, Georgia
Twitter: Jill Gough

232 Building Mathematical Identity through Fractions

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, Ballroom C

This session will center on building a strong mathematical identity through implementation of the Eight Mathematics Teaching Practices. Participants will reflect on their mathematical identity and explore teaching strategies to foster positive identities where all students see themselves as capable, inspired mathematicians.

Mimi Granados, Fairfax County Public Schools, Virginia
Twitter: @MimiGranados3
Daniella Daddario, Fairfax County Public Schools, Virginia
Kelly Halpin, Fairfax County Public Schools, Virginia

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- Challenging and Advancing Policy and Structures in Mathematics Education
- Expanding the Narrative of Who Belongs
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- Presidents' Series
- New Teacher Strand
- Equity Strand
- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

233 Intersectionality and Math Achievement: Creating Good Ground (Community)

General Interest Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 145AB

We will explore how teachers can create a community that supports class achievement. We will share the Intersectionality and Math Achievement rubric, show how to use the rubric, and explain how preparing the classroom environment starts with you. Specific strategies are given, and the results of implementation of this work are shared.

Peter Eley, Alabama A&M University, Normal
Twitter: @drpetereley

234 Listen, Uncover, Reimagine, Move: Using the Equity Transformation Cycle to Tackle Root Causes

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 152A

The Equity Transformation Cycle is an iterative process grounded in radical inclusion, curiosity, creativity, and courage. Join others to engage in learning more about the cycle and how you can use the process to support solution-seeking aimed at tackling inequities that exist to create access and opportunity for high-quality mathematics for all.

Erin Sylves, Fairfax County Public Schools, Virginia
Tiffany Wilson, Fairfax County Public Schools, Alexandria, Virginia

235 Out of the Shallows: Four Principles for Diving Deeper into Culturally Responsive Math Practices

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 203AB

Leading with equity in today's multiracial mathematics classrooms takes passion, vision, and intention. Removing the barriers to equity requires in-depth knowledge and an immovable focus on culturally responsive practices. Embracing, empowering, educating, and including all students helps mathematics educators create opportunities for all learners.

Salandra Grice, Conscious Education Consulting, LLC., Katy, Texas
Twitter: @GriceSalandra

236 Reinventing Mathematics Intervention: Making Time for Understanding

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, Ballroom A

Recent focus on unfinished learning in mathematics has brought intervention into the spotlight. We know that our intense efforts with intervention are not leading to desired outcomes. In this session, six features for reimagining intervention will be shared. The features relate to content choices, content delivery, and professional development.

Juli Dixon, UCF, Indialantic, Florida
Twitter: @thestrokeofluck

236.1 AP® Calculus Panel Symposium

10–12 Exhibitor Workshop
Walter E. Washington Convention Center, 143C

A panel led by Stephanie Ogden from the College Board and Chief Reader Julie Clark that will discuss and answer questions about the 2023 exam reading as well as other important topics concerning AP® Calculus. A Q&A session will follow. Recommended for all AP® Calculus educators and administrators. This session is sponsored by BFW Publishers.

BFW Publishers, Hamilton, New Jersey

236.2 Solving the Fractions Problem – It's Finally Happening!

3–5 Exhibitor Workshop
Walter E. Washington Convention Center, 156

Fractions knowledge is powerfully linked to a student's future prospects in mathematics. Unfortunately, too few of our students ever develop the proficiency needed for long-term success. Join us for a discussion of the fractions problem, insights from recent research, and a breakthrough adaptive system that is making mastery a reality for students of all ability levels.

ExploreLearning, Charlottesville, Virginia

236.3 An All-Access Pass to Meaningful Math with Heather Sander, Savvas Learning Co.

General Interest Exhibitor Workshop
Walter E. Washington Convention Center, 158AB

Let's investigate open tasks that invite all students into the math. The book, 5 Practices for Orchestrating Productive Mathematics Discussions by Smith and Stein 2nd Edition* encourages all students to work at levels that are appropriately challenging for them, within the content in their grade. Discover how to make this happen with ease in your classroom and have some fun while we are at it.

Savvas Learning Company, Paramus, New Jersey

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- Presidents' Series
- New Teacher Strand
- Equity Strand
- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

237 Math Inquiry Lab: A Vehicle of Mathematical Enrichment and In-the-Moment Professional Development K–2

PreK–2 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 202B

We will share our innovative Math Inquiry Lab model/structure so that coaches, specialists, and teachers can implement it with success. The model allows for differentiated instruction to provide students of varying levels of proficiency with multiple entry points, hands-on experiences, tangible math tools to construct meaning, and PD for teachers.

Dina Carlucci, Farmingdale Public Schools, New York
Jennifer Olsen, Farmingdale School District , New York
Janice Puglisi, Farmingdale Public Schools, New York

238 Supporting Teachers to Integrate Computer Science into Mathematics Activities

PreK–2 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Independence Ballroom A-C

This presentation focuses on ways to support elementary school mathematics teachers to integrate computer science (CS) in their lesson planning such that CS practices can be leveraged to help all students to engage in mathematics. Examples of lesson plans and research-based rubrics will be shared.

Sarah Lilly, National Council of Teachers of Mathematics, Reston, Virginia

239 Time Is "an Amount of Numbers Together in Real Life and How Much It's in the End"—Nick, Age 4

PreK–2 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 149AB

Young children come to school with a rich bank of temporal and durational reasoning. But how exactly do they understand time? In this burst session, we will explore some different ways children think about time and duration, and we will discuss implications for classroom practices and instruction.

Amy Smith, Stetson University, DeLand, Florida

240 Ensuring Elementary Students' Success in Reading and Making Sense of Mathematics Story Problems

3–5 Burst
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 201

Many students have difficulties with math story problems and teachers often use teaching reading strategies to help them. A challenge in making sense of math story problems can be the vocabulary used in these stories. We offer specific teaching approaches that can help students develop strategies for reading and making sense of math story problems.

Aina Appova, The Ohio State University, Marion
Julia Hagge, The Ohio State University, Marion

241 I *Am* a Mathematician!: Expanding Seats at the Math Table

3–5 Burst
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 206

This session reframes narratives of who is a mathematician. *All* students and communities possess rich capital that can be leveraged in math teaching and learning. How do teachers look beyond classroom walls and use students' out-of-school experiences, families, and communities to anchor mathematics learning? Concrete examples will be shared.

Shonda Lemons-Smith, Georgia State University, Atlanta

242 Fostering Mathematical Discourse and Engagement through Data Visualizations

6–8 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 152B

The use of artistic, student-interest-driven data visualizations in the mathematics classroom is an emerging field. We will share suggested practices, challenges, sample activities, and resources for implementing a data visualization unit that combines math, data, and art with a focus on fostering meaningful discourse and engagement.

Lynn Hodge, University of Tennessee – Knoxville
Twitter: @LynnLHodge
Rita Swartzentruber, University of Tennessee – Knoxville
Amanda Galbraith, University of Tennessee – Knoxville
Joy Bertling, University of Tennessee – Knoxville
Tabitha Wandell, University of Tennessee – Knoxville

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New Teacher Strand
Equity Strand
NCTM Committee Session
New NCTM Publication Session
Exhibitors Workshop

243 Is a Tuna Melt Actually a Pizza? Fostering Debates and Justifications in the Math Classroom

6–8 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 209ABC

Is a tuna melt actually a pizza? Is a loaf of bread a sandwich? Is a book just a paper taco? This session will introduce participants to the "sandwich chat," a model for debate in the math classroom that teachers can use throughout the year while exploring mathematical concepts.

Justin Aion, Eye In Education, Greensburg, Pennsylvania
Twitter: @JustinAion
Shelby Strong, Lesley University, Worcester, Massachusetts

244 What Do You See? The Importance of Task Selection for Formative Assessment through Observation

6–8 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 204AB

One tool for formative assessment is observations; however, task selection for assessing understanding through observation is not often discussed. This presentation will feature example tasks that demonstrate how the choice of mathematical tasks can lend itself to a clearer initial assessment of where students are in their learning trajectory.

Elizabeth Barlow, Auburn University, Alabama

245 Circle of Functions: A Vertically Aligned Project for Every HS Math Course

8–10 Burst
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 150B

Circle of Functions is a culminating project in which students employ technology (Desmos) to develop a deep understanding of function families and their properties by linking functions from different families that share the same characteristics. Participants will learn how to tailor this project to use with students from algebra 1 through calculus.

Jennifer Bruce, Clayton-Bradley Academy, Maryville, Tennessee
Arielle Kennedy, Clayton-Bradley Academy, Maryville, Tennessee

246 Elevating Class Discussions: Promoting Student Engagement through Interactive Gallery Walks

8–10 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 207A

This burst examines an instructional strategy used to develop students' sense of discussion in a prealgebra course. This presentation includes the task, student work, students' written feedback, and the structure of the instructional strategy to develop students' ability to make connections across multiple representations in class discussions.

Brooke Krejci, University of Wisconsin River Falls
Twitter: @dr_brooke_krejci

248 Creating Women Mathematicians in the STEM Fields

Coaches/Leaders/Teacher Educators Burst
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 207B

This session is on how to create an enthusiasm for young women to identify themselves as mathematicians and STEM majors. Specific activities and ideas on how to nurture women in mathematics will be provided. Participants will be able to help female students in your school identify themselves as confident mathematicians.

Dianna Sopala, Saint Peters University, New Jersey
Twitter: @DiannaNJMathEdu

249 Understanding How to Implement GAISE II Recommendations into PK–12 Mathematics Classrooms

Coaches/Leaders/Teacher Educators Burst
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 151B

The focus of this session is to show how to implement the GAISE II (Guidelines for Assessment and Instruction in Statistics Education) report recommendations across grade levels in PK–12 mathematics classrooms. I will showcase the same topic/example across the three levels as described by GAISE II.

Angela Walmsley, Concordia University Wisconsin, Mequon

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- Exhibitors Workshop

250 Connect to the Real World with Research Experiences for STEM Educators and Teachers (RESET)

General Interest Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Mount Vernon

Research Experiences for STEM Educators and Teachers (RESET) is dedicated to improving STEM education across the nation by focusing on middle and high school educators. This presentation aims to share the AEOP RESET program with math educators who want to experience real-world research and learn about how to translate that into effective curriculum.

Jennifer Meadows, TN Tech University, Cookeville, Tennessee
Leslie Suters, TN Technological University, Knoxville, Tennessee

251 Mathematicians Look Like Me: Humanizing the Story of Who Does Mathematics

General Interest Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 102AB

When we search "famous mathematician," we are greeted by a long row of White male faces. It is important that *all* of our students see themselves reflected in the work of mathematics. In this workshop, we will examine our own preconceptions of who does the work of math and discuss easy to implement strategies to challenge those preconceptions.

Ella Hereth, Indianapolis Public Schools
Twitter: Ella Hereth

252 NCTM's Resources for the Secondary Classroom

General Interest Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 143AB

As busy teachers, it can be hard to find the best resources for your classroom. NCTM offers members a wealth of high-quality resources from online interactives and instructional plans to a new library of Notice and Wonder lessons. Come learn about NCTM's online Classroom Resources collections for the secondary classroom.

Mary Velez, Wappingers Central School District, New York

253 Navigating Math Anxiety to Guide Students Back On-Task

General Interest Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Judiciary

Join us for a presentation focused on providing you with tools to identify mathematics-related anxiety in our learners and how to leverage instructional strategies to help students become more confident in their mathematics abilities. The presenters will focus on alleviating and redirecting math anxiety on instructional tasks and assessments.

Julia Keith, Orange County Public Schools, Orlando, Florida
Twitter: Julia Keith
Kelly Penny, Orange County Public Schools, Orlando, Florida

254 Reimagining Grading in Math Classrooms

General Interest Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Liberty Ballroom I-K

Grading has often been a controversial topic. This session will focus on the curriculum, instruction, and assessment that supports more equitable grading practices focused on learning instead of grading. I will highlight practices that allow students to take ownership of their learning and structures for teachers to implement easily.

Natalie Farrell, Charlottesville City Schools, Virginia

254.1 Creating Conceptual Change One Problem at a Time

Higher Education Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Capitol Congress

How can I help my students think deeply about math with procedurally focused curriculum? In this session, we describe how we used the framework of reversibility, flexibility, and generalization questions with cognitively demanding tasks to prepare preservice teachers to transform procedurally focused problems into open and deep math tasks. This process can be applied to many curriculum materials and shared with math teacher communities to create change of more focus on conceptual understanding.

Bill W. DeLeeuw, Brigham Young University – Idaho, Rexburg
Brady Ward, Brigham Young University – Idaho, Rexburg

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- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

255 Supporting Culturally Responsive Pedagogy with IM K–5 Math™

PreK–2 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 147B

Districts across the country are addressing inequities in math education by implementing culturally responsive pedagogy. Providing students with opportunities to see themselves during instruction is essential to creating positive math identities. In this session, key design features of IM K–5 Math™ that support this effort will be highlighted.

LaToya Byrd, Illustrative Mathematics, Conyers, Georgia
Twitter: @byrdteaching

256 Three Reads + Five Practices = Awesome Mathematical Discourse

PreK–2 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Liberty Ballroom N-P

A language-rich mathematical environment is essential for our English language learners. Yet orchestrating effective discourse in a K–2 classroom can be a challenge. Learn how to incorporate the Three-Read Protocol and the Five Practices, two research-informed instructional routines, into an intellectually invigorating math environment for *all*.

Erika Davalos-Lemus, Merced County Office of Education, California
Duane Habecker, Merced County Office of Education, California

257 Broadening the Purposes of Learning and Knowing Math through Relevant Mathematical Investigations

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Treasury

The Catalyzing Change series argues to broaden the purpose of learning math to include understanding and critiquing the world. This session will introduce teachers to an approach to conducting mathematical investigations into relevant topics in students' lives. This session uses math to investigate the cereal aisle at the grocery store.

Megan Myles, Argument-Driven Inquiry, Austin, Texas
Victor Sampson, The University of Texas at Austin

258 How to Launch a Collaborative Mathematics Classroom: Fostering Meaningful Interactions Every Day

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 154AB

Collaborative mathematics promotes deep understanding and student voice. But how do you get students to work and learn together? Join us as we draw on a framework from our new book to create a plan for fostering collaboration in your K–5 classroom that considers how students will interact with their environment, one another, and mathematics.

Jen Munson, Northwestern University, Evanston, Illinois
Jennifer Osuna, Stanford University, California
Faith Kwon, Oakland, California
Mary Trinkle, Oakland, California

259 Using Rich Tasks to Promote Greater Student Engagement

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 140AB

Effective instruction requires materials that provide entry points and allow students to go deep with mathematics. We'll consider how these aspects can be embodied in a single mathematical task. Attendees will collaborate to solve problems that promote problem solving and engage all students.

Patrick Vennebush, The Math Learning Center, Portland, Oregon
Twitter: @pvennebush

260 Caution: Accelerated Curriculum Ahead!

6–8 Session
SESSION CONTENT LEVEL: In-Depth
Marriott, Marquis Ballroom Salon 12&13

Learn the Why, the What, and the How of creating and evaluating accelerated curriculum. Discern the difference between compacted and accelerated programs so you can create or select the best program to prepare your students for college and careers.

Connie Laughlin, Great Minds, Muskego, Wisconsin
Twitter: Connie Laughlin

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- Expanding the Narrative of Who Belongs
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- Presidents' Series
- New Teacher Strand
- Equity Strand
- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

261 Problem Pairs in Middle School

6–8 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Union Station

Planning for instruction in middle grades mathematics involves building bridges to grade-level learning and cultivating engagement. Creating strategic pairs of problems that highlight similarities and differences and connect mathematical ideas is a powerful strategy. At this session, you will examine problem pairs and practice creating your own!

Peter Coe, Coe Learning, LLC, New York, New York
Twitter: @pcoemath

262 Activate! Strategies to Spark Mathematical Learning through Projects

8–10 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 151A

Looking for project-based learning that engages *and* teaches core math? Project-based learning that is the math class main course, not the dessert? Learn strategies for activating standards-based math learning while engaging students in meaningful projects. This session draws on projects developed for algebra 1, but the shared strategies apply broadly.

Lei-Anna Bertelsen, XQ Institute, Oakland, California

263 Beyond Spreadsheets: Getting the Most from Data Science Tools

8–10 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 101

Do you want your students to use more data in the classroom but are fed up with hacking a path through the spreadsheet jungle? Packed with examples of classroom-proven technology, tips, and easy-to-use software tools, this show-and-tell session will give you a roadmap to the best data analysis software available for math education today.

Zarek Drozda, Data Science 4 Everyone, Chicago, Illinois
Twitter: @ZarekDrozda
Hollylynne Lee, North Carolina State University, College of Education, Durham
Jessica Lyons, Tableau, A Salesforce Company, Montgomery, Illinois
Steve Kraynak, Microsoft, Redmond, Washington

264 Quod Erat Demonstrandum!

8–10 Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Independence Ballroom F-H

Writing a proof increases the understanding of a mathematical statement, develops and communicates mathematical knowledge, expands and sharpens thinking skills, and more. In this session, we will explore the most beautiful proofs in high school geometry. Proving can be more instructive that a statement itself and will make students clear thinkers!

Ana Gonzalez Enriquez, School District of Osceola County, Kissimmee, Florida

265 What Made You Say That? Promoting Mathematical Literacy with Annotation and Recitation

8–10 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Monument

Wonder why students can't make sense of math problems? We will discuss specific strategies that our students use to work with texts and explain their thinking verbally. These annotation and recitation techniques help students decode language, build confidence, and strengthen their mathematical identities.

Bobson Wong, Bayside HS (NYC Public Schools), New York
Twitter: @bobsonwong
Larisa Bukalov, Bayside HS (NYC Public Schools), New York

266 Coding Calculus: How Students Derive and Integrate with Coding

10–12 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Independence Ballroom D

Learn how students coded in high school calculus using Google Apps for Education. For this project, students created a program/code that computed the derivative and integral of a polynomial function using Google Sheets and Google Apps Script with the push of a button. Learn how to implement this project and experience the process as a student.

Emily McDonald, Red Bank High School, Chattanooga, Tennessee
Twitter: @EMcDonaldEDU

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- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

267 Creating, Critiquing, and Using Guided-Discovery Lessons

10–12 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 150A

Guided-discovery lessons allow students to "fend for themselves" mathematically by teaching themselves a new concept via a carefully executed written lesson. This increases student confidence in approaching word problems and reading textbooks and online materials when they need help. This makes them more independent and more mathematically adept.

Robert Gerver, State University of NY, Kings Park, New York
Richard Sgroi, Fox Lane HS, Retired, Bedford, New York

268 Math Therapy: A Crash Course in Becoming a Math Therapist

Coaches/Leaders/Teacher Educators Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 146B

Did you know that pretty much anyone who thinks they're "not a math person" has math trauma they haven't worked through yet? This session will empower you to help your students build a better relationship with math while also encouraging them to dream big. Why? Because anything is possible—even math! This workshop is packed with strategies, takeaways, and a 5-step toolkit you can immediately implement in any educational setting. Add "Math Therapy" to your list of teachable and change the lives of your students far beyond the classroom!

Vanessa Vakharia, The Math Guru, Toronto, ONorthwest Territories
Twitter: themathguru

269 President Series: Benjamin Banneker Association Student Affiliate Groups: Strengthening the STEM Pipeline

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Archives

This session will focus on how BBA Student Groups provide opportunities to engage diverse students in the STEM pipeline. Students who participate in informal math experiences can have opportunities to build positive math identities through learning about the contributions of diverse mathematicians. Participants will learn about resources to help students engage in collaborative mathematics activities that foster creativity, critical thinking, and can serve as a gateway into the STEM pipeline.

Shelly Jones, Central Connecticut State University, New Britain
Twitter: @ShellyMJones1

270 Co-Taught Math Instruction: So Much More Than Just Two Teachers!

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, Ballroom B

Effective co-teaching in mathematics is about so much more than having two adults in the classroom. This session will discuss the roles of each teacher and how they work together to deliver specially-designed instruction (SDI) for the benefit of all students. We will also share our journey to implement research-based strategies to support co-teaching.

Johnathan Taylor, Community High School District 128, Libertyville, Illinois
Twitter: @tayloredu1
Steven Korney, Vernon Hills, Illinois

Visit the NCTM Exhibits in Hall D
PreK–2

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- Expanding the Narrative of Who Belongs
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- Equity Strand
- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

271 Disrupting Myths about the Mathematical Potential of Students with Disabilities

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, Ballroom C

How can we provide access and opportunity in math for students with disabilities? Deficit thinking about students can result in less rigorous learning opportunities. As educators and researchers whose work bridges mathematics and special education, we will explore how the term "evidence-based" can be misapplied and result in deficit myths about the mathematical potential of students with disabilities. We will explore these myths and offer asset-based framings that trust in student thinking.

Rachel Lambert, University of California Santa Barbara, Isla Vista
Twitter: @mathematize4all
Erica Mason, University of Illinois Urbana-Champaign

272 M. C. Escher's Tessellations: 101 Years

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 145AB

In 1922 the Dutch artist M. C. Escher completed his first true tiling pattern. Even though he lacked a background in mathematics, throughout his career he was fascinated by the ways in which a planar surface could be regularly divided. More than a hundred years later, his works of genius remarkably unite both the subjects of algebra and geometry.

David Masunaga, Iolani School, Honolulu, Hawaii

273 President Series: What Is Your Question? Brave and Bold Educators Create Positive Change

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 202A

Are you working on increasing focus on grade-content, working to disrupt unproductive mindsets and practices that inhibit learning, and/or striving to achieve more equitable instructional practices? Brave and bold educators ask good questions that help to create momentum and move work forward. Come to this session to consider how the seemingly simple act of asking thoughtful and intentional questions of yourself, your colleagues, and varied stakeholders drives meaningful change for students.

Katherine Arrington, NCSM: Leadership in Mathematics Education and UTeach Institute, University of Texas at Austin
Twitter: @ArringtonKatey

274 Why Teach Mathematics?

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Shaw/LeDroit Park

Students often ask, "Why do I have to learn this?" We should ask, "Why do I teach this?" Our answer has strong implications for who should be doing math and for how we should be teaching it. We will explore reasons for teaching math and implications for how we organize and engage students in learning mathematics today.

Matt Larson, Past President, National Council of Teachers of Mathematics, Reston, Virginia; Lincoln, Nebraska
Twitter: @mlarson_math

274.1 Creating Richer Math Conversations with Marian Small

General Interest Exhibitor Workshop
Walter E. Washington Convention Center, 143C

We know students learn through more conversation. Conversations build mathematical reasoning skills, so that students don't simply know just how to do math, but also how to communicate mathematically with their teachers and peers. But how do you facilitate good conversations? In this workshop, we will discuss replicable strategies to help facilitate meaningful math conversations in your classroom as soon as your next class period.

Savvas Learning Company, Paramus, New Jersey

274.2 NGPF Math on a Mission: Finance Knowledge for All

10–12 Exhibitor Workshop
Walter E. Washington Convention Center, 159AB

By embedding finance into math class, you'll not only be making math relevant – you'll also be teaching your students lifelong financial skills. Today you'll learn where to find these gems on the free NGPF math website: an activity around exponential functions and car depreciation and a problem set where students graph systems of equations for savings goals. We've got Desmos Classroom activities, too! You'll be equipped to make math more meaningful the next time you step into class.

Next Gen Personal Finance, Palo Alto, California

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- Equity Strand
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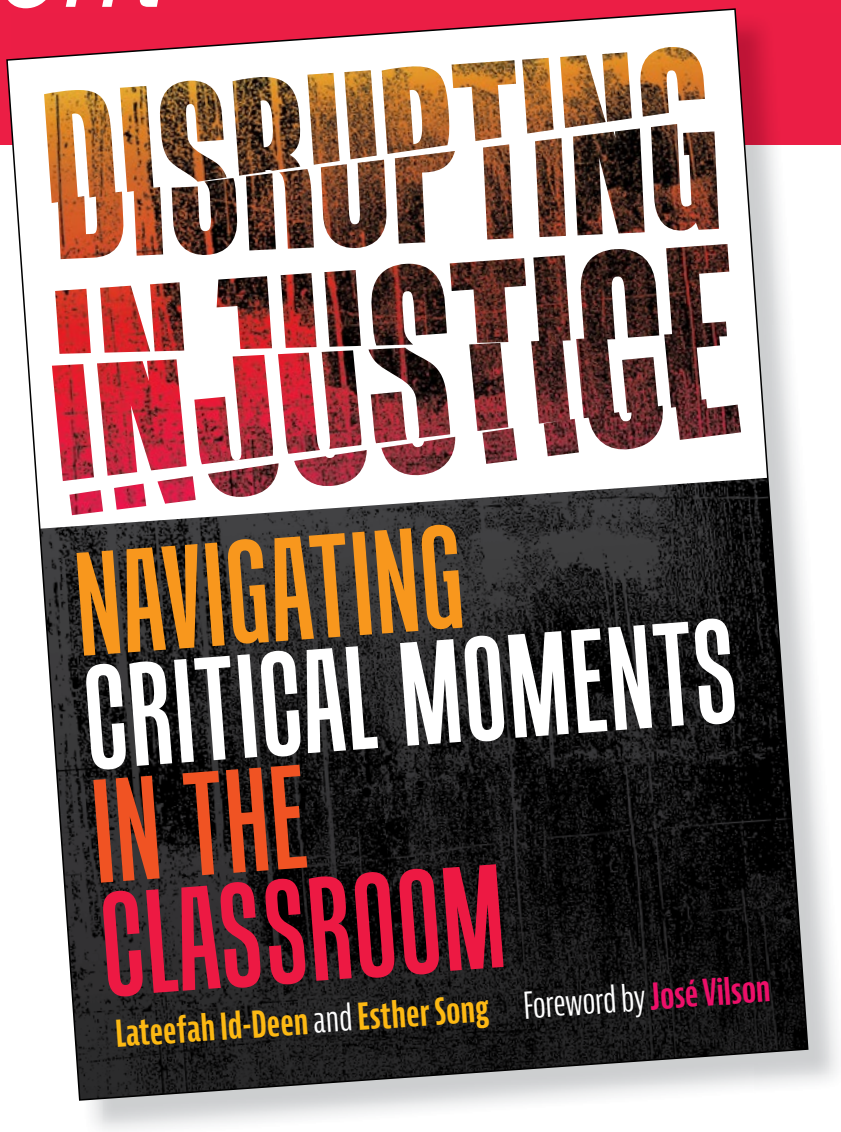
Navigate Critical Moments in the Classroom



Responding to and disrupting injustice isn't always as simple as right or wrong, and one-stop-shop solutions are hardly adequate to respond to the complex challenges today. Disrupting Injustice offers a framework to identify and respond to injustices both inside and outside of the classroom. We invite teachers to practice the skills of identifying injustice, reflecting on the social, political, and cultural influences that have shaped our own perspe*ctive, and re*sponding with empathy.

Disrupting Injustice: Navigating Critical Moments in the Classroom

By Lateefah Id-Deen and Esther Song

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Attend session 222
"Disrupting Injustice: Navigating Critical Moments in the Classroom,"
Thursday at 4:00 PM | Marriott: Independence Ballroom D

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275 Developing and Assessing Young Learners' Mathematical Sense Making with Number Racks

PreK–2 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 149AB

The Number Rack (aka Rekenrek) is an effective tool for developing young learners' ability to see and understand number relationships. In this session, we will make Number Racks, explore powerful PK–2 activities, and investigate a comprehensive assessment tool that supports systematic observation of students' development to guide instruction.

Shelly Scheafer, Math Learning Center, Bend, Oregon
Twitter: Shelly
Kimberly Markworth, The Math Learning Center, Bellingham, Washington

276 Using Screen-Free Coding Robots as a Learning Tool to Teach Early Childhood Mathematics

PreK–2 Workshop
SESSION CONTENT LEVEL: Intermediate
Marriott, Independence Ballroom A-C

This workshop session gives attendees a hands-on experience using a screen-free coding robot (Botley 2.0 by Learning Resources) to teach early childhood mathematics. The lessons demonstrated in this workshop session have been implemented and iteratively refined for over two years at Utah State University's Edith Bowen Laboratory School.

Joseph Kozlowski, Edith Bowen Laboratory School; Utah State University, Logan
Lauren Nix, Center for Creativity, Innovation, and Discover, Logan, Utah

277 Equity-Based Mathematics Teaching Practices Embedded in Different Components of a Math Classroom.

3–5 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 151B

Participants will learn about three categories of equity-based mathematics teaching practices: reflecting, noticing, and engaging in community. Participants will see how the practices are embedded in each part of the math block, which includes a sense-making routine, focus lesson, stations, and reflection.

Stephanie Sigmon, Fairfax County Public Schools, Alexandria, Virginia
Daniella Daddario, Fairfax County Public Schools, Falls Church, Virginia

278 Hearing Every Student Voice: Facilitating a Mathematical Community That Lets Your Kids Talk!

3–5 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 147A

Ensure that all student voices are heard by nurturing their ideas, questions, and arguments as budding mathematicians using talk moves. See how rich tasks foster *all* students' mathematical agency, belonging, and joy. Learn how to engage students in mathematical discourse during your first 20 days of math class! It starts with you!

Barbara Blanke, Cal Poly, San Luis Obispo, California
Twitter: @bblankephd

279 Ready, Set, Experience My Culture: Using Virtual Reality to Bridge the Gap between Math and Community

3–5 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Mount Vernon

In this session, participants will use virtual reality as a tool for building background knowledge for novel ideas, providing concrete visual and tactile learning opportunities for abstract tasks, and promoting diverse cultures through the use of virtual environments. Bring a device, and be prompt for the full experience.

Iesha Smith, East Baton Rouge Parish School System, Louisiana
Twitter: @ieshajsmith
George Cage, Ph.D., East Baton Rouge Parish School System, Louisiana

280 Using Students' Culture to Build an Engaging Classroom Mathematics Community

3–5 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Judiciary

Participants will learn about students' cultural backgrounds, how to incorporate them into lessons, and strategies that can be used in the classroom. These experiences are designed to help students become at least biculturally competent and use this understanding as a catalyst for uniting us as a community.

Tywana Fulford, Open Up Resources, Sugar Hill, Georgia
Twitter: @TNFulford
Tonya Clarke, Clayton County Public Schools, Atlanta, Georgia

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- Equity Strand
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- Exhibitors Workshop

281 Using Visualization to Unlock Fraction Sense

3–5 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 209ABC

Participants will learn how using visualization can transform students' conceptual understanding of fractions. Learn ways to guide students to visualize fractions as more than just their notations and how to use these visualizations to overcome common fraction misconceptions in areas such as reasoning, number lines, equivalencies, and comparing.

Jessica Scandurra, Stratford Public Schools, Connecticut
Twitter: @jess_scandurra
Robyn Tedesco, Trumbull Public Schools, Monroe, Connecticut

282 Catalyzing Change in Middle School by Broadening the Purposes of Learning Mathematics

6–8 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 102AB

Join us for a closer look at the first key recommendation of *Catalyzing Change in Middle School Mathematics: Initiating Critical Conversations*: Broaden the Purposes of Learning Mathematics. We will explore tasks emphasizing the recommendation of broadening the purposes for learning mathematics as well as discuss beginning action steps for building them into your mathematics program!

Christa Jackson, Saint Louis University, Missouri
George Roy, University of South Carolina, Chapin
Sarah Bush, Orlando, Florida

283 Five Equity-Based Practices: Teaching Lessons That Value Student Identity and Go Deep with the Mathematics

6–8 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 206

Participants will share in engaging activities that value student identities through equitable teaching practices while focusing on important mathematical ideas. Through intentional student-centered approaches, together we will facilitate explore content, methods, technology, equity, and assessment considerations in authentic, relevant contexts.

Farshid Safi, University of Central Florida, Orlando
Twitter: @FarshidSafi
Jennifer Wolfe, University of Arizona, Tucson
Maral Karimi, School of Teacher Education, CCIE, Orlando, Florida
Jackie Karastamatis, University of Central Florida, Orlando

284 Hands-On Math! Leveraging Multiple Representations to Unlock Collaborative Problem Solving

6–8 Workshop
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, 152B

Are you looking for more ways to bring collaborative-problem solving to your classroom? We'll explore three lesson structures—Scale Modeling, Story Problems, and Equation Proof—that can help you turn any standard into a problem-based lesson. These models leverage Multiple Representations Theory to cultivate conceptual understanding.

Jeff Lisciandrello, Room to Discover, Charlottesville, Virginia
Twitter: @edtechjeff

285 Scaffolds vs. Modifications: Differentiating Curriculum to Meet the Needs of Each and Every Student

6–8 Workshop
SESSION CONTENT LEVEL: Intermediate
Marriott, Liberty Ballroom I-K

This workshop explores decision-making around implementing core curriculum. Come join us to think about how to adapt your math curriculum to meet the needs of each and every student while maintaining the integrity and coherence of the curriculum resource. Additionally we will share research-based ways to differentiate with high-quality curriculum.

Emily Bryant Hare, Guilford County Schools, Asheboro, North Carolina
Twitter: Emily B Hare
Kathleen Stevens, Pivot Learning, Hurdle Mills, North Carolina

286 Cultivating Curious Math Classrooms

8–10 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 204AB

What predicts success better than IQ? Is curiosity learned? How does curiosity promote equitable instruction? What do curious math classrooms look and feel like? How can we increase curiosity with boring content? This active session explores these questions with practical ways to cultivate curiosity!

Traci Jackson, Poway Unified School District, San Diego, California
Twitter: @traciteacher

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- New Teacher Strand
- Equity Strand
- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

287 Deepening All Students' Understanding with Algebra Experiments

8–10 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 201

Are you looking for ways to deepen your algebra students' understanding of linear, quadratic, and exponential functions? Come to this workshop and engage in experiments that simulate real-world situations. You will collect data, model data using multiple representations, and analyze results. Questions that promote student discourse will be shared.

Amy Herman, Math Solutions, Louisville, Kentucky
Connie Horgan, Independent, Sun City West, Arizona

288 Fostering Empathy: Becoming a Teacher of Mathematical Modeling in Grades 6–12

8–10 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Chinatown

Mathematical modeling involves taking an authentic situation, translating it into the mathematical world to pursue a solution, and interpreting the results in context. Empathy is a practice that can be cultivated in students' mathematical modeling. Come to explore the critical role empathy plays in how students solve authentic problems.

Elizabeth Arnold, Colorado State University, Fort Collins
Elizabeth Burroughs, Montana State University, Bozeman

289 Pillars and Practices: Ungrading to Catalyze Change at the Margins

8–10 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 146C

As educators, we seek innovative ways to engage students, close gaps between student groups, and motivate all students to demonstrate their brilliance. Come learn how a major overhaul of my grading practices led students to stop chasing points and embrace authentic learning with a focus on mathematical identity and agency.

Nolan Fossum, Mount Miguel High School, Spring Valley, California
Twitter: @NolanFossum

290 Using Fermi Problems as Gateway Tasks to Encourage Math Modeling: Implementation and Assessment

8–10 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Supreme Court

Come explore Fermi problems as a way to incorporate meaningful mathematical modeling experiences with limited classroom time and for students and teachers with little to extensive experience in modeling. We welcome novice to experienced modelers to engage with problems and rubrics, and we share student work and classroom-ready ideas.

Rose Mary Zbiek, Pennsylvania State University, Port Matilda
Twitter: @RZbiek
Amber (Amy) Brass, Bellefonte, Pennsylvania
Alex Greenwood, Bend Tech Academy @ Marshall High School, Oregon
Adewale Adeolu, Clarkson University, Potsdam, New York
Benjamin Galluzzo, Clarkson University, Potsdam, New York

291 Discourse, Productive Struggle, and Equity: The Five Practices in Practice in Secondary Math

10–12 Workshop
SESSION CONTENT LEVEL: Intermediate
Marriott, Capitol Congress

Promoting discourse and productive struggle in secondary math provides equitable access for all learners. This sessions uses the Five Practices model for orchestrating productive mathematics discussions—anticipating, monitoring, selecting, sequencing, and connecting—to transform planning, teaching, and assessment for more equitable outcomes.

Mike Steele, National Science Foundation, Alexandria, Indiana
Twitter: @mdsteele47

292 How to Design Mathematics Lessons That Inspire Curiosity

10–12 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 202B

Participants will learn about a lesson design approach that interprets the unfolding mathematical ideas as stories and has enabled HS mathematics teachers to teach lessons students describe as "intriguing" and "thought-provoking." Participants will experience one mathematical story and will analyze how it works to support student curiosity.

Leslie Dietiker, Boston University, Winchester, Massachusetts
Twitter: lesliedietiker

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Presidents' Series
New Teacher Strand
Equity Strand
NCTM Committee Session
New NCTM Publication Session
Exhibitors Workshop

293 Trigonometry from the Ground Up

10–12 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 207A

Learn how to use the right tasks and questions to build deep, conceptual understanding of trigonometric relationships from geometry through precalculus. We'll explore how small shifts in the way we teach trig can have huge effects on student understanding and illuminate the marvel of trigonometric ratios. There's more to trig than SOHCAHTOA!

Sarah Stecher, Math Medic, Grand Rapids, Michigan
Lindsey Gallas, Math Medic, Grand Rapids, Michigan
Luke Wilcox, East Kentwood High School, Grand Rapids, Michigan

294 Building Teacher Capacity for Equitable and Inclusive Mathematics Instruction

Coaches/Leaders/Teacher Educators Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 144ABC

Teachers often lack time and opportunity to build capacity for high-level mathematics teaching and plan for students in Tiers 2 and 3. We developed a four-day course to deepen teachers' mathematical content and pedagogical knowledge. This session will share our journey and reflections on shifts in teacher dispositions and instructional efficacy.

Rebecca Evans, Lincoln Public Schools, Nebraska
Karla Bandemer, Lincoln Public Schools, Nebraska
Delise Andrews, Lincoln Public Schools, Nebraska

295 Generative Assessment Practices: Working toward Equity Using the Details of Student Thinking

Coaches/Leaders/Teacher Educators Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 150B

We must transform assessment practices to honor our students and what they *do* know, understand, and are capable of accomplishing. Join us as we explore how shifting the focus to noticing the details of students' mathematical thinking creates generative spaces for educators to intentionally work toward justice, equity, and liberatory practices.

Janene Ward, UCLA SE&IS, Los Angeles, California
Twitter: @75Janene
Maria DiMeglio, UCLA, Los Angeles, California

296 Proactive Mathematics Coaching: Bridging Content, Context, and Practice

Coaches/Leaders/Teacher Educators Workshop
SESSION CONTENT LEVEL: In-Depth
Marriott, Independence Ballroom E

This session launches NCTM's recent book, *Proactive Mathematics Coaching: Bridging Content, Context, and Practice*, that supports mathematics specialists and teacher leaders in advocating for equitable mathematics instruction that advances learning opportunities for all students. We also share the Proactive Coaching Framework–PCF–a structure that guides coaches' goal setting in ways that advocate research-informed practices and facilitates critical conversations about initiating, assessing, and sustaining change within schools.

Courtney Baker, George Mason University, Fairfax, Virginia
Twitter: @PiBaker18
Melinda Knapp, Oregon State University–Cascades, Bend

296.1 Accessing Teacher Leadership through an Equity and Identity Lens

Coaches/Leaders/Teacher Educators Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 143AB

Teacher leadership through a lens of equity and identity is key to building a professional network, whether it is accompanied by a formal title or not. Teachers with any level of experience can utilize leverage points within their context to practice teacher leadership and share their knowledge.

Allie Webb, Columbus City Schools, Ohio
Twitter: @MsWebb16
Dwaina Sookhoo, NYC Lab High School for Collaborative Studies, New York, New York
Sarah DiMaria, Cedars

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- New Teacher Strand
- Equity Strand
- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

Friday Morning Practice Sessions

8:00 AM–10:00 AM

297 The Teacher's Superpower: How to Build Your Pedagogical Content Knowledge (PCK) and Put It to Work

6–8 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 207B

Effective math teaching requires more than just math knowledge. It requires an understanding of the common paths students take in learning math, including likely detours and bridges. It also requires techniques for responding to those different paths. The presenter and the audience will engage in exercises for developing this PCK-pushups for your teacher brain and methods for responding to student thinking, all of which you can take back to your departments and PLCs. We'll do this together.

Dan Meyer, Desmos Classroom @ Amplify, Oakland, California
Twitter: @ddmeyer

298 Invigorating High School Mathematics: Practical Guidance for Long Overdue Transformation

10–12 Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Liberty Ballroom L

It seems as if nearly everyone agrees that high school mathematics needs to change. For far too long, math has not worked for far too many students. Math has not changed substantially in my lifetime, nor has it changed substantially for most students, teachers, and schools. It is clearly an issue, and it is time to discuss and make serious changes.

Eric Milou, Rowan University, Glassboro, New Jersey
Twitter: @drMi

Friday Morning Sessions

9:30 AM–10:30 AM

299 NCTM Business Meeting

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 203AB

Join NCTM leadership for an overview of recent activities and strategic priorities for the coming year.

Kevin Dykema, President, National Council of Teachers of Mathematics, Reston, Virginia; Mattawan Middle School, Michigan

300 But the Data Doesn't Show That! How to Encourage Data Literacy in the Early Grades

PreK–2 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 147B

We will explore the role of data-literacy lessons in preparing students to navigate an information-heavy world. Using data relevant to students' experiences and example student tasks, we will engage in discussion about how to create rich lessons that deepen student understanding of data while guiding them to be critical consumers of information.

Gina Picha, Amplify, Brooklyn, New York
Twitter: @ginapicha

301 No More Tears: Developmentally Appropriate Assessment

PreK–2 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 101

We know that young children learn best through experiences that are personally meaningful, direct, and interactive. What does that mean for assessment? This session explores tools and practices for developmentally appropriate assessment in early childhood classrooms.

Lacy Endo-Peery, Great Minds, Washington, DC, District of Columbia
Melanie Gutierrez, Great Minds – Eureka Math, Washington, District of Columbia

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- Expanding the Narrative of Who Belongs
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- Equity Strand
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- New NCTM Publication Session
- Exhibitors Workshop

302 Same but Different Math: A Language-Based Routine to Promote Equity in the Classroom

PreK–2 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Liberty Ballroom N-P

Same but Different Math is a powerful routine for use in a math classroom. This routine can immediately be added into an educator's toolbox for developing conceptual understanding of important mathematical ideas. This session will provide teachers with all the information they need to confidently use this routine with their students.

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

303 Healing-Centered Engagement in Mathematics

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Archives

We can build our anti-racist math practices by centering student learning within a context of healing-centered engagement. In this session, we will unpack the work of Dr. Shawn Ginwright and consider it within math classrooms K–12. We will move beyond trauma-informed practices to recognize young people as agents of change in their own well being.

Rachel Benoff, NYC Dept. of Education, New York, New York
Neha Sobti, New York City Department of Education

304 Math Coaches' Experiences Building a Thinking Classroom Lab in an Elementary School

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 152A

Learn how schools put research into action to create math labs focused on promoting thinking using the book *Building Thinking Classrooms in Mathematics*. The work was anchored by selecting tasks, forming groups, and determining where and how students work. The experiences in the lab carried into choices teachers made in their classrooms to promote thinking.

Robyn Tedesco, Trumbull Public Schools, Connecticut
Jessica Scandurra, Stratford Public Schools, Connecticut

305 Mudpies for Everybody! Explorations of Love, Joy, and Agency in Mathematics

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 146B

When we foster belonging, intention, and agency in mathematics classrooms, children and the people who teach them experience joy and thriving in mathematics. Centering mathematics doing on the experiences of the people we care about requires us to tackle some of our most rigid assumptions about the nature of mathematics. And yet traditional and modern notions of classroom mathematics must be confronted and reimagined if we are to maximize the joy that humans experience with mathematics. Humanizing joy in mathematics is a celebration of people—the beauty of communities, families, and culture with at least as much passion as we celebrate content. Centering the beauty of people as mathematics doing is an absolute necessary precondition for a positive impact on the human experience.

Lou Matthews, Urban Teachers, Baltimore, Maryland
Twitter: @loumatthewslive

306 Is It Magic? Successful Black Teachers Building Mathematics Expertise in Their Black Girls

6–8 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 151A

Traditional mathematics logics lead to inequities that position Black girls at the bottom of both racialized and gendered hierarchies. As such, we will highlight strong instructional practices from Black teachers that disrupt these logics and support their Black girl students to build collectivity, autonomy. and mathematics expertise.

Brittany Marshall, Rutgers University – Graduate of Education, New Brunswick, New Jersey
Twitter: @lesliebm81302
Dan Battey, Rutgers University, New Brunswick, New Jersey

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- Expanding the Narrative of Who Belongs
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309 Building Equitable Mathematics Learning Opportunities through Tasks and Talk

8–10 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Independence Ballroom F-H

The tasks and talk in our math classrooms frame students' learning experiences and form their conceptions about what mathematics is and what it means to do mathematics. In this session, we will explore how different types of tasks and talk moves can provide more enriching, more accessible, and more equitable learning experiences for students.

Melissa Boston, Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; Duquesne University, Pittsburgh, Pennsylvania
Amber Candela, Saint Louis, Missouri

310 Building Thinking Classrooms in Mathematics Support/Intervention Settings

8–10 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 150A

Participants will engage in conceptual, middle-level mathematics tasks and practices meant for mathematics support courses that focus on collaborative problem solving, discourse, and fostering mathematical dispositions and communities. Participants will also examine research on one such curriculum and will have ample opportunity for questions.

Lisa Amick, University of Kentucky, Lexington

Visit the NCTM Exhibits in Hall D
Higher Ed

311 Creating a Seat at the Table: Using Teacher Identity and Beliefs to Transform Student Learning

10–12 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 154AB

Unpacking teacher identity and beliefs about mathematics gives you the tools to advocate for spaces you never imagined. Advocating for my students led to a transformational 100 percent female AP Calculus course. Join me as I share this experience, its impacts, strategies and tools to cultivate inclusivity, and where these female mathematicians are today.

Sarah DiMaria, Cedars International Next Generation High School, Austin, Texas
Twitter: @MsDiMaria

313 Designing Teaching through Problem-Solving Lessons by Drawing a Map to Facilitate Discussion

Coaches/Leaders/Teacher Educators Session
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, 202A

The heart of teaching through problem-solving (TTP) lessons is creating a rich discussion with students' approaches. To do so, setting goals and anticipating student responses is the first step. Then, develop a few different paths to facilitate discussion. This session guides you to create a map to lead the discussion using anticipated responses.

Akihiko Takahashi, Akihiko Takahashi, Chicago, Illinois
Twitter: @AkihikoTa

314 Designing Lessons That Actually Support Students with Learning Disabilities and Those Other Kids

General Interest Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 145AB

This session will engage participants in considering how to use mathematics-specific strategies within the framework of Universal Design for Learning (UDL) to support each and every student, particularly those who have learning disabilities or struggle with mathematics.

Joshua Males, Lincoln Public Schools, Nebraska
Twitter: @josh_males
Lorraine Males, Univeristy of Nebraska – Lincoln

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315 Elevating Engagement and Thinking for All Students through the Four Levels of Inquiry in Mathematics

General Interest Session
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, Ballroom B

Teachers want their students fully engaged and thinking during math class. In this session, you will experience four levels of inquiry and discover how subtle shifts in instructional practices and task design promote active engagement and greatly enhance learning for students. You will then learn how to apply these ideas in your classroom.

Mike Flynn, Flynn Education Inc., Florence, Massachusetts
Twitter: @MikeFlynn55

316 Increasing Student Responsibility in a Thinking Classroom

General Interest Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, Ballroom A

In this session I will look at the four practices from the book *Building Thinking Classrooms (Grades K–12): 14 Teaching Practices for Enhancing Learning* that help students take responsibility for their own learning as well as help them to move collective knowing and doing into individual knowing and doing.

Peter Liljedahl, Simon Fraser University, Burnaby, British Columbia
Twitter: @pgliljedahl

317 President Series: Opening Doors through Mathematics: Building Pathways to the Future

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, Ballroom C

Over the past few decades, we have learned how to better engage students in learning mathematics. During this journey, we have learned more about what mathematics is key in helping students reach their career goals. How well are we preparing them for the future? Come join a discussion about mathematics pathways and preparing students for the future.

Laura Watkins, American Mathematical Association of Two-Year Colleges, MESA, Arizona

317.1 Increasing Mathematical Confidence in Future Elementary Educators and Others

Higher Education Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Liberty Ballroom M

Students in preservice elementary education programs often enter with negative experiences and attitudes about mathematics. In this session, we will share strategies that have helped our preservice teachers change their dispositions and emerge as confident future mathematics educators. We also hope to hear strategies that others have used to affect mathematics dispositions. The ideas that emerge can then be applied to any group of students who view mathematics negatively.

Brady Ward, Brigham Young University – Idaho, Rexburg
Bill W. DeLeeuw, Brigham Young University – Idaho, Rexburg

317.2 Vive le Difference Quotient: Approximating Derivatives

10–12 Exhibitor Workshop
Walter E. Washington Convention Center, 143C

In this this interactive presentation, former chief reader Steve Kokoska and Tom Dick will focus on problems involving the difference quotient and applications related to the definition of the derivative and approximating instantaneous rate of change. We will discuss both typical AP Calculus type analytical problems and applied questions. We will also present ways in which technology can be used to introduce, visualize, and solve problems involving the difference quotient.

Texas Instruments, Dallas, Texas

- Uplifting and Inspiring the Mathematics Educator
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- New Teacher Strand
- Equity Strand
- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

317.3 Harnessing the Power of Learning Progressions and Hands-On Centers to Foster Early Numeracy Skills

General Interest Exhibitor Workshop

Walter E. Washington Convention Center, 156

Join us for an exciting session with author and numeracy expert, Sue O'Connell, as she explores the concept of leveraging a learning progression model to guide the development and reinforcement of numeracy skills in math centers. Explore tailored learning centers that develop and reinforce early numeracy skills. See how shifting the focus to what students can do, allows us to build on prior knowledge and pave the path to mastery. Experience the power of hands-on numeracy tasks!

hand2mind, Inc., Vernon Hills, Illinois

317.4 From the Whiteboard to the White House: Math Lessons of Award-Winning Teachers

General Interest Exhibitor Workshop

Walter E. Washington Convention Center, 159AB

Meet award-winning teachers who will share creative lesson plans for you to take back home! Their work in the classroom has been recognized by the White House and now you can hear their inspiring stories and learn some of their teaching tools of the trade. You will also hear how receiving a Presidential Award for Excellence in Mathematics and Science Teaching (PAEMST) changed their lives – and can change your life too!

National Science Foundation, Alexandria, Virginia

317.5 Break the Forgetting Cycle Part 2: Cumulative Assessment with Get More Math

6–8 Exhibitor Workshop

Walter E. Washington Convention Center, 158AB

Unit testing trains student brains to experience math as a series of disposable two-week hurdles. Let's change this with cumulative assessment! When every test covers "everything" learned up to the point of the test, students and teachers maintain a stronger connection to the whole body of skills and concepts in the course. In this session, we will explore the power of cumulative testing to break the 'Forgetting Cycle' and how Get More Math software takes care of the heavy lifting.

Get More Math, Quarryville, Pennsylvania

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318 Counting Collections as Context for Liberation

PreK–2 Workshop
SESSION CONTENT LEVEL: Intermediate
Marriott, Independence Ballroom A-C

In every conversation with students, teachers influence student thinking and identity. Together let's consider how counting collections can be a space "to practice freedom" for both children and their teachers (Shalaby 2017). Participants will analyze classroom vignettes, consider research, and leave with practical ideas for generative teacher moves.

Jenna Laib, Brookline Public Schools, Massachusetts
Twitter: jennalaib
Kassia Omohundro Wedekind, Independent Math Coach & Stenhouse Publishers, Arlington, Virginia

319 Make It Count: Imagine, Explore, and Discover Math in the PK–2 Classroom

PreK–2 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 204AB

We know Number Sense is *caught* not *taught*. In this session, learn ways to leverage highly engaging activities with your students. Promote purposeful play and elevate student voice using choral counting, counting collections, and integrating children's literature. Come imagine, explore, and discover as we make early learning count!

Arcy Alafa, Tulare County Office of Education, Visalia, California
Twitter: Arcelia V Alafa
McKenzi Hurick, Tulare County Office of Education, Visalia, California

320 Using Progressions and Learning Trajectories to Guide Intervention in Addition and Subtraction

PreK–2 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 149AB

Explore a mathematical task and examine where addition and subtraction concepts and skills fall in standards and in research on how children develop mathematical understanding. See how learning progressions and learning trajectories are each uniquely helpful in planning for and providing mathematics intervention for students in the early grades.

Shannon Olson, Olson Educational Services, LLC, Lehi, Utah
Twitter: @ShannonOlsonEd

321 Asegurando el Acceso Para Estudiantes Bilingües | Providing Access for Multilingual Learners

3–5 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 206

All students deserve access to grade-level mathematics. In this session, we will engage in a bilingual mathematics task in order to understand the experiences and needs of multilingual children in the classroom, while considering the major work of grades 3–5. Let's learn the importance of using instructional and language routines in math!

Ally Lewis, Open Up Resources, Menlo Park, California
Twitter: @allyelewis
Brooke Powers, Open Up Resources , Menlo Park, California
Morgan Stipe, Open Up Resources , Menlo Park, California

322 Fostering a Mathematics Learning Culture That Involves, Engages, and Empowers All Learners

3–5 Workshop
SESSION CONTENT LEVEL: In-Depth
Marriott, Mint

Ensuring mathematically proficient students requires involving students intentionally, engaging them in making connections and building understanding, and empowering them to develop math agency. Participants engage in activities that illuminate recommended shifts in our teaching practice that involve, engage, and empower math learners.

Erin Edgington, University of Wisconsin – Platteville
Twitter: @ErinEdgington

323 Let's Talk Fractions: Making Math Accessible with Intentional Anchor Charts

3–5 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Mount Vernon

Anchor charts make math accessible to students with disabilities, multilingual children, and all learners of mathematics. Explore connections between visual displays, Universal Design for Learning (UDL) guidelines, and mathematical language routines (MLRs) as we explore the progression of fractions in elementary mathematics and beyond!

Morgan Stipe, Open Up Resources, Carroll, Iowa
Twitter: @mrsstipemath
Tywana Fulford, Open Up Resources, Sugar Hill, Georgia
Zack Hill, Open Up Resources, Menlo Park, California

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New Teacher Strand
Equity Strand
NCTM Committee Session
New NCTM Publication Session
Exhibitors Workshop

324 Math Routines Ignite Deep Thinking and Remind You of the Passion That Carried You into Education

3–5 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 147A

Many highly effective math routines and resources are being shared among educators, both in person and online. This session will feature three routines that spark joy and rich math talk, including Esti-Mysteries, the Estimation Clipboard, and Splat! Take away 100 ready-to-use resources and spread the joy in your classroom and online communities.

Steve Wyborney, Ontario School District, Oregon
Twitter: @stevewyborney

325 Rich and Accessible Math Tasks for Grades 4–5: Engaging Students in *Doing* Math

3–5 Workshop
Session Content Level: Intermediate
Walter E. Washington Convention Center, 202B

Rigorous and accessible tasks enable powerful mathematics learning opportunities for students. However, finding rich, inclusive, and engaging mathematics tasks that align to the standards we teach can be challenging and time consuming. Join us in exploring two rich, ready-to-implement tasks for grades 4–5.

Sorsha-Maria Mulroe, Howard County Public Schools, Ellicott City, Maryland
Twitter: @sorsham1
Delise Andrews, Lincoln Public Schools, Nebraska

326 Every Student Deserves Teachers of Mathematical Modeling

6–8 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Liberty Ballroom I-K

Are you looking for ways students can see themselves in mathematics and form connections to grow their mathematical identity? Do you want students to model mathematically but are not sure how to get started? Join us to foster mathematical community, explore rich tasks, and engage with mathematical modeling in this fast-paced, hands-on workshop!

Jennifer Hylemon, Cosenza & Associates, LLC, Dallas, Texas
Twitter: @jhylemon

327 Moving from Good Questions to Good Questions That Connect to Student Thinking

6–8 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 102AB

Participants will engage in (1) collaborative problem solving and discussion to prepare for thinking about and crafting questions for students that value students' mathematical ideas and push their mathematical thinking forward, and (2) using Notice and Wonder to connect students' work to the question(s) centered on particular mathematics.

Valerie Klein, School of Education, Drexel University, Philadelphia, Pennsylvania
Amanda Reinsburrow, Drexel University, PHILADELPHIA, Pennsylvania
Anthony Matranga, San Marcos, California
Jason Silverman, Philadelphia, Pennsylvania

328 Oracy for Multilingual Learners' Success in Mathematics Classes

6–8 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 209ABC

This workshop explores the Oracy framework, benchmarks, and resources that can be used in math classes for multilingual learners. Participants will learn how they can create and implement classroom protocols for students to learn to talk and learn through talk by experiencing real-time math demonstration lessons that apply to their teaching practice.

Jian Liu, New York University School of Professional Studies
Twitter: @LXJSmonk
Yanira Stoker, Onondaga Cortland Madison Board of Cooperative Educational Services , Liverpool, New York

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- Challenging and Advancing Policy and Structures in Mathematics Education
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- New NCTM Publication Session
- Exhibitors Workshop

329 Paper? Device? Vertical? Horizontal? Nonpermanent? ... What Is Best for Learning?

6–8 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Supreme Court

Instruction typically focuses on the what and the how, but what about the where? In this session, you will consider different venues for learning to happen: on paper, on a device, at a vertical workspace, and more. Come engage in different tasks, use the mathematical practices, and recognize the strengths and limitations of different venues.

Karen Wootton, CPM Educational Program, Elk Grove, California
Krista Holstein, CPM Educational Program, Sacramento, California

330 Structures and Routines That Make Math Accessible to All Students

8–10 Workshop
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, 150B

Are your high school students reluctant to explain their thinking? Do they hesitate to participate in class because they lack confidence or feel left out? Come to this session to experience some classroom structures and routines that empower all students, giving them access to rigorous problems. We will share a collection of engaging tasks.

Connie Horgan, Independent, Sun City West, Arizona
Amy Herman, Math Solutions, Louisville, Kentucky

331 Using Physical Models Made by Students to Promote Access and Engagement to High-Quality Tasks

8–10 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 207A

When students, especially those who are multilingual, are introduced to tasks only through words, it's a word problem! Students' accessibility and engagement can be improved when they use physical models to better understand a task. Students can also deepen their understanding of mathematics by teaching other students with these models.

Ron Lancaster, University of Toronto, Hamilton
Gurpreet Sahmbi, Toronto, ON

332 Using Technology to Connect Representations

8–10 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 201

Connecting representations and contexts is a powerful way to use technology, and it needn't be difficult to do. Join us on an interactive journey through Computation Layer and learn how to make activities more dynamic and math more meaningful. If you're new to CL, we're here to help! If you're a pro, we'd love to benefit from your expertise.

Jay Chow, Amplify Education, Brooklyn, New York
Twitter: @mrchowmath
Kathy Henderson, Black Pine Circle School, Berkeley, California

333 Yes, You Can (and Should) Use Manipulatives in High School

8–10 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Chinatown

We often think of manipulatives as a tool for younger children, but high school students need the same opportunities for hands-on learning to build a solid foundation for new concepts. In this session, we will look at a variety of manipulatives that are appropriate for these learners and also share some activities that you can take home.

Matthew Christiansen, Didax, Inc., Syracuse, Utah
Twitter: @thethirdr

334 AP Statistics Flipped: How We Quadrupled Our Enrollment and Made the World Our Classroom

10–12 Workshop
SESSION CONTENT LEVEL: In-Depth
Marriott, Judiciary

By converting our AP Statistics curriculum from a traditional lecture style to a flipped model, our AP Exam scores improved, and our course enrollment increased. We will share examples of videos, projects, activities, guided notes, field trips, daily assignments, AP exam review assignments, and advertising techniques. We will demo activities in the workshop!

Candice Sagliano, Lake Park High School District 108, Roselle, Illinois
Twitter: @LPmathteam
Ben Bishop, Lake Park High School West Campus, Roselle, Illinois

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Expanding the Narrative of Who Belongs
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Presidents' Series
New Teacher Strand
Equity Strand
NCTM Committee Session
New NCTM Publication Session
Exhibitors Workshop

335 Empowering Each and Every Student through Mathematical Modeling in K–12 Classrooms

10–12 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 143AB

Authentic mathematical modeling tasks expand the narrative of who belongs in our classroom. In this presentation, we will explore components of mathematical modeling tasks; and we will engage in and examine activities that center, leverage, and allow students to think deeply about the community and global context for mathematical situations.

Aline Abassian, Seminole State, Casselberry, Florida
Twitter: @AlineAbassian
Daniel Edelen, Georgia State University, Atlanta
Siddhi Desai, Fairleigh Dickinson University, Lawrenceville, New Jersey

336 The MacGyver Approach to Solving Good Problems in Mathematics

10–12 Workshop
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, 152B

Many of the problems that we encounter in mathematics curriculum are very predictable and safe for assessment. But what if the problems were a bit more open-ended and required students to draw together mathematics, creativity, and ingenuity? Now you have a MacGyver problem. In this workshop, we will explore and solve some of these problems.

Dan Butler, The Lovett School, Mableton, Georgia
Twitter: Dan Butler
Michael Huberty, Minnesota Department of Education, St. Paul

337 Continuing to Learn from the Past to Project the Future: Examining Social Justice from NCTM's Lens

Coaches/Leaders/Teacher Educators Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 151B

Examine the gradual development of social justice in mathematics education in US schools by exploring the interaction between present and historical events with the response employed by NCTM through its annual yearbooks and annual perspectives. Experience engaging activities with social justice and anti-racist teaching themes.

Treshonda Rutledge, University of Central Florida, Orlando
Twitter: Treshonda
Thomasenia Lott Adams, University of Florida, Gainesville

337.1 Taught to Teach: Youth Teaching Youth How to Math!

Coaches/Leaders/Teacher Educators Workshop
SESSION CONTENT LEVEL - INTRODUCTION TO THE TOPIC
Marriott, Room: Capitol Congress

We will start off by telling you a little about Flagways, a number theory game played by youth often in a gymnasium or field. We will go further into depth about how prime and composite numbers play a role in the game and how you win! Then we will talk about our research on personal experiences and identities with math and how the program has helped or hurt our math identity. Throughout the presentation we will touch on how we were taught the game first then had to come up with a elementary team on our own and prepare them for a National tournament.

Dream H. Jordan, Baltimore Algebra Project, Maryland
Tranaya T. Gross, Baltimore Algebra Project, Maryland
Solei F. Pole, Baltimore Algebra Project, Maryland

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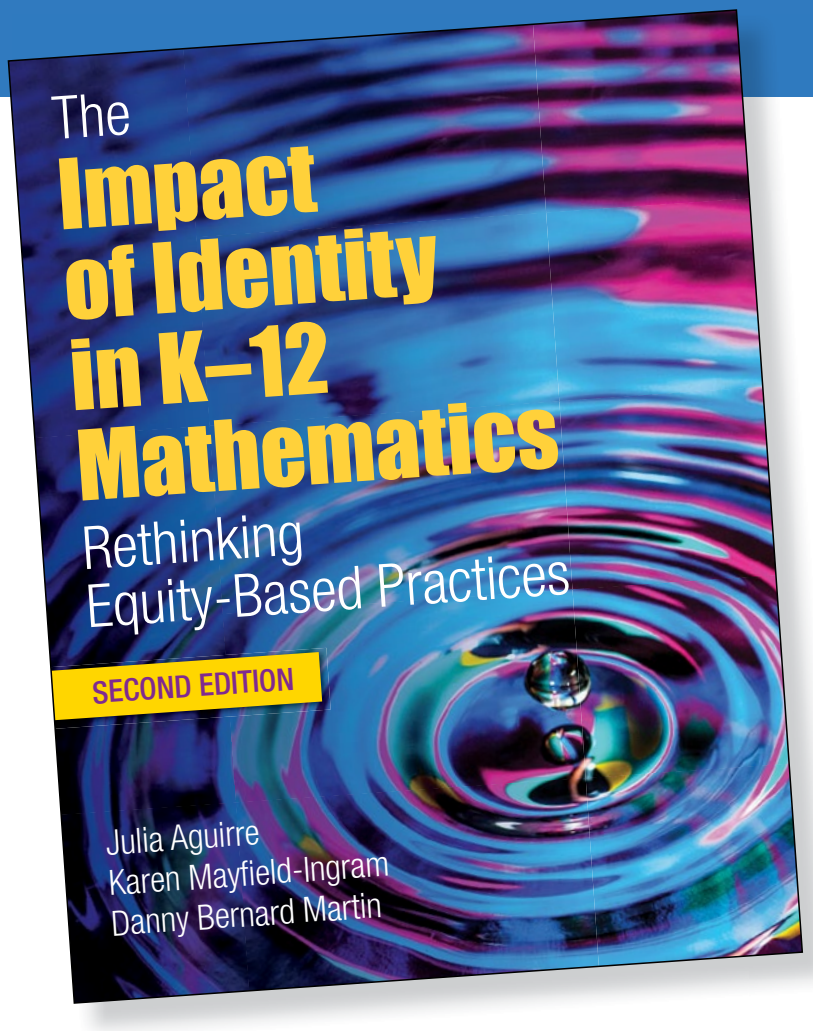
EXPECTED RELEASE DATE: JANUARY 2024

Re-Envision Mathematics Learning and Teaching



The expanded second edition of the best-selling *The Impact of Identity in K-8 Mathematics: Rethinking Equity-Based Practices* **invites elementary and secondary teachers of mathematics to reflect on their own and their students' identities that impact how students experience learning mathematics.** Rich possibilities for learning result when teachers draw on these identities in asset-based ways to offer high-quality, equity-based teaching to all students, especially those who have been marginalized by race, ethnicity, class, language, and gender. The book offers five equity-based practices that help educators re-envision mathematics learning and teaching in light of beliefs and structures, curriculum and instruction, and family and community partnerships across K-12, including:

- Going Deep with the Mathematics
- Leveraging multiple mathematical competencies
- Affirming mathematics learners' identities
- Challenging spaces of marginality
- Drawing on multiple resources of knowledge

The second edition features new and revised content, including a new instruction analysis tool for the five equity-based practices and four additional chapters.

The Impact of Identity in K-12 Mathematics: Rethinking Equity-Based Practices, Second Edition

By Julia Aguirre, Karen Mayfield-Ingram, Danny Bernard Martin

Contact me when pre-sale information becomes available!

NCTM | NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS

Friday Morning Practice Session

10:00 AM–12:00 PM

338 A *Live* Lesson and Learning Lab at a Conference! Observe and Analyze Student Discourse in Real Time

6–8 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 146A

We will engage in all three components of a learning lab. We'll preview a lesson to anticipate student thinking and teacher moves to promote student discourse. We'll then observe a live lesson to capture evidence of student discourse—often linked to specific teacher decisions. Finally, we'll share noticings and wonderings that arise and hear some of the teacher's decision points. Participants will leave understanding the power of a learning lab and the nuances of facilitating discourse.

Amy Lucenta, Fostering Math Practices, Natick, Massachusetts
Twitter: @AmyLucenta
Lauren Massa, Liverpool Central School District, New York
Lorraine Pascarella, Liverpool Central School District, New York
Miranda Magley, Liverpool Central School District, New York
Justin Teague, Liverpool Central School District, New York

Membership questions? We've got answers!
Visit **Member Services** in NCTM Central.

Friday Morning Sessions

11:00 AM–12:00 PM

339 Discovering Math Joy in Numberblocks

PreK–2 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, Ballroom B

Come learn about the hit math education show *Numberblocks*. Hear from the creator Joe Elliot about how the learning goals behind *Numberblocks* supports the development of numeracy. Find out how each episode has been carefully crafted to ensure that *Numberblocks* builds good number sense and a solid foundation for math success.

Joe Elliot, Alphablocks limited, Vernon Hills, Idaho

340 Diversity in Mathematics: Children's Books and Lived Experiences

PreK–2 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 147B

In this session, we will explore how you can recognize diversity in your mathematics lessons through the incorporation of children's books, drawing on lived experiences, and using culturally responsive practices. Participants will be provided with examples of how these practices can be used to develop cultural competence and empower all learners.

Lucas Elliott, Jefferson County Public Schools, Louisville, Kentucky

341 Doubling Dipping! Connecting Fractions and Geometry for Early Learners

PreK–2 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 203AB

Fractions before third grade? Absolutely! By focusing on early learners' conceptual understanding, we can help students make sense of fractions and feel confident in themselves as brilliant mathematicians. Join us in learning about how to connect fractions and geometry through tangible contexts, meaningful representations, and precise language.

Kristin Harbour, University of South Carolina, Columbia
Twitter: @_keharbour
Stefanie Livers, Missouri State University, Springfield

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342 Student Stories: Leveraging Student Interest and Background in Math Class

PreK–2 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Liberty Ballroom N-P

Come explore creating an environment that promotes problem solving and community while engaging in rich tasks based on the lives of your students. Discover how these tasks help students see themselves in the math they are learning. Lessons and student work will be shared. Leave with a framework for planning tasks in your classroom.

Lori Price, The Discovery School, Ponte Vedra Beach, Florida

343 How to Make Problem Solving Routine for Increased Opportunity, Access, and Engagement

3–5 Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Archives

Teaching problem solving is hard. It is about helping students learn to make sense, think, and reason. Simply put, problem solving is not a procedure. Problem solving is not delivered; it is developed. In this session, participants learn how to do just that through engaging daily problem-solving routines. Classroom-ready resources will be shared.

John SanGiovanni, Howard County Public School System, Westminster, Maryland
Twitter: @JohnSanGiovanni

344 Maximize the Power of Number Talks by Using Models

3–5 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 140AB

When students see models during Number Talks, it not only brings meaning to the symbols but engages them in a search for structures and relationships in the number system. Number Talks using models provides access to all students and empowers them as mathematicians.

SallySue Dolphin, Math Perspectives Teacher Development Center, Henderson, Nevada
Twitter: @suedolphin9105
Kathy Richardson, Math Perspectives Teacher Development Center, Bellingham, Washington

345 Why We Must Stop Teaching Base-8

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 151A

First, we will describe the importance of teaching multiple bases. Then we will outline the issues with teaching fictional bases. Last, we will describe the vigesimal base system that is not only authentic and promotes flexible thought but also may connect to students' home lives and cultures, therefore encouraging culturally sustaining pedagogy.

Melissa Gallagher, University of Houston, Texas
Twitter: @melissag427
Carlos Nicolas Gomez Marchant, Austin, Texas

346 Empowering Diverse Learners to Learn Prealgebra through the Implementation of the CRA Approach

6–8 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Marquis Ballroom Salon 12&13

Participants will explore best practices by engaging in activities from six different programs for developing strategic competence by (1) performing arithmetic operations on polynomials; (2) solving equations and inequalities in one variable; and (3) understanding how to solve equations as a process of reasoning for promoting adaptive reasoning skills.

Jen Bond, Ferguson-Florissant School District, Missouri
Joseph Sencibaugh, Webster University, St Louis, Missouri

347 Using Argument-Driven Inquiry to Catalyze Change in Middle Grades Math

6–8 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Shaw/LeDroit Park

Argument-driven inquiry (ADI) is an approach to teaching elementary mathematics aligned with Catalyzing Change's multiple purposes for learning mathematics. Along with supporting students in learning concepts required by state standards, ADI is designed to foster students' development of an identity as a doer, knower, and sense maker of mathematics.

Matthew Boal, Argument-Driven Inquiry, Austin, Texas
Todd Hutner, University of Texas, Austin

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348 Connecting the Dots: Deepening Conceptual Understanding through Connections across Domains

8–10 Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Monument

This session "connects the dots" across topics in statistics, algebra, and functions by looking at pixels, pointillism, and points on a graph. The activities presented will use a variety of pedagogical practices, including use of technology, open-ended modeling tasks, and Socratic questioning.

Selena Oswalt, Great Minds, Washington DC, District of Columbia
Bridget Soumeillan, Great Minds, Washington DC, District of Columbia

348.1 Supporting Student Learning: Using Continuous Improvement Strategies to Improve Math Instruction

8–10 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Ballroom F–H

Teachers from the School District of Osceola County, FL and Brooklyn, NY will discuss ways they have used continuous improvement processes to refine their instruction. Participants will learn how the teachers identify new routines to try in their classrooms and collect data to study and refine those routines. The audience will discuss how these and other routines can be used to foster productive struggle, encourage math discourse, and build conceptual understanding in the math classroom.

Tracy Fray-Oliver, Bank Street College of Education, New York, New York
Jing-Jing Hu, Bank Street College of Education, New York, New York
Emma Vandeberg, Osceola County Public Schools
Toni Smith, American Institutes for Research, Arlington, Virginia

349 Socially Relevant Algebra: A Nonpartisan and "Non-Contrived" Approach

8–10 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 150A

We need citizens who can use math to analyze complex issues. So, let's invite real issues into the math classroom, and let's do so a nonpartisan and non-contrived way. This session will present ready-to-use algebra 1 and 2 lessons on important issues, including the true environmental impact of electric vehicles, voter power, and healthcare costs.

Dashiell Young-Saver, Skew The Script, San Antonio, Texas
Twitter: @dashyoungsaver

350 Blocking, Matched Pairs, and the AP Statistics Exam

10–12 Session
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, 146B

In this session, we will do an activity that introduces the concept of blocking in an experiment and illustrates the benefits of using a blocked design. Then we will look at question 2 on the 2022 AP Statistics Exam and discuss common student errors—and how a better understanding of blocking could have helped students avoid them.

Josh Tabor, The Potter's School, Oro valley, Arizona
Daren Starnes, Retired, Hilton Head, South Carolina

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Expanding the Narrative of Who Belongs
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Equity Strand
NCTM Committee Session
New NCTM Publication Session
Exhibitors Workshop

351 Modern Math Tasks: Transforming Change through Political, Social, Civic, and Design Literacies

10–12 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Independence Ballroom D

Good citizens are literate in many interconnected disciplines. We will explore tasks that prepare students to put mathematics into action and equip teachers to put action into mathematics in various contexts including design, civics, politics, and finance. These tasks encourage students to discuss and think critically about applications of math.

Suzanne Harper, Miami University, Oxford, Ohio
Twitter: @MiamiUMathEd
Dana Cox, Miami University, Oxford, Ohio
Leah Simon, Amplify, Brooklyn, New York
David Glassmeyer, Kennesaw State University, Georgia

352 Collaborative Coaching: Using Student Interviews as a Tool for Learning and Growing Together

Coaches/Leaders/Teacher Educators Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 152A

Come learn about what collaborative coaching is and how it can build community, while also deepening a team's content and pedagogical knowledge. We will explore how student interviews are one coaching tool that centers students' thinking and allows teams to learn together about ways to elicit and respond to students' mathematical conceptions.

Nicora Placa, Hunter College, New York, New York
Twitter: @NicoraPlaca

353 Using Mathematical Practices to Create Equitable Instruction for All

Coaches/Leaders/Teacher Educators Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Liberty Ballroom L

The goal of mathematics education is to develop the mathematical practices in all students. The content standards are the vehicle that math teachers use to develop these practices in our students. In this session, participants will discuss vignettes and best practices that will help teachers provide equitable instruction for all.

Dr. India White, Big Ideas Learning, Brooksville, Florida
Twitter: Indispeaknteach
Tonya Clarke, Clayton County Public Schools, Atlanta, Georgia

354 Embrace Their Pace: Using Student-Paced Activities to Provide Personalized Learning

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 154AB

We want to honor the diverse needs of all students, and that often focuses on the speed at which they process. We will discuss and provide templates for activities that afford students the opportunity to work at a pace that fits them as an individual and fosters independent learner skills while still providing the support and feedback they need.

Lisa Davis, Community HS District 128, Libertyville, Illinois
Twitter: @lisaligdavis
Johnathan Taylor, Community High School District 128, Libertyville, Illinois

355 Fun with Geometric Arrays of Whole Numbers in Grades 1–12

General Interest Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Liberty Ballroom M

The hundred chart of grade 1 and Pascal's Triangle in high school are two geometric arrays of whole numbers that students encounter. In this session, we explore these and other whole-number arrays for properties that are well within students' capacities to explore, verify, and prove, some even as early as the primary grades.

Zalman Usiskin, (retired), Winnetka, Illinois

- Uplifting and Inspiring the Mathematics Educator
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- Presidents' Series
- New Teacher Strand
- Equity Strand
- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

356 Iris M. Carl Equity Address: Essential Elements for Cultivating Joy and Justice in Mathematics Education: A Critical Dialogue for Taking Action

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, Ballroom A

Systemic inequities persist in math education despite well-meaning efforts to improve access and meet the learning needs of students. In this talk, two math educators of color challenge conventional wisdom and discuss essential nonnegotiable elements needed to transform the math learning space to one that cultivates math joy and justice.


Julia Aguirre


Karen Mayfield-Ingram

About the Iris M. Carl Equity Address:
The Iris M. Carl Equity Address was established in 2008 in honor of Iris Carl, a past president of NCTM who championed mathematics literacy for all.

The Iris M. Carl Equity Address posthumously recognizes Carl's work in placing NCTM at the forefront of the public debate on the importance of curricular standards. She was also a well-respected public voice in support of mathematics education through testimony before Congress and in the news media. Carl served as NCTM president from 1990 to 1992. In 1997, she received the Mathematics Education Trust Lifetime Achievement Award in recognition of her lifelong commitment to mathematics education. Carl died in 2004.

The address features a selected speaker at the NCTM Annual Meeting and Exposition. Each year a distinguished mathematics educator, noted for making significant contributions to research in education equality, will be invited to give the address.

Julia Aguirre, University of Washington, Tacoma
Karen Mayfield-Ingram, Lawrence Hall of Science, University of California Berkeley
Sponsored by McGraw Hill Education

357 President Series: Leveraging Digital Technologies to Promote Deeper Learning

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, Ballroom C

Learn strategies to use digital technologies to develop students' conceptual understanding. We unpack recommendations from technology position statements from national organizations to illustrate ways in which digital technologies can be used to promote equity and equitable teaching practices while fostering deeper learning.

Enrique Galindo, Indiana University, Bloomington
Twitter: @cybermathedian

358 Technology That Thinks with You, Not for You

General Interest Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 202A

Technology wears two faces. One allows us to have and share new questions, insights, and ideas. The other can constrain and surveil our thoughts, offloading the interesting work of asking and answering questions to an unthinking program. We'll look at ways that tech can think with us and our students.

Eli Luberoff, Desmos Studio PBC, Beaverton, Oregon

359 The Power of the Five Representations for Math Students Who Are Learning English

General Interest Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 145AB

When students are not yet fluent in the language of instruction, how can they share their thinking and reasoning? Using the five representations—symbolic, physical, visual, contextual, and language—allows students to share their thinking and gain a foothold into others' thinking! We'll examine examples of the power of representations.

Laurie Speranzo, Institute for Learning, University of Pittsburgh, Quincy, Massachusetts
Twitter: @lauriesperanzo

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- Equity Strand
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- New NCTM Publication Session
- Exhibitors Workshop

359.1 Back to the Future. Print Textbooks meets AI.

8–10 Exhibitor Workshop
Walter E. Washington Convention Center, 143C

With an increasing focus on digital learning in math classrooms, do traditional print textbooks still have value?

Join Mathspace's US Curriculum Lead, Victoria Lowery, and founder Mohamad Jebara, for a discussion on creating curriculum that blends the best traditional strategies with cutting-edge AI.

Learn how to use print and digital resources in harmony rather than an either/or proposition. Preview our powerful AI tutor chat that safely supports students and keeps educators in the loop.

Mathspace, New York, New York

359.2 Watson, I Have Found the Missing Link! Let Me Draw You a Picture!

3–5 Exhibitor Workshop
Walter E. Washington Convention Center, 156

You invest time modeling with manipulatives, move to formal algorithms, and students still make the same errors. This interactive session will reveal the missing link between manipulatives and formal symbolic algorithms. Focus will be on development of addition and subtraction from conceptual to procedural using universal place value drawings and more.

Pamela Richards, STEMscopes Regional STEM coach and expert in K-8 Math and Science content and master teacher with 30+ years of experience.

STEMscopes / Accelerate Learning, Inc., Houston, Texas

359.3 K–5 Hands-On Manipulatives + Real-Time App Feedback = Success with Owlet Math Tools

General Interest Exhibitor Workshop
Walter E. Washington Convention Center, 159AB

Looking for the perfect equation for fun, interactive, and cutting-edge math instruction? In this session, get hands on with Owlet Math Tools – two groundbreaking math manipulatives with real-time feedback to help make abstract math concepts concrete for grades K-5. Explore concepts like place value, money, fractions, and more with hands-on exploration and collaborative math talk. Leave this session with new ideas, free resources, and everything you need to borrow Owlet FREE for 60 days!

BirdBrain Technologies, Pittsburgh, Pennsylvania

359.4 NBA Math Hoops – Creating the Next Math Champion

6–8 Exhibitor Workshop
Walter E. Washington Convention Center, Exhibit Hall D, Th1

NBA Math Hoops leverages the game of basketball and the NBA/WNBA to engage students with math and social-emotional learning skills through a board game, curriculum, mobile app, and community program. The workshop is fully hands-on. The educators will get to learn the program and strategies of the game through interactive game play. Educators will draft their own NBA/WNBA team, dice will be rolled, & spinners will be spun. All resources for the program are completely free of cost for educators.

Learn Fresh, Philadelphia, Pennsylvania

359.5 Build Confidence with Collaborative Math Talk for Active Inquiry-based Learning

General Interest Exhibitor Workshop
Walter E. Washington Convention Center, 158AB

Explore active and engaging approaches to collaborative inquiry-based learning that builds mastery and brings joy to the classroom. See how Math Talk's research-based approaches help create inspiring student-centered learning environments where students aren't afraid to take risks while expressing mathematical thinking. Can't make this session? Stop by the Heinemann Publishing booth (#205) for more information on Math Talk and other inquiry-based support.

Heinemann Publishing, Portsmouth, New Hampshire

- Uplifting and Inspiring the Mathematics Educator
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- Challenging and Advancing Policy and Structures in Mathematics Education
- Expanding the Narrative of Who Belongs
- Improving Core Instruction through Deeper Mathematical Content and Pedagogical Knowledge
- Presidents' Series
- New Teacher Strand
- Equity Strand
- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

360 Counting and Cardinality: Research-Based Activities to Help Young Students Develop Number Sense

PreK–2 Burst
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 202B

Current research on counting, cardinality, and conservation of number will be shared along with video clip examples. Participants will learn that mastery is not a linear process and will be provided with a rich variety of activities that encourage number sense prior to mastering counting, cardinality, and conservation of number.

Kim Hartweg, Western Illinois University, Macomb

361 Purposeful Questioning in the Elementary Classroom

3–5 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 147A

Looking for ways to improve the questions you ask in the elementary mathematics classroom? This session will provide you with a variety of questioning strategies. Join us to improve your diverse learners' understanding of mathematics addressing higher-level thinking with a mathematics-specific framework.

Emily Cline, Emporia State University, Kansas
Twitter: @emilyclineESU
Brandy Crowley, Emporia State University, Kansas
Meghan Shave, Emporia State University, Kansas
Amanda Neff, Emporia State University, Kansas

362 What Are We Really Saying? Examining the Belief Messages We Send through Our Teacher Decisions

3–5 Burst
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, 151B

What changes might you make if you considered your teacher decisions through a new lens? Becoming the parent of an elementary student pushed me to reconsider many of my teacher choices. Join me in reflecting on the decisions we make as teachers and examining the messages we may (accidentally) be sending to students and their families.

Karla Bandemer, Lincoln Public Schools, Nebraska

363 Classroom Structures That Inspire Students to Want More

6–8 Burst
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 152B

Mathematics leaders will be equipped with strategies to increase student engagement in the classroom by increasing learning through the power of collaborative structures. Teachers and coaches will participate in activities designed to increase student learning in diverse classroom settings by empowering teachers to provide targeted student feedback.

Shannon McCaw, EdGems Math LLC, Neptune, New Jersey

364 Don't Be Scared of the Data! It Leads the Way for Small-Group Instruction!

6–8 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 204AB

The use of data to provide explicit small-group instruction to targeted students ensures students are receiving what they need to show progress. This session will share various formative assessment strategies as well as small-group instructional strategies to enhance student performance.

Angela Stafford, Charles R Drew, Atlanta, Georgia
Twitter: @MsStafford99

365 Participation through the Practices: Access for All Learners of Mathematics

6–8 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Independence Ballroom A-C

How do you quantify participation? This team will share their journey on how they instituted a structure to measure participation through rich tasks grounded in the Common Core State Standards for Mathematical Practice. Focusing on sense making, perseverance, and precision, these rubric-based tasks honor developing the mathematician so all students can actively participate in the math classroom.

Virginia Dalton, Farmingdale School District, New York
Isabel Cabales, Farmingdale School District, New York
Marissa Sciremammano, Farmingdale Public Schools, New York
Marissa Puleo, Farmingdale School District, New York

Uplifting and Inspiring the Mathematics Educator
Creating Inclusive, Engaging, and Rigorous Mathematics for All
Challenging and Advancing Policy and Structures in Mathematics Education
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Presidents' Series
New Teacher Strand
Equity Strand
NCTM Committee Session
New NCTM Publication Session
Exhibitors Workshop

366 Ten Different Ways to Answer Why a Negative Times a Negative Is a Positive

6–8 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 209ABC

Why is a negative times another negative always equal to a positive answer? This is one of the most commonly asked questions in mathematics classes in middle and high school. In this session, we will discuss 10 different ways to answer why a negative times a negative is a positive. We will use some real-world examples to explain this concept.

Cheng-Yao Lin, Southern Illinois University, Carbondale
Kuan-Chun Chen, Southern Illinois University Carbondale

367 Chem-e-Cars in the Classroom

8–10 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Supreme Court

A Chem-e-Car is a water bottle with wheels, powered by a chemical reaction of baking soda and vinegar, connecting chemistry, engineering, and mathematics. We will provide videos, handouts, and lessons for several topics (e.g., graphing ordered pairs, modeling, and trig functions). Come race a Chem-e-Car and learn about impact on student learning.

Tabatha Rainwater, University of Tennessee, Knoxville
Twitter: @rainwater_math
Francia Zelaya, University of Tennessee, Knoxville
Jonathan Clark, University of Tennessee, Knoxville
Jeneva Clark, University of Tennessee, Knoxville

368 Improving Mathematics Teachers' Culturally Responsive Lesson Planning and Teaching Practices

8–10 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 201

Preparing teachers to implement culturally relevant (CR) teaching practices is vital for improving mathematics education for all students. In this presentation, we share how practicing mathematics teachers used their understanding of their students' culture and background to develop cognitively demanding CR and social- justice mathematical tasks.

Darryl Corey, Radford University, Virginia
Belinda Edwards, Kennesaw State University, Georgia
Mariah Walton, Cobb County School District, Smyrna, Georgia

369 Come on Down! Using the Price is Right to Teach Probability

10–12 Burst
SESSION CONTENT LEVEL: Intermediate
Marriott, Chinatown

This session aims to demonstrate how participants can use the Price is Right or other game shows to teach the concepts of probability. Participants will see sample activities that have successfully been done in classes that can be used to show students practical applications of theoretical concepts.

David Postlethwait, Hempfield Area School District, Herminie, Pennsylvania
Twitter: @MrPost_
Shannon Miller, Prince William County Public Schools, Manassas, Virginia
Jeannette Newman, Gar-Field High School, Woodbridge, Virginia

370 Creating Authentic Safe Spaces to Promote Student Belonging

10–12 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Capitol Congress

Not all students feel like they belong in a math classroom. Creating a space for safe authentic whole-class conversations is essential to creating a space of belonging. We will show how by giving students a space to discuss relevant concerns from personal identity to budgeting, we increased participation and belonging in our classroom communities.

Yanjie Zheng, Cedars International Next Generation High School, Austin, Texas
Thinh Dao, Cedars International Next Generation High School, Austin, Texas

- Uplifting and Inspiring the Mathematics Educator
- Creating Inclusive, Engaging, and Rigorous Mathematics for All
- Challenging and Advancing Policy and Structures in Mathematics Education
- Expanding the Narrative of Who Belongs
- Improving Core Instruction through Deeper Mathematical Content and Pedagogical Knowledge
- Presidents' Series
- New Teacher Strand
- Equity Strand
- NCTM Committee Session
- New NCTM Publication Session
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371 Graph Theory and Research Experience: A Nontraditional, Advanced but Accessible Elective Course

10–12 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 143AB

Come and learn about a high school elective course that introduces students to graph theory and the practice of formal proof-writing! The course is designed to be accessible to students at the precalculus level, so it offers students who are especially interested in math a great opportunity to expand their mathematical breadth and experience.

Tamar Avineri, North Carolina School of Science and Math, Durham

372 Recruiting Minoritized Math Preservice Teachers with Retention in Mind: Implications for Practice

Coaches/Leaders/Teacher Educators Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 207B

This presentation will provide an overview of the implications for practice from my dissertation on recruiting minoritized preservice mathematics teachers with retention in mind. The findings from the data analysis resulted in these overall resonant threads: Minoritized Identity, Critical Individuals, "Aha Moments," TEP, and Learning and Barriers.

Nick Kim, University of Tennessee-Knoxville
Twitter: @nkim615

373 Storycircles: A Process-Oriented Approach for Teacher Learning about Problem-Based Lessons

Coaches/Leaders/Teacher Educators Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 207A

We explore what teachers can learn in Storycircles, a process where teachers collaboratively anticipate high-school mathematics lessons. In general, we discuss the complexities of a process-oriented approach for teacher learning, in which teachers are not expected to adopt specific practices but to enhance their capacities for mindful teaching.

Amanda Brown, University of Michigan, Ann Arbor
Patricio Herbst, University of Michigan, Ann Arbor

374 Math in the Mirror: Lifting Up Diverse Mathematicians to Promote Mathematical Identity and Belonging

General Interest Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 150B

When your students think of mathematicians, who comes to mind? In this session, explore a step-by-step process for leveraging the stories of mathematicians of all ethnic, gender, racial, linguistic, and socioeconomic groups to break down stereotypes about who mathematicians are and transform students' confidence to see themselves as mathematicians

Katherine Muelling, Nowell Academy, Warwick, Rhode Island
Twitter: @Kate_Muelling

375 Mindfulness and Mathematics

General Interest Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Judiciary

Stress and anxiety seem to be ever-present in today's world. Teachers are stressed about how to support their students while moving forward with grade-level content. Students' anxiety can be a barrier in their learning. In this session, you will learn about techniques to reduce stress and anxiety for yourself and your students.

Krista Holstein, CPM Educational Program, Sacramento, California

376 Perspectives from Teacher Leaders on How to Foster Access, Justice, Equity, Diversity, and Inclusion

General Interest Burst
SESSION CONTENT LEVEL: Intermediate
Marriott, Mount Vernon

How can teachers lend their voice, insights, and experiences as educators and leaders to federal programs, initiatives, and policy efforts? Participants in this interactive session will learn about federal advocacy roles for educators.

Jill Latchana, Department of Energy, Washington, District of Columbia
Twitter: @aef_program
Kenji Nomura, Albert Einstein Distinguished Educator Fellow, Washington, District of Columbia
Lachanda Garrison, Albert Einstein Distinguished Educator Fellow, Washington, District of Columbia
Stacie Marvin, Albert Einstein Distinguished Educator Fellow, Washington, District of Columbia

- Uplifting and Inspiring the Mathematics Educator
- Creating Inclusive, Engaging, and Rigorous Mathematics for All
- Challenging and Advancing Policy and Structures in Mathematics Education
- Expanding the Narrative of Who Belongs
- Improving Core Instruction through Deeper Mathematical Content and Pedagogical Knowledge
- Presidents' Series
- New Teacher Strand
- Equity Strand
- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

377 Routines to Support Multilingual Learners' Social Status in the Mathematics Classroom

General Interest Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 102AB

"The one who does the talking does the learning." But do we hold this same expectation for multilingual learners in the mathematics classroom? This session dives into language instructional routines that focus on receptive and productive language to ensure that all students, including MLLs, have access to the classroom's math discourse community.

Mary Christensen-Cooper, Great Minds, Alpena, Michigan
Twitter: Mary Christensen-Cooper

378 The Mathical Book Awards: The Best of Mathematics and PK–12 Literature

General Interest Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Liberty Ballroom I-K

Each year awards are presented by the Simons Laufer Mathematical Sciences Institute (SLMath) for the best books in PK–12 mathematical literature (in five grade bands: PK, K–2, 3–5, 6–8, and 9–12). This session will share information about the collection of Mathical Books winners, the Mathical Books website, and the process for selecting the winners.

J Michael Shaughnessy, Past President, National Council of Teachers of Mathematics, Reston, Virginia; Portland State University, Oregon

379 Challenging the Status Quo: Making Early Mathematics Meaningful and Playful

Higher Education Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 144ABC

This study used play as a vehicle to move mathematics instruction and learning beyond rote memorization to a more expansive understanding of mathematics. Both quantitative and qualitative methods were conducted to examine preservice teachers' conceptions of early mathematics and play.

Bilge Cerezci, National Louis University, Chicago, Illinois
Twitter: Bilge Cerezci

379.1 Digging Deeper: What are NCTM's Playlists?

General Interest Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 149AB

What is a playlist? Playlists are intended to share related articles, books, podcasts, videos, and other resources to help us learn more about the topic discussed by one of the keynote speakers. Come dive deeper on the Keynote speakers' topics with us! We will briefly share the anatomy of the playlists and then you will have time to gather with others with similar interests to extend the discussion. We will also have time for questions and feedback on the playlists.

Bill W. DeLeeuw, Brigham Young University – Idaho, Rexburg
Anna Wan, University of Southern Mississippi, Hattiesburg

Visit the NCTM Exhibits in Hall D
Grades 6–8

- Uplifting and Inspiring the Mathematics Educator
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- Challenging and Advancing Policy and Structures in Mathematics Education
- Expanding the Narrative of Who Belongs
- Improving Core Instruction through Deeper Mathematical Content and Pedagogical Knowledge
- Presidents' Series
- New Teacher Strand
- Equity Strand
- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

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BREAKING THROUGH: COACHING TO SUPPORT CHANGE

380 Mathematics Tasks: Empowering K–2 Teachers to Effectively Facilitate the Five Practices

PreK–2 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Monument

Join us as we share primary classroom examples of rich mathematical tasks using the Five Practices for Orchestrating Productive Mathematics Discussions. Learn about planning and facilitation practices that promote discourse, risk taking, reflection, and joy! Our experience builds on the strengths of students as we explore how our youngest learners can engage in rigorous mathematical opportunities.

Erica Beckett, Fairfax County Public Schools, Virginia
Twitter: @Erica_Beckett
Wendy Wall, Fairfax County Public Schools, Virginia
Kelly Halpin, Fairfax County Public Schools, Virginia

381 Number Lines in Children's Educational Television

PreK–2 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Liberty Ballroom N-P

Young children love TV! In an effort to engage children in mathematical reasoning, many educational shows have begun to incorporate number lines into their narratives. Hear an analysis of such use, watch some clips, and leave with ideas for integrating these programs into your own teaching and efforts to build positive school-home connections!

Rebecca Borowski, Western Washington University, Bellingham
Joe Robinson, E. L. Haynes Public Charter School, Washington, D.C., District of Columbia

382 We Are (Math) Family: Helping Young Children and Families Learn to Love Math Together

PreK–2 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 147B

We will share details and themes across several projects at our center that engage families in their young children's math learning through various participatory structures. Common themes include spotlighting foundational math concepts, engaging in math together, attending to feelings about math and math identities, and making math joyful and fun.

Deborah Leslie, University of Chicago, Illinois
Twitter: @daleslie99
Becky Criollo, University of Chicago, Illinois
Jeanne DiDomenico, UChicago STEM Education, Illinois
Cheryl Moran, University of Chicago, Illinois

383 Designing Community-Based Math Modeling Tasks to Empower Young Mathematicians

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 151A

We will introduce five design principles for planning community-based mathematical modeling (CBMM) tasks that engage students in using math as a powerful tool to make decisions that affect their families and community. It begins with students exploring data to better understand community issues and using math modeling to build impactful solutions.

Jennifer Suh, Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; George Mason University Fairfax, Virginia
Twitter: @completemath
Susan Call, FCPS, Falls Church, Virginia
Kristen Burke, FCPS, Falls Church, Virginia
Gretchen Maxwell, FCPS, Falls Church, Virginia
Samantha Anstett, FCPS, Falls Church, Virginia

384 Desmos Classroom Activities for Elementary School

3–5 Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Union Station

Desmos Classroom activities can create a more inclusive and rigorous learning environment through connected visual representations of content using the tools Desmos offers. This session will share how Desmos Classroom invites all students to explore mathematical concepts and how teachers can use technology to support student understanding.

Kelly Serpa Howe, Amplify – Desmos Classroom, Brooklyn, New York
Twitter: @kellyserpahowe
Kurt Salisbury, Amplify – Desmos Classroom , Brooklyn, New York

- Uplifting and Inspiring the Mathematics Educator
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- Challenging and Advancing Policy and Structures in Mathematics Education
- Expanding the Narrative of Who Belongs
- Improving Core Instruction through Deeper Mathematical Content and Pedagogical Knowledge
- Presidents' Series
- New Teacher Strand
- Equity Strand
- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

385 Integrating Algebraic Thinking: The Power of a Routine

3–5 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 152A

Using CGI research, learn how a 15-minute routine helps develop deep understanding in algebraic thinking while engaging *all* students. In this session, we will share classroom-tested routines and the power of recording student thinking in order to support students to make mathematical connections through their explorations with numbers.

Melissa Canham, Downey Unified School District, California
Twitter: Melissa Canham
Julie Yearsley, Long Beach, California
Glenda Martinez, Downey Unified School District, California

386 Trying to Find Your Way in Mathematics Education: Thomasenia Adams and Juli Dixon Share Their Journeys

3–5 Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Archives

Bring your coffee and tea! Gather around and be uplifted and inspired. Thomasenia and Juli will share their stories. They will "pour tea" related to their experiences about their identities as mathematics educators, being prepared for opportunity, overcoming obstacles and failures, navigating systems, and aiming for impact. The context of their stories will be teaching and learning mathematics across a combined 70+ years in the field. They will be transparent and intentional around a common theme that will allow the session to have a meaningful conclusion for participants.

Thomasenia Lott Adams, University of Florida, Gainesville
Twitter: @TLAMath
Juli Dixon, UCF, Indialantic, Florida

387 You Want Me to Assess How?! Assessing Student Knowledge through Everyday Learning

3–5 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 154AB

Assessing students' knowledge through traditional testing can feel like drudgery for all. By the time teachers find out what students know, it's too late! Students can show what they know in engaging ways through ongoing, informal assessment. You will experience how student discourse, explorations, and projects reveal students' deep conceptual understanding.

Angela Das, Friendship Public Charter School, Washington, District of Columbia
Robyn Silbey, Independent, Gaithersburg, Maryland

388 Creating Open-Ended Assessments and How to Grade Them

6–8 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Marquis Ballroom Salon 12&13

Learn how to build assessments that are inclusive of all learners. We will dig deep into what an open-ended assessment looks like and why it's beneficial to students.

Ritu Virmani, Independent, Kensington, Maryland
Twitter: @rtz

389 Engaging Students with Big Ideas

6–8 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Shaw/LeDroit Park

Focusing on understanding big ideas in middle school, participants will experience how engaging and comprehensive lessons can have multiple big ideas entwined. Participants will gain an appreciation of how big ideas develop deep mathematical understanding for their students while linking ideas together.

Cynthia Raff, Center for Mathematics and Teaching, Pasadena, California
Mark Goldstein, Center for Mathematics and Teaching, Redondo Beach, California

390 Mathematics Identity in the Classroom

6–8 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Treasury

Mathematics Identity affects student learning. Mathematics identity work is a way to help more students see themselves as mathematicians. We will first unpack your mathematics identity through creative use of writing and visuals. Then, we will learn how to use this technique with your students.

Fawnda Norman, University of Wisconsin, Oshkosh
Twitter: Fawnda Norman
Lesa Covington Clarkson, Woodbury, Minnesota

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- Expanding the Narrative of Who Belongs
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- Presidents' Series
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- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

391 Solving With Students: An Innovative Approach to Student Feedback in the Math Classroom

8–10 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Liberty Ballroom M

Impact Florida's Solving with Students cadre is a professional learning network that has helped secondary math teachers across Florida leverage student feedback to improve the learning environment. In this session, teachers who are currently engaged in Solving with Students will discuss their experiences and recommendations for ways teachers and districts can take the leap in middle and high schools to use direct student feedback to impact classroom culture and ultimately student success.

Kelly Zunkiewicz, Impact Florida, Tallahassee
Twitter: @impactfla

392 Solving Problems with Data: Tasks and Technology to Support Evidence-Based Decision-Making with Data

8–10 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Independence Ballroom F-H

This interactive session will share tasks that are designed to empower students to make evidence-based decisions using data. We will also share technology and resources to support engaging students in data investigations and developing students' productive habits of mind and dispositions related to statistics and data science.

Gemma Mojica, NC State University, Holly Springs, North Carolina
Emily Thrasher, NC State University, Durham, North Carolina
Adrian Kuhlman, NC State University, Raleigh, North Carolina
Bruce Graham, NC State University, Raleigh, North Carolina

393 Ideas for Centering All Students as Knowers, Doers, and Learners of Mathematics

10–12 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 146B

The Catalyzing Change series makes several key recommendations, but none is as important as engaging and empowering math instruction for all students. This session will consider ideas and strategies that empower all students, and especially those who have been traditionally disempowered, to see themselves as knowers, doers, and learners of mathematics.

Mark Russo, Pascack Valley Regional High School District, Montvale, New Jersey

394 Using the Desmos Teacher Dashboard to Elicit and Make Use of Student Thinking

10–12 Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Independence Ballroom D

Using prepopulated Desmos Teacher Dashboards and associated classroom video, teachers will engage with the practice of eliciting and making use of student thinking to support each and every student learning from and contributing to the secondary mathematics classroom.

Lara Dick, Bucknell University, Lewisburg, Pennsylvania
Allison McCulloch, UNC Charlotte, North Carolina
Jennifer Lovett, Middle Tennessee State University, Murfreesboro
Kristen Fye, Charlotte, North Carolina

395 Elevating Stakeholder Voices in the Development of a Math Vision and Curriculum

Coaches/Leaders/Teacher Educators Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 150A

We will share the framework and tools we used for engaging stakeholders in the development of a new math vision statement and curriculum. Using surveys, empathy interviews, and collaborative learning sessions with stakeholders (including students), we redeveloped our math system to address the root causes of our instructional challenges.

Kelley Grorud, School District of Beloit, Wisconsin
Twitter: @kelleygrorud
Meridith Falkavage, School District of Beloit, Wisconsin
Theresa Morateck, School District of Beloit, Wisconsin

396 Systematic Integrating of Counting Collections in K–5 Classroom Practice

Coaches/Leaders/Teacher Educators Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Liberty Ballroom L

Join us as we delve into how coaches and leaders can support the purposeful implementation of Counting Collections across K–5 grade classrooms. This session will discuss both the power of Counting Collections as learning tools and the (often overlooked) logistics of supporting sustainable classroom, school, and district-wide change.

Christine Jenkins, Hatboro-Horsham School District, Pennsylvania
Twitter: @ckellyjenks

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- Improving Core Instruction through Deeper Mathematical Content and Pedagogical Knowledge
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- Equity Strand
- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

396.1 Connected Mathematics Classroom: How My Students and I Find Joy and Build Resilience Together

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, Ballroom B

Our students have changed from and since the pandemic, and we teachers have changed, too. The research on childhood and adolescent mental health is very sobering. AND the science is promising!

We heal through connections. I will share with you my experiences, what they taught me, and some ideas to support belonging and personal connections in the mathematics classroom. And maybe there will even be a touch of mathematics to deepen our understanding of change and connections.

Rebecka Peterson, National Teacher of the Year, CCSSO

398 Beyond Career Day: Engaging Students in Thinking about STEM Careers

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 203AB

STEM careers are for *all* students! Learn how mastering Common Core State Standards for Mathematical Practice translates into workforce success by bridging the gap between STEM careers and classroom spaces. Explore proven strategies for hosting STEM professionals in your math classroom! Walk away with grade-specific engagement guides written for teachers, by teachers!

Kristen Record, Stratford BOE, Connecticut
Twitter: @KristenRec
Carly Bowden, Olatha Public Schools, Olathe, Kansas
Tim Stumpff, Charlotte-Mecklenburg Schools, North Carolina
Nola Greer, School District of Philadelphia, Pennsylvania

399 Fact Fluency: Foundations for Future Success!

General Interest Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, Ballroom A

The foundations of fact fluency include counting, deriving, number sense, conceptual understanding of operations, and more. Shortcutting building strong foundations robs students of exploration and understandings they need for future success. Learn about all phases of fact fluency and how to shepherd students through them.

Janet Pittock, Legends of Learning, South Lake Tahoe, California
Andrea Goddard, Flagler College, Tallahassee, Florida

400 Past President Address: Creating Spaces for Change: A Look Back over the Past Five Years Since Catalyzing Change

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 145AB

Five years have passed since the first publication in the Catalyzing Change Series came on the mathematics education scene. It began with a focus on high school, then two years later, early childhood, elementary, and middle school were addressed. Together they provided a framework to initiate critical conversations related to policies, practices, and issues that affect mathematics education. So, what has been happening? Have we created spaces for change to broaden the purposes of mathematics, create equitable structures in mathematics, implement equitable mathematics instruction, and support all learners to develop deep mathematical understanding as the recommendations propose? Let's explore this question through the lens of examining research and practice in the classroom, school districts, states, and nationally. Together we can identify potential next steps.

Trena Wilkerson, Past President, National Council of Teachers of Mathematics, Reston, Virginia; Baylor University, Waco, Texas

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401.1 Daring to DREAM: An Elementary Snapshot of our District-Wide Math Focus

General Interest Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 202A

Description: In this session, DC Public School educators from across our agency will share more about our DREAM – the DCPS Road to Equity and Achievement in Math. We will zoom in to walk through our elementary math (re)visioning work, how we set big goals to accomplish around the DREAM, and the first steps we are taking to ensure that every elementary math classroom in our city is providing joyful, equitable, and consistent math experiences that ensure students reach their fullest potential. We will start with a brief overview and then host a panel of DCPS senior leaders and educators to speak the math mindsets and learning we are embarking on as a district.

The DCPS Elementary Math and Science Team, DCPS Senior Leaders, and Educators

401.2 So, You Want to Explore Space?

General Interest Exhibitor Workshop
Walter E. Washington Convention Center, 143C

Join astronomer and National Geographic Explorer, Munazza Alam, for an in-depth conversation on space exploration! Educators will realize the deep connection between mathematics and astrophysics as Dr. Alam shares her experiences working with powerful telescopes, such as the Hubble Space Telescope and the James Webb Space Telescope. Educators will learn ways to guide students from their very own classrooms to eventually pursue a career in the vastness of space.

Big Ideas Learning, Erie, Pennsylvania

401.3 Playing with Quadratics in Standard Form & Other Curiosities

10–12 Exhibitor Workshop
Walter E. Washington Convention Center, 156

How can we engage our students in the beauty and wonder of mathematics? Often, we explore math in unusual places. But what about the puzzles that lie within mathematics itself? Come dive into interesting relationships within the world of Quadratics.

Texas Instruments, Dallas, Texas

401.4 A Culture of Conversation: Supporting Classroom Discussion and Maintaining Math Learning

6–8 Exhibitor Workshop
Walter E. Washington Convention Center, 159AB

Take a peek inside a Louisville, Kentucky classroom using Core Curriculum by MidSchoolMath to see and experience a classroom culture that fosters discussion and maintains math learning. Find out how students are able to easily recall lessons and standards from months prior and walk away with practical ideas for increasing mathematical conversations and supporting recall in your classrooms.

MidSchoolMath, Taos, New Mexico

401.5 Same and Different: What's New in *Bridges in Mathematics Third Edition*

3–5 Exhibitor Workshop
Walter E. Washington Convention Center, Exhibit Hall D, Th1

The Math Learning Center develops student-centered K–5 materials based on visual models and problem solving. We created *Bridges in Mathematics Third Edition* with equity in mind so students have choice, feel included, and can be heard. What else has changed? Join us to see how the curriculum expands representation, offers suggestions for increasing engagement, and includes more relevant, open-ended tasks that support sensemaking and develop positive math identities.

The Math Learning Center, Salem, Oregon

Visit the NCTM Exhibits in Hall D
Grades 9–12

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402 Confronting Deficit-Based Views of Children: Building on Strengths in Elementary Classrooms

PreK–2 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 202B

Despite what we hear in the media, all children have strengths upon which we can build. Yet, students are often labeled high/average/low or above/below grade level. This session will explore student work samples and video clips to identify children's strengths, understand their needs, and explore avenues for growth—the students' and our own.

Ryan Flessner, Butler University, Indianapolis, Indiana
Twitter: @ryanflessner
Courtney Flessner, Central Indiana Educational Services Center, Indianapolis

403 Counting Collections: Building and Accelerating Essential Foundations for Young Learners

PreK–2 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Independence Ballroom A-C

Learning mathematics should be humanizing, liberating, healing, and joyful. Counting collections is a powerful routine in the early childhood classroom that provides opportunities for high engagement, deep learning, and joy. Come explore how this routine supports culturally responsive practices.

Danielle Robinson, Milwaukee Public Schools, Wisconsin
Twitter: Robinson
Claire Madden, Milwaukee Public Schools, Wisconsin
Lakesha King, Milwaukee Public Schools, Wisconsin

404 Inclusive and Engaging Teaching Strategies That Develop *All* Students into Mathematical Thinkers

PreK–2 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 149AB

How do we empower every student to engage in problem solving and mathematical thinking? We'll discuss teaching practices that create inclusive classrooms, build student agency, and promote access for *all* of our students to participate in mathematical thinking, discourse, and meaningful connections. Ready-to-use resources provided.

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

405 "Launching" Story Problems to Empower Children as Mathematical Sense Makers

3–5 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 150B

How we introduce story problems can make or break lessons! We will introduce a toolbox of four "launching" practices that help children make sense of story problems by engaging their imagination, curiosity, and past experiences. Participants will watch video and explore data from a recent study to experience this toolbox with fraction problem solving.

Katie Tuttle, University of North Carolina – Greensboro
Vicki Jacobs, University of North Carolina at Greensboro

406 A Deep Understanding of Division

3–5 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 147A

Join us to dig deeper into the meaning of whole number, rational, and integer division. Manipulatives, pictures, and abstract representations will be explored to fully understand division models and algorithms.

Barbara Boschmans, Northern Arizona University, Flagstaff
Brian Beaudrie, Northern Arizona University, Flagstaff

407 Take a MathWalk with Me: Using MathWalks to Connect Students to the Mathematics a round Them

3–5 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Independence Ballroom E

Participants will engage in meaningful discussion of the engagement of students in mathematics outside of the classroom in the spirit of ethnomathematics. A MathWalk project with preservice teachers at three universities will be highlighted with examples and background, and participants will then get to create their own MathWalks to share.

Nirmala Naresh, University of North Texas, Denton
Siddhi Desai, Fairleigh Dickinson University, Lawrenceville, New Jersey

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408 Mathematical Language Routines: Cultivating Conversation in Middle School Classrooms

6–8 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Judiciary

Come learn how math language routines simultaneously support sense making and language development. We'll experience these routines to see how mathematical ideas take shape through language as well as look at student work to see how discourse can support understanding and develop community, giving all students access to high-quality math instruction.

Jennifer Wilson, Illustrative Mathematics, Black Mountain, North Carolina
Twitter: Jennifer Wilson
LaToya Byrd, illustrative Mathematics, Conyers, Georgia

409 Mathematics Interventions: Examining Student Work to Make Appropriate Instructional Decisions

6–8 Workshop
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, 102AB

The purpose of teaching is student learning. Student learning is measured using various assessments. Results of such assessments provide information that we cannot ignore. During this workshop, participants will engage in deep thought regarding learning progressions of proportional reasoning that provide insight on appropriate interventions.

Tashana Howse, Georgia Gwinnett College, Lawrenceville
Twitter: @tdhowse_math

410 Modeling Matters! Examining the Progression of Representations and Manipulatives

6–8 Workshop
SESSION CONTENT LEVEL: Intermediate
Marriott, Liberty Ballroom I-K

Time is the resource we need the most, yet get the least. How often do we have time to critically examine what students are learning outside of our grade band? In this session, we will follow the progression of representations and manipulatives from the foundations in kindergarten through calculus.

Shelby Strong, Lesley University, Worcester, Massachusetts
Twitter: @Sneffleupagus
Kit Golan, Belmont, Massachusetts
Jennifer Miles, Lesley University, Wakefield, Massachusetts

411 The Sum of Us: Power Reimagined in Mathematics

6–8 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 206

This session shares ideas to build communities of powerful math makers. We will examine how to center on stories and hi/stories of resistance and solidarity as sites for mathematical investigation and ways to create spaces that center on BIPOC students' and teachers' identities, stories, and joy through mathematics.

Naehee Kwun, UCI, irvine, California
Twitter: @NaeheeK
Kyndall Brown, Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; University of California–Los Angeles, California
Cathery Yeh, Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; University of Texas at Austin

413 Humanizing Assessment: Partnering with Students through a Portfolio Model

8–10 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Chinatown

How can a badging system be used to energize high school mathematics and transform the way we think about student learning? In this session, we situate the use of a portfolio model as evidence of student learning within a larger restructuring of high school mathematics and show how a portfolio can center student choice and voice.

Shelbi Cole, Student Achievement Partners, Trinity, Florida
Twitter: @ShelbiCole1
Vanessa Cerrahoglu, Orange County Department of Education, Huntington Beach, California
Nolan Fossum, Mount Miguel High School, Spring Valley, California
Amber Walker, Student Achievement Partners, New York, New York

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Creating Inclusive, Engaging, and Rigorous Mathematics for All
Challenging and Advancing Policy and Structures in Mathematics Education
Expanding the Narrative of Who Belongs
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Presidents' Series
New Teacher Strand
Equity Strand
NCTM Committee Session
New NCTM Publication Session
Exhibitors Workshop

414 Modeling Can Be Messy

8–10 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 204AB

We will experience the messiness of a modeling task, reflect on our experience, identify instructional choices for increased accessibility, and connect SMPs and UDL guidelines. We will consider how students see themselves in learning and applying mathematics, the need for diverse contexts, and how to include community-based and global contexts.

Bridget Soumeillan, Great Minds, Richmond, Virginia
Twitter: @BSoumeillan
Selena Oswalt, Baton Rouge, Louisiana

415 SEL: What's Math Got to Do with It?

8–10 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Capitol Congress

Strengthen SEL in your classroom by prioritizing the Social Emotional and Academic Development (SEAD) themes: Agency, Belonging, Discourse, and Identity. Engage in a math task, and connect the themes with the Standards for Mathematical Practice and Content to promote a safe, equitable, and empowered class culture.

Jocelyn Dunnack, CPM Educational Program, Elk Grove, California
Twitter: @JocelynDunnack
Mark Jones, CPM Educational Program, Elk Grove, California

416 Connecting Trigonometry and Geometry in an Inclusive Classroom

10–12 Workshop
SESSION CONTENT LEVEL: Intermediate
Marriott, Supreme Court

A math class has a diverse set of abilities, with varying levels of math anxiety and/or students who must learn math in tandem with a new language. Our development of the 16-point Unit Circle will reveal why trigonometric terms such as secant and tangent are derived from their geometry counterparts. Paper folding, measurement, basic calculations, and dynamic geometry will drive this presentation toward conceptual understanding while providing success through multiple entry/exit points.

John Ashurst, Harlan Independent Schools (Retired), Kentucky
Twitter: @kiltedcyclist
Lindsay Gold, University of Dayton, Ohio
Michael Houston, Riverside Beaver County School District, Ellwood City, Pennsylvania
Karen Campe, Karen Campe, New Canaan, Connecticut

417 Exploring Logarithms through Experimentation and Play with Manipulatives

10–12 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 207A

Learn how to create and use a new manipulative to discover the properties of logs! Make use of physical manipulatives that display all the properties of logs and allow for discovery of these properties through play and experimentation. All attendees will get a free two-dimensional version of the manipulative and materials to use with their students.

Philip Dituri, FiCycle/Dituri Consulting, Brooklyn, New York
Twitter: phildituri
Jack Marley-Payne, FiCycle, New York, New York

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Challenging and Advancing Policy and Structures in Mathematics Education
Expanding the Narrative of Who Belongs
Improving Core Instruction through Deeper Mathematical Content and Pedagogical Knowledge
Presidents' Series
New Teacher Strand
Equity Strand
NCTM Committee Session
New NCTM Publication Session
Exhibitors Workshop

418 Group Activities to Get Students Talking in AP Calculus: Instructional Approaches from the CED

10–12 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 209ABC

Get students talking and writing about math! We will use my favorite collaborative work structures and instructional practices to explore key concepts from calculus. Activities include Derivative Card Sort; Predict and Confirm; Free Response Writing Series; Quiz-Quiz-Trade, and Integral Discussion Groups. Activities can be adapted for multiple topics.

Karen Hyers, Tartan High School, North Saint Paul, Minnesota
Twitter: @keyhyers

419 Origami Math: Exploring Parallelograms and Special Right Triangles through the Art of Paper Folding

10–12 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 143AB

By the end of the workshop, attendees will have gained a better understanding of symmetries, rotations, proof, and the Unit Circle through origami. The first part has participants folding parallelograms, squares, rectangles, and rhombuses, and discovering their properties. The second part leads participants through folding special right triangles.

Tracy Conte, WCPSS, Knightdale, North Carolina
Twitter: @PlayingWithDice

420 A Systemic Approach to Access and Equity in Mathematics

Coaches/Leaders/Teacher Educators Workshop
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, 152B

The Clayton County Mathematics Department put social justice and equity in the hands of the students using mathematical models to analyze social issues and a systemic structure that empowered the educators to implement the tools that promote equity and access in mathematics. The I'm W.O.K.E. project makes math matter for all students.

Tonya Clarke, Figtree and Siblings, LLC, Jonesboro, Georgia
Twitter: @clarkesgotclass
Charlene Matthew, Clayton County Schools, Jonesboro, Georgia
Marsha Lee, Clayton County Schools, Jonesboro, Georgia
Naketa Winfrey, Clayton County Schools, Jonesboro, Georgia
Tiffanie Nealy, Clayton County Public Schools, Jonesboro, Georgia

421 Centering *Catalyzing Change* in Your School Mathematical Community: Tips and Collective Planning

Coaches/Leaders/Teacher Educators Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 144ABC

Have you been wondering how to use the book *Catalyzing Change* to learn collectively with others? This session will highlight some of the ways in which coaches facilitated a state-wide book study with teachers and leaders. Participants will consider the key recommendations though discussion protocols, documenting thinking over time in an interactive setting.

Holly Tate, Fairfax County Public Schools, Burke, Virginia
Twitter: @HTMathematics
Alicia Broadwater, Virginia Beach Public Schools

Uplifting and Inspiring the Mathematics Educator
Creating Inclusive, Engaging, and Rigorous Mathematics for All
Challenging and Advancing Policy and Structures in Mathematics Education
Expanding the Narrative of Who Belongs
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New Teacher Strand
Equity Strand
NCTM Committee Session
New NCTM Publication Session
Exhibitors Workshop

422 Supporting and Extending Students' Mathematical Thinking

PreK–2 Workshop

SESSION CONTENT LEVEL: Intermediate

Walter E. Washington Convention Center, 146C

In this session, we will review and then rehearse approaches to supporting students to solve problems in ways that make sense to them and enabling students to see how they can extend their ideas. We will rehearse launching, eliciting, and following up on students' mathematical ideas. The operations will serve as the mathematical focus of the session.

Megan Franke, UCLA, Los Angeles, California
Twitter: @meganlfranke

Visit the NCTM Exhibits in Hall D
Grades 3–5

- Uplifting and Inspiring the Mathematics Educator
- Creating Inclusive, Engaging, and Rigorous Mathematics for All
- Challenging and Advancing Policy and Structures in Mathematics Education
- Expanding the Narrative of Who Belongs
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- New Teacher Strand
- Equity Strand
- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

424 Centering Student Voice and Discourse

PreK–2 Session
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, 202A

How can we empower our students to engage with and listen to each other's ideas? During this session, we'll explore how to get students talking about math with a focus on how they talk and listen to each other. Often, math discussions are centered on one teacher and a few students. We've become interested in investigating how our students communicate about math with each other. Come play with some math ideas and learn how our students are engaging with one another.

Zachary Champagne, The Discovery School, Jacksonville Beach, Florida
Twitter: @zakchamp
Claire Riddell, The Discovery School, Jacksonville, Florida

425 Mathematizing Children's Literature: Nurturing Students' Sense of Belonging through Read Alouds

PreK–2 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, Ballroom A

Within the pages of children's literature lie vibrant opportunities for young children to see themselves as mathematicians and build connections among stories, their lives, and the world. Join us to think about how to approach stories to expand the narrative of who belongs in mathematics while nurturing positive mathematical identities.

Allison Hintz, University of Washington, Bothell
Twitter: @allisonhintz0124
Antony Smith, University of Washington Bothell

426 Meaningful Math: Improving Student Outcomes by Integrating Content and Process through PBL

PreK–2 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 101

Participants will be introduced to the three-layered approach to mathematics integration in project-based learning. They will explore a variety of PBL units and will learn special considerations for intentionally integrating math skills and content that lead to powerful student outcomes.

Sara Lev, Early Childhood PBL, LLC, Los Angeles, California
Twitter: @saramlev
Judith Fabrega, Innovamat and Universitat Autononoma de Barcelona, Spain
Amanda Clark, Early Childhood PBL, LLC, Des Moines, Iowa
Erin Starkey, Early Childhood PBL, LLC, San Antonio, Texas

427 Chat GPT: Harnessing the Affordances for Lesson Planning, Task Design, and Homework Help

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 146B

Math teachers are uniquely prepared for the launch of Chat GPT because they have already overcome the obstacles of teaching using calculators, Photomath, and other answer-generating tools. Learn how to use the affordances of Chat GPT in your planning to create better tasks, extension problems, real-world (authentic) problem solving, and homework help. You will also learn tips on how to support teachers in other subject areas to learn how to use the affordances of the tech tool.

Theresa Wills, George Mason University, Fairfax, Virginia
Twitter: @theresawills
Jennifer Suh, Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; George Mason University, Fairfax, Virginia
Kate Roscioli, Neabsco Elementary School, Bristow, Virginia
Kendra Heffelbower, George Mason University, Fairfax, Virginia
Maureen Vora, George Mason University, Fairfax, Virginia

- Uplifting and Inspiring the Mathematics Educator
- Creating Inclusive, Engaging, and Rigorous Mathematics for All
- Challenging and Advancing Policy and Structures in Mathematics Education
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- Exhibitors Workshop

428 Integration of Literacy and Mathematics in Elementary Grades

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Union Station

Often, mathematics and literacy are taught as two different and separate sets of knowledge and skill. In this session, participants will learn how to integrate the teaching and learning of mathematics and literacy. Participants will engage in a sample lesson sequence supporting student mastery of mathematics and literacy.

Briana Ivey, Independent, Austin, Texas
Victor Sampson, The University of Texas at Austin

429 Planning and Facilitating a Strengths-Based Mathematics Classroom to Support Student Success

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Archives

Cultivate students' learning opportunities using students' strengths to develop transformative and strategic instruction that capitalizes on what students know. We will explore how we can strategically use language, feedback, and specific instructional practices to reimagine our learning spaces from focusing on deficits to celebrating strengths.

Beth Kobett, Stevenson Univeristy, Eldersburg, Maryland
Twitter: bkobett
Karen Karp, Johns Hopkins University, Baltimore, Maryland

430 "Be Curious, Not Judgmental": How These Words Help Every Student Become a Confident Math Thinker

6–8 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 151A

Many students think their role is to produce answers. When we measure success by rightness/wrongness, many students lose hope and decide math is not for them. Let's flip this script by empowering students *and* teachers to be curious, using questions and differentiated extensions to get students unstuck and help them become confident math thinkers.

Raj Shah, Math Plus Academy, Powell, Ohio
Twitter: @drrajshah

431 Strategies to Infuse Executive Function Supports into Middle Grades Math Classrooms

6–8 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Marquis Ballroom Salon 12&13

Improving executive function skills is a powerful lever to support students in becoming proficient mathematics learners. Join us to learn how various strategies to strengthen and support EF skills in math classrooms have been implemented in math learning prototypes and how you can use these strategies to support math learning in your own classroom.

Michelle Tiu, AERDF, Oakland, California
Melina Uncapher, Oakland, California
Karin Lange, Moore, Oklahoma

432 How about Some Stats? Let's Try Some Quality Activities You Can Use in Your Core Classes

8–10 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Treasury

Need help teaching and/or incorporating the CCSS statistics/probability standards in grades 8–12? Would you like to see and participate in some activities that promote them (and where they fit in)? Come spend an hour with us to see ready-to-implement activities that truly follow the progression. Traditional or Integrated pathway? We can help!

Chad Shepherd, Pontiac Township High School, Illinois
Twitter: @cshep75

433 Planning Questions and Responding: How Do I Privilege Student Thinking?

8–10 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 147B

How can questioning support student thinking? Questioning can honor and encourage student thinking so students do the sense making. Explore planning questions, anticipating responses, and developing actions to engage students in learning. Tools are provided to create environments where students do the sense making.

Edward Nolan, Moravian University, Bethlehem, Pennsylvania
Twitter: @ed_nolan

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- Exhibitors Workshop

434 Uncovering Personal Biases for More Equitable Pedagogy

8–10 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Shaw/LeDroit Park

Current mathematics teaching initiatives encourage equitable teaching practices so that we can better serve students who have been historically marginalized in our classrooms. This presentation seeks to provide teachers with resources to reflect on their unconscious biases and make pedagogical change on the basis of how those biases manifest themselves in the classroom.

David Dai, Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; Barton Academy for Advanced World Studies, Alabama
Twitter: @dai_mathguy

435 Bringing Geometry to Precalculus: Using Matrices to Transform Plane Figures

10–12 Session
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, 150A

Come learn how to turn matrix multiplication from mysterious to marvelous for your students! Together we will take a geometric look at the new AP Precalculus curriculum and explore transformations of plane figures using 2×2 matrices as operators on shapes—including both polygons and conics—defined using vectors.

Gregory Foley, Ohio University, Athens
Karen Campe, Karen Campe, New Canaan, Connecticut

436 Student-Centered, Student-Paced Learning in the Blended Classroom with Project-Based Assessments

10–12 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 203AB

How can we close the achievement gap? How can we make learning accessible to all students? How can we enable all students to succeed? In this session, we will share how we revolutionized our classrooms to put the students in the driver seat of their learning so everyone can succeed.

Jeannette Newman, Gar-Field High School, Woodbridge, Virginia
Twitter: @MrsNewmanGFHS
David Postlethwait, Hempfield Area School District, Herminie, Pennsylvania
Shannon Miller, Prince William County Public Schools, Manassas, Virginia

437 You Want Great Answers? You Need Great Questions

10–12 Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Independence Ballroom D

Examine question types that promote higher equity in your classroom by having students play an active role in their learning. Learn how to elevate discourse by planning which questions to ask, anticipating results, and helping students form their own sense of mathematical identity. Adapt tasks to increase access for all students.

Kieran Flahive, Arrupe College of Loyola Univ, Chicago, Illinois
Fred Dillon, Fred Dillon, Strongsville, Ohio

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- New Teacher Strand
- Equity Strand
- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

438 Embracing the Joy of Teaching with Ethnomathematics

Coaches/Leaders/Teacher Educators Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 145AB

During the past 15 years, the University of Hawai'i Ethnomathematics Program has created a worldwide network of mathematics educators. Collaborative in-person and online experiences contributed to building a thriving community of learners. Join us as the staff and students share about how we develop and sustain this professional learning network.

Linda Furuto, University of Hawai'i at Mānoa, Honolulu, Hawaii
Twitter: @lindafuruto
Janel Marr, University of Hawai'i at Mānoa, Honolulu, Hawaii
Antonina Monkoski-Takamure, University of Hawai'i at Mānoa, Honolulu, Hawaii

439 Establishing Equitable, Inclusive, and Affirming Mathematics Learning Environments

General Interest Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 152A

Classroom discourse will be used as a framework for designing mathematics learning environments that are equitable, inclusive, and affirming. Examples will include strategies for English learners and students with special needs.

Gladis Kersaint, University of Connecticut, Storrs
Twitter: @GKersaint

440 Math Workshop: Creating the Classroom Experience You Wish You Had as a Student

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Monument

Don't you wish you had a math experience in which you were respected and valued; a place where you could take risks, have a voice, and find joy? Although we may not have had that when we were in school, we can create a positive, welcoming, and inclusive math experience for our students by using a math workshop model in our classrooms.

Jennifer Lempp, Educational Consultant, Alexandria, Virginia
Twitter: @Lempp5

441 Mathematical Practices: The Pathway to Equitable, Rigorous PBL Projects

General Interest Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, Ballroom B

Project-based learning is a powerful tool for students to engage deeply with and see themselves in mathematics. Achieving this lofty goal involves leveraging the Standards of Mathematical Practices into a project. In this session, we will unpack how to weave the practices into a PBL project to support rigorous instruction and equitable engagement.

Sheila Orr, Michigan State University, East Lansing
Twitter: @mrssheilaorr
Sarah DiMaria, Cedars International Next Generation High School, Austin, Texas
Carlee Madis, Flint, Michigan

441.1 5 Classroom Habits to Shift a Students' Math Identity – And Why it Matters More Than You Think

General Interest Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Liberty Ballroom L

Students bring their unique math identity to your room, formed by years of math experiences. Their past is beyond your influence, but their future has yet to be written. This engaging session reveals five little-known habits that can shift a student's (or teacher's) math identity in less than 60 seconds a day. It's the foundation we build from.

Liesl McConchie, Math With the Brain in Mind

442 Three Engaging Methods to Uncover and Fix Hidden Student Misconceptions

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, Ballroom C

It's frustrating when students appear to understand our lessons, only to find out later that they had many misconceptions. Imagine instead that we had three strategies we could incorporate to reliably spot and fix these issues, that students loved using them, and that they'd work even if students didn't realize they had misunderstandings.

Robert Kaplinsky, robertkaplinsky.com, Long Beach, California
Twitter: @robertkaplinsky

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- Improving Core Instruction through Deeper Mathematical Content and Pedagogical Knowledge
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- New Teacher Strand
- Equity Strand
- NCTM Committee Session
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442.1 Practical Measures for Continuous Improvement and Advancing Equity in Middle Grades Math

6–8 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Liberty Ballroom N–P

When teachers and instructional leaders work to shift pedagogical practice, they often lack access to a coherent set of high-quality practical measures to understand their progress and inform their next steps. To address this gap in the field, WestEd has developed a repository of practical measures that give insight into classroom processes, student experiences, and teachers' daily work. This presentation details WestEd's repository and how the measures have been used in improvement efforts.

Sola Takahashi, WestEd, San Francisco, California
Kirk Walters, WestEd, San Francisco, California
Andrew Brannegan, WestEd, San Francisco, California
Fri, 10/27: 2:30 PM - 3:30 PM

442.2 Game On: How Prodigy's Digital Gaming Experience Ignites the K-8 Classroom!

3–5 Exhibitor Workshop
Walter E. Washington Convention Center, 156

Join us to learn how to ignite learning in the K-8 classroom with Prodigy Math, North America's most popular game-based learning platform! In this session, we'll cover the award-winning student experience, provide details about our adaptive algorithm, train you on key teacher features, and share teacher-to-teacher tips to help you use Prodigy Math effectively. Additionally, we'll outline how we provide Prodigy Math at NO COST to educators thanks to our unique freemium business model.

Prodigy Education, Beamsville, Ontario

442.3 Math Teacher Lounge LIVE!

General Interest Exhibitor Workshop
Walter E. Washington Convention Center, 158AB

Join us for a live Math Teacher Lounge podcast session with Dan Meyer and a special guest! We'll be investigating math fluency and finding fun ways to get all students engaged in math instruction. Participants will even have a chance to be featured on this season of the podcast. Doors open at 2:15 PM and the session starts at 2:30 PM You won't want to miss it!

Amplify, Brooklyn, New York

442.4 Exploring Function Transformations

10–12 Exhibitor Workshop
Walter E. Washington Convention Center, 159AB

Provide your students the opportunity to explore and discover the effects changing parameters has on a parent graph. In this session, Tom Reardon will engage participants in utilizing the graphing feature and the transformational graphing app on the TI 84 Plus CE to help students build a conceptual understanding of transformations.

Texas Instruments, Dallas, Texas

442.5 Ensure Sensemaking with Mindful Problem Solving for Reflective Inquiry-based Learning

General Interest Exhibitor Workshop
Walter E. Washington Convention Center, 143C

Build mastery and bring joy to the classroom with ways to implement mindful inquiry-based learning into math instruction. See how empowering introspection addresses learning loss in math. Plus, learn how problem-solving helps establish foundations while encouraging self-directed learning through reflection, resourcefulness, and more. Can't make this session? Stop by the Heinemann Publishing booth (#205) for more information on Problem Solving and other inquiry-based support.

Heinemann Publishing, Portsmouth, New Hampshire

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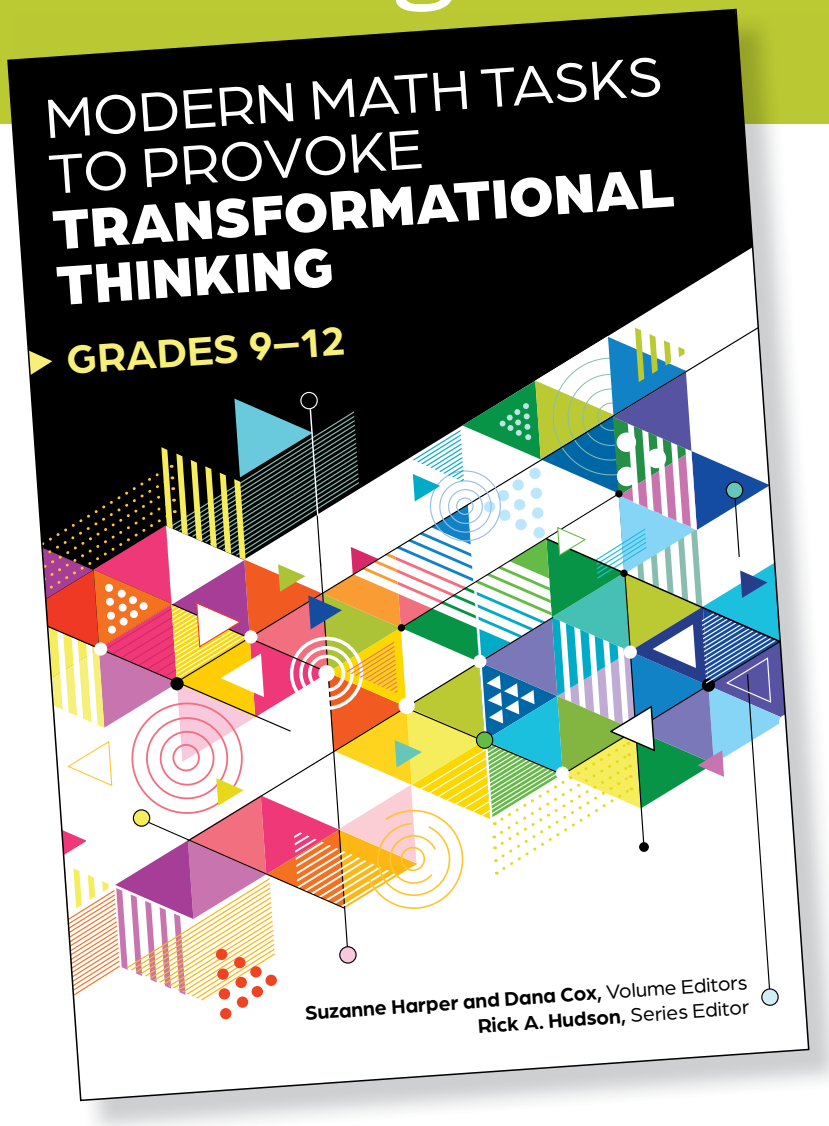

Putting action into mathematics refers to the fact that teachers should rethink how mathematics has traditionally been taught in schools by making rich tasks and collaboration as the focus of instruction. With *Modern Math Tasks to Provoke Transformational Thinking, Grades 9-12,* teachers can put action into mathematics lessons by providing contextualized problems that motivate students to learn and focusing instruction on the thinking and work of students. Furthermore, teachers can leverage the power of collaborative thinking to solve mathematical problems in the 9-12 classroom.

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By Rick A. Hudson

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Attend session 351,
"Modern Math Tasks: Transforming Change through Political, Social, Civic, and Design Literacies,"
Friday at 11:00 AM | Marriott: Independence Ballroom D

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444 Intentional Interactions for Equity and Mathematization

PreK–2 Workshop
SESSION CONTENT LEVEL: Intermediate
Marriott, Independence Ballroom A-C

All children bring funds of knowledge to learning. We will examine ways to notice and appreciate nonverbal, informal mathematical understandings of children (birth through age 8). We will analyze strategies to mathematize knowledge and examine ways we can intentionally use these strategies to create equitable and inclusive spaces for all children.

Kateri Thunder, Independent, Charlottesville, Virginia
Twitter: @MATHplusLIT
John Almarode, James Madison University, Harrisonburg, Virginia

445 Building a Community of Mathers by Leveraging the Standards for Mathematical Practice

3–5 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 207B

The goal of this session is to examine the Standards for Mathematical Practice (SMP) and to connect each practice to instructional moves that support the development of positive math identity and equitable math practices. By engaging in math routines that focus on these standards, participants will discover the untapped power of SMP.

Deborah Peart, My Mathematical Mind, St Petersburg, Florida
Twitter: @debpeart1
Adrienne Baytops-Paul, My Mathematical Mind, Upper Marlboro, Maryland
Latisha Jones, My Mathematical Mind, Atlanta, Georgia

446 Deepen Mathematical Understanding and Encourage Flexible and Visible Thinking with Rich Math Tasks

3–5 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 147A

Work together with colleagues to actively engage in authentic performance tasks. Explore ways to incorporate tasks into math instruction, helping your students develop critical thinking, reasoning, and communication skills. Hear about the experiences of our students as they became capable, confident problem solvers.

Tracey Curcio, Chesterfield County Public Schools, Virginia
Twitter: Tracey Curcio
Kimberly Bender, C.E. Curtis Elementary School, Chester, Virginia
David Neglia, C.E. Curtis Elementary School, Chester, Virginia

447 Embrace the Problem-Solving Process: It's Messy!

3–5 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 206

Problem solving is a messy process, and students can learn to embrace it. Regardless of the learning and teaching environment, students should receive rich mathematical tasks and structures to support the discourse. Let's explore the structures that allow students to engage in discourse and reasoning.

Rob Nickerson, ORIGO Education, Lakewood, Colorado

448 Mastering Fractions with Deep Understanding, Fluency, and Real-Life Problem Solving: Success for All!

3–5 Workshop
SESSION CONTENT LEVEL: Intermediate
Marriott, Independence Ballroom E

Are you looking for great ideas to help every student understand fractions? Come learn strategies to develop deep understanding of fractions, focusing on fractions as numbers, equivalent fractions, operations with fractions, and decimal equivalence. Actively engage with effective questioning strategies and real-world problem solving. Handouts.

Donna Knoell, Independent, Shawnee Mission, Kansas
Twitter: DonnaKnoell#DonnaKnoellonnaKnoell

449 New Uses of Equations to Explore Fraction Relationships

3–5 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Judiciary

Discover new ways to use equations in fraction instruction! Children naturally use and articulate fraction relationships when solving story problems. Follow-up equations that highlight these relationships can help develop a deeper understanding of fractions. Participants will engage with video to see examples and practice constructing these equations.

Vicki Jacobs, University of North Carolina at Greensboro
Susan Empson, Austin, Texas
Joan Case, Greensboro, North Carolina

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Equity Strand
NCTM Committee Session
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Exhibitors Workshop

450 Embedding Statistical Investigation into Elementary Classrooms

6–8 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Liberty Ballroom I-K

We know that all children need opportunities to collect and make sense of data, but where can we find the time? In this session, participants will engage in a lesson from GAISEII's Ladybugs sequence designed to introduce young learners to variation across the four stages of a science statistical investigation.

Christine Franklin, American Statistical Association, Watkinsville, Georgia
Leticia Perez, WestEd Data Fluency Development Lead, San Francisco, California

451 Making Measurement Formulas Meaningful

6–8 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Capitol Congress

Participants will take a hands-on journey through discovering area, surface area, and volume formulas. Activities will show how formulas relate to and build on one another as well as distinguish between different types of measurement units.

Audrey Bullock, Austin Peay State University, Clarksville, Tennessee

452 Reimagining Fluency through Powerful Routines in the Secondary Math Classroom

6–8 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 209ABC

In this session, teachers will learn strategies for engaging students in activities that promote the development of fluency within various grade-level strands. The fluency routines modeled and practiced in this session will provide teachers with highly-effective strategies designed to shift how fluency is learned and practiced in the classroom.

Shannon McCaw, EdGems Math LLC, Neptune, New Jersey
Jessica Reyes, EdGems Math, Neptune, New Jersey

453 You Can Build Your Own Thinking Classroom

6–8 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 102AB

Have you heard of Dr. Peter Liljedahl's book, *Building Thinking Classrooms in Mathematics*? Are you interested in giving it a try but are unsure about how to get started or how it might work in your classroom? Join us as we show you how we've introduced teachers to the BTC practices and supported them as they've built their thinking classrooms.

Julie Frizzell, Region 10 Education Service Center, McKinney, Texas
Twitter: @MzFrizzMath
Kim Jones, Region 10 ESC, Richardson, Texas

454 How Will You Modernize *Your* Mathematics Ecosystem?

8–10 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 149AB

States across the country are taking bold steps to modernize systems and improve access to higher-level mathematics. Join leaders from California, Virginia, Oregon, and Utah and explore reimagined math pathways that provide access for marginalized populations historically excluded from STEM fields by the singular track to college via calculus.

Stephanie Melville, Independent, San Diego, California
Lindsey Henderson, Utah State Board of Education, Salt Lake City
Mark Freed, Oregon Department of Education, Salem
Deborah Crawford, Frederick County Public Schools, Stephens City, Virginia
Tina Mazzacane, Glen Allen, Virginia

Thank you to all of the volunteers who have helped make this Conference a success!

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- Improving Core Instruction through Deeper Mathematical Content and Pedagogical Knowledge
- Presidents' Series
- New Teacher Strand
- Equity Strand
- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

455 Owning versus Renting Knowledge: Using Writing in Mathematics Classes to Solidify Comprehension

8–10 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 204AB

How many times have your students proclaimed, "I can solve the problem; I just can't explain it"? Students who can solve yet not explain how they solved a problem are renting rather than owning knowledge. Writing in mathematics provides students with opportunities to explore concepts, clarify meaning, elaborate on what they are learning, and think on paper. You will gain a window into your students' thinking, have opportunities to refine where needed, and spend less time reteaching.

Megan Clementi, Pennsylvania Department of Education, Harrisburg
Twitter: @Momma_Cherub

456 Real-World Math Activities for Informed Citizenship

8–10 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Chinatown

Quantitative reasoning is at the heart of understanding our world and solving authentic problems. In this experiential session, engage in activities—data analysis, graphing, modeling and representation—to better understand social, environmental, and economic trends that shape our lives and require informed civic participation.

Carol Bliese, Population Education, Washington, District of Columbia
Twitter: @PopulationEd
Katie Grams, Washington, District of Columbia

457 Bridging AP Statistics and Data Science: A Motivating Postexam Project

10–12 Workshop
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, 143AB

By the end of AP Statistics, students can interpret study designs and summary statistics. Yet they have little experience working with raw, multivariate data and modern software. Let's bridge the gap. Come learn about a post-AP Exam data science project that uses R (for beginners) and multiple regression to get students hooked on doing more with data.

Ji Son, California State University, Los Angeles
Twitter: @cogscimom
Dashiell Young-Saver, Skew The Script, San Antonio, Texas

458 Cardioids, Limaçons, Lemniscates, and Roses: The Geometric Definitions of Polar Curves

10–12 Workshop
SESSION CONTENT LEVEL: In-Depth
Marriott, Supreme Court

Cardioids, limaçons, lemniscates, and roses are famous mathematical curves with their own independent geometric definitions. Just as we first define a circle and later discover the formula, let's take these curves seriously. We will define them geometrically and then prove their formulas. Rethink the entire unit on polar coordinates!

William Rose, Montgomery Blair High School, Silver Spring, Maryland
Twitter: @dodecahedra

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Expanding the Narrative of Who Belongs
Improving Core Instruction through Deeper Mathematical Content and Pedagogical Knowledge
Presidents' Series
New Teacher Strand
Equity Strand
NCTM Committee Session
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Exhibitors Workshop

459 Content, Pedagogy, and Technology: The UCLA IDS Model for Professional Development in Data Science

10–12 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 150B

Why do students make claims based on experiences even in the presence of data? Can teachers generate productive discussions from problematic statements when discussing real-world issues? Join us for a short data science PD about learning to discern chance differences from real differences to develop "data talk" as a means to productive discourse.

Suyen Machado, UCLA-Statistics Department, Los Angeles, California
Twitter: @uclaIDS
Rob Gould, UCLA, Los Angeles, California
Monica Casillas, UCLA DSEC, Sylmar, California
Carole Sailer, North Hollywood, California

460 Tips from the AP Calculus Test Development Committee to Foster Student Understanding and Mastery

10–12 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 207A

The best preparation for the AP Calculus exam is a long-term investment in conceptual understanding and practice of course skills. Using collaborative activities appropriate for varied levels of proficiency, we will explore the calculus concept of accumulation of change in several contexts. We will also share ideas for use in vertical teams.

Stephanie Ogden, College Board, Knoxville, Tennessee
Twitter: Stephanie B Ogden
Sharon Taylor, Georgia Southern University, Statesboro

462 Building Discussions of Mathematics Teaching Pedagogy from Teachers' Experience and Thinking

Coaches/Leaders/Teacher Educators Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 151B

How do you plan for pedagogical discussions with teachers? Explore key factors in planning discussions of mathematics pedagogy for preservice and in-service teachers, going beyond what we know about discussions of mathematics. Research-based approaches, including anticipating thinking about pedagogy and creating discussion questions, will be shared.

Signe Kastberg, Purdue University, West Lafayette, Indiana
Susan Hillman, Saginaw Valley State University, University Center, Michigan
Alyson Lischka, Middle Tennessee State University, Murfreesboro

463 New Teacher Celebration

Coaches/Leaders/Teacher Educators Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 152B

Come and celebrate the progress and possibilities as new and early-career teachers, or as a teacher still in training. Meet and network with the NCTM Board and leadership and other new and early-career teachers. We'll have refreshments and prizes, too!

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

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- Presidents' Series
- New Teacher Strand
- Equity Strand
- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

464 Community, Culture, and Three-Act Tasks: Fostering Belonging in Mathematics

PreK–2 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Monument

How can three-act tasks help students see themselves in the primary math classroom and connect to their families, culture, and community? In this session, we will explore three-act tasks through culturally responsive teaching and investigate strategies that value and honor the knowledge, skills, and experiences that students bring every day.

Justin Burris, University of Houston, Richmond, Texas
Twitter: @drburrismath
Carrie Cutler, Spring, Texas

465 Ensuring Equitable Opportunities in Early Elementary: Examining Tracking in the Early Grades

PreK–2 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 147B

Join in a discussion on creating equitable mathematical structures in early elementary mathematics. We examine tracking of students in early grades by examining classroom interactions and student discourse. Suggestions are provided for detracking in K–2 grades and ways to create equitable opportunities for all students to be doers of mathematics.

Daniel Edelen, Georgia State University, Atlanta

466 The ABCs of Building a PBL Classroom Community: (Spatial) Arrangement, Beliefs, and Conventions

PreK–2 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Liberty Ballroom N-P

Exploring, collaborating, and sharing are critical for problem-based learning (PBL), but we often have questions about how to do this with our youngest learners. Come learn how we used a Unit 0 to establish how and where to work and find tools (spatial arrangement); a growth mindset (beliefs); and routines for participation, discourse, and using the tools (conventions).

Cheryl Fricchione, Coaching that Counts, Toms River, New Jersey
Twitter: @mathcoachcheryl
Samantha Crow, North Hanover Township School District, Wrightstown, New Jersey
Josh Raposo, North Hanover Township School District, Wrightstown, New Jersey
Kaynetha Walker, North Hanover Township School District, Wrightstown, New Jersey

467 Just Because I Am Learning English Does Not Mean That I Can't Do Math!

3–5 Session
SESSION CONTENT LEVEL: In-Depth
Marriott, Archives

We want to engage our English language learners (ELLs) in sharing their rich math knowledge. Investigate easy-to-implement tasks you can use to support and empower ELLs in many areas of your math program. As with all effective strategies, these hands-on tasks and approaches can be used to support every K–5 learner and create a more equitable class environment for all.

Cathy Marks Krpan, University of Toronto, Oakville, Ontario
Twitter: @CathyMarksKrpan

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- Challenging and Advancing Policy and Structures in Mathematics Education
- Expanding the Narrative of Who Belongs
- Improving Core Instruction through Deeper Mathematical Content and Pedagogical Knowledge
- Presidents' Series
- New Teacher Strand
- Equity Strand
- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

468 Overarching Learning Goals: Moving beyond a Daily Learning Target

3–5 Session
SESSION CONTENT LEVEL: Intermediate
Marriott, Union Station

Has posting daily learning targets lost its impact for teachers and students? Come and learn how using an overarching unit learning goal provides a consistent and coherent way to focus and connect students' day-to-day learning. Leave with ideas on how to develop and implement overarching goals in classrooms.

Beth Schefelker, University of Wisconsin–Milwaukee
Twitter: @beth_3041
DeAnn Huinker, University of Wisconsin–Milwaukee

469 Side-by-Side Math: Playfully Connecting Math Representations in K–5 Small-Group Settings

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Treasury

Join us as we examine a dynamic approach in which students connect their understanding from manipulatives to other visuals and symbols. We will focus on selecting just-right tools in small-group settings and exploring adaptations for whole-class instruction.

Kimberly Rimbey, KP Mathematics, Glendale, Arizona
Twitter: @kimrimbey

470 Invigorate, Engage, Inspire: Low-Floor, High-Ceiling Activities

6–8 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 151A

Low-floor, high-ceiling tasks engage all students in rigorous mathematics. They allow students to see themselves as thinkers and doers of mathematics. Take a deep dive into multiple standards-aligned low-floor, high-ceiling tasks and explore why these powerful tasks increase rigor and engagement. Then learn strategies for design and implementation.

Janae Pritchett, Great Minds, Richmond, Virginia
Cathy Terwilliger, Great Minds, Washington, District of Columbia

471 Lose the Key Words: Using Tape Diagrams to Make Sense of Word Problems

6–8 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Shaw/LeDroit Park

Students need a better approach to word problems than just the key word strategy, which leads to a correct solution less than 10 percent of the time for multistep problems. Come learn how tape diagrams and the Read-Draw-Write protocol will increase access to word problems for all students. Experience the joy of some amazing student-centered solutions.

Duane Habecker, Merced County Office of Education, California
Twitter: @dhabecker
Katie Koehn, Merced County Office of Education, California

472 Analyzing Racial Inequities with Function Transformations

8–10 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 101

Sociopolitical consciousness (SPC) is the ability to critically analyze the world and your place in it, and it is a pillar of culturally relevant pedagogy. Finding meaningful math contexts that develop SPC can be a challenge for teachers, so we'll analyze a lesson on racial inequity through function transformations and how it builds students' SPC.

Ryan Colon, Teaching Lab, Bowie, Maryland
Twitter: @ThatTeacherColon

473 Keep the Focus: Addressing Unfinished Learning within Grade-Level Work

8–10 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 203AB

How do we maintain a focus on grade-level work while also addressing students' unfinished learning? Learn how we use readiness checks in conjunction with just-in-time supports to keep the focus on grade-level work.

Karen McPherson, Buncombe County Schools, Old Fort, North Carolina

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- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

474 Let's Talk: Supporting Classroom Discourse and Argumentation while Investigating Data

10–12 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Independence Ballroom D

Classroom discourse and argumentation are important components to supporting students' practice in statistics and data science. Bring a laptop and learn to support students' ability to explain their logic and justify their reasoning while engaged in data investigations. Materials for supporting discourse during data investigations will be shared.

Emily Thrasher, NC State University, Raleigh, North Carolina
Gemma Mojica, NC State University, Raleigh, North Carolina
Bruce Graham, NC State University, Raleigh, North Carolina
Adrian Kuhlman, NC State University, Raleigh, North Carolina

475 The Problem of Human Trafficking: Using Graph Theory to Explore a Global Issue

10–12 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 146B

Human trafficking continues to be a global market worth an estimated 150 billion dollars. In this session, we will provide a brief history and show how graph theory can be applied to analyze this global problem. The session will conclude with a discussion on writing or adapting problems with the goal of incorporating interdisciplinary perspectives.

Ashley Loftis, North Carolina School of Science and Mathematics, Durham
Tamar Avineri, North Carolina School of Science and Math, Durham

475.1 Questing for and Questioning Calculus

10–12 Session
Marriott, Independence Ballroom F-H

The math education community has been asking questions about the learning and teaching of calculus for many decades. Calculus for whom, and when? What should a calculus course look like, and feel like? What should it contain, and what should its purposes be? As national dialogues about calculus continue, we'll discuss the new NCTM/MAA joint position statement. Topics will include instructional and curricular practices, new initiatives and old inequities in the pathways that lead to the study of calculus, and efforts to support students in developing the broader preparation needed for success in and beyond calculus.

Ralph Pantozzi, Kent Place School, Millington, New Jersey
Joan Zoellner, Dana Center, Austin, Texas
Melodie Baker, Just Equations, Buffalo, New York
Julie Baker, Hollins University, Roanoke, Virginia

476 Engaging Data Science for Culturally and Historically Responsive Teaching in Mathematics

Coaches/Leaders/Teacher Educators Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Liberty Ballroom M

This presentation explores a framework on quantitative historical study and student-centered pedagogy to engage learners in culturally relevant and historically responsive data science practices in mathematics classrooms and quantitative-literacy–focused learning environments.

Nathan Alexander, Morehouse College, Atlanta, Georgia
Twitter: @professornaite

477 Revamping Our Routines

Coaches/Leaders/Teacher Educators Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 150A

Change is hard. Teachers (and students) often have deeply engrained ways of "doing" math that don't necessarily align with their beliefs and values. In this session, we will look at why implementing meaningful changes that empower students can be tricky and will explore structures, routines, and strategies for disrupting less effective practices.

Jeanne Di Domenico, University of Chicago STEM Education, Illinois
Deborah Leslie, University of Chicago, Illinois

478 President Series: Did Someone Say Active Learning? Well, Let's Get Moving!

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 152A

Embodied cognition is a philosophy that hypothesizes that learning is body-based. In this presentation, I will share research and classroom practices that showcase this hypothesis and that support multilingual students. Wear comfy clothes and engage in activities where you can learn mathematics by moving in new ways. Don't forget your fun meter.

Hortensia Soto, Colorado State University, Fort Collins

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- Equity Strand
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- New NCTM Publication Session
- Exhibitors Workshop

479 Hanging Math out to Dry: Using K–6 Clotheslines to Build Number Sense

General Interest Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 145AB

Do you know that number line appears in the standards more than 26 times? This workshop is designed to explore how the clothesline (an open number line) creates the opportunity for all students to engage in discourse that promotes the development of number sense. Participants will investigate how this tool is used in K–grade 6.

Kristen Acosta, KristenAcosta.com, Upland, California
Twitter: @kristenmacosta

480 Iron Sharpens Iron: Black Womxn in Mathematics Education (BWXME) Speak

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, Ballroom A

The Black Womxn in Mathematics Education collective was founded in 2020 to convene Black Womxn of mathematics excellence to advocate for one another by using their voice, influence, and expertise in the mathematics education arena. They collaborate on ideas and projects; mentor one another to and through entrepreneurship, and elevate each other.

Christina Lincoln-Moore, Los Angeles Unified School District, Inglewood, California
Twitter: @talknumber2me
Tashana Howse, Georgia Gwinnett College, Lawrenceville
Lybrya Kebreab, iSCORE at Saint Louis University, Cheyenne, Wyoming
Shelly Jones, Central Connecticut State University, New Britain
Dr. India White, Big Ideas Learning, Brooksville, Florida

481 The Difference between Doing the Math and "Getting It"— Teaching for More Aha! Moments

General Interest Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, Ballroom B

How can we teach so our students learn more than just how to do math procedures? We'll look at classroom examples of students to consider how the way we teach can stimulate (or shut down) students "getting it," and we'll discuss how to shift our practice to help every student develop confidence and competence as a mathematical thinker and problem solver.

Cathy Lynn Seeley, Past President, National Council of Teachers of Mathematics, Reston, Virginia; Independent, McDade, Texas
Twitter: @cathyseeley

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483 How Cognitively Demanding Are Mathematical Tasks in Teacher-Designed Integrated STEM Units?

3–5 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 151B

In this session, we will explore the presence of mathematics in integrated STEM units that were designed by science teachers. We will share how lessons with mathematical content compared with those without. We will also discuss the levels of cognitive demand of mathematical tasks that students are engaged in throughout these integrated STEM units.

Elizabeth Forde, State University of New Your at New Paltz, Miami, Florida
Latanya Robinson, Florida International University , Miami
Josh Ellis, Florida International University , Miami
Emily Dare, Florida International University , Miami

484 How to Apply an Expanded Understanding of Fractions to Make Sense of and Solve Problems

3–5 Burst
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, 206

As students progress and build their mathematical understanding, flexibility and accuracy with fractions are key elements for determining student success. We make sense of problems that support all students in building their understanding of a fraction as a single number and conceptualizing fractions as part of a number system.

Anita Brown, NWEA, Chicago, Illinois
Twitter: @musicmathmom

485 Creating a Culture of Statistical Skeptics with CODAP

6–8 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 147A

Students as young as middle school are inundated with data and statistics through social media platforms like TikTok every day. CODAP is a free, powerful online tool that allows students to analyze data sets in real time to question and critique issues that affect the world around them every day.

Shauna Hedgepeth, Purvis Middle School, Mississippi
Twitter: @approx_normal
Joel Bezaire, Nashville, Tennessee

487 Shorts, Hooks, and Inquiry: Middle-Level Mathematics

6–8 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Independence Ballroom E

This burst will demonstrate how multimedia shorts can provide the essential hook to lead middle-level students toward complex and rigorous problem solving and inquiry. See how to quickly spark student interest and get them thinking critically.

Michael Sherman, Beverly Hills Unified School District, California

488 Digital Fabrication: A Tool for Modeling in Algebra

8–10 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 150B

We will explore the use of Tinkercad for modeling in algebra. Participants will engage in activity briefs that support conceptual understanding of algebraic concepts. We will explore graphing connections, generalizations, and tool accessibility.

Jessica Ivy, Bellarmine University, Louisville, Kentucky
Anna Wan, University of Southern Mississippi, Hattiesburg

489 What My Students Learned about Math in Computer Science Class

10–12 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Capitol Congress

Let's explore connections between math curriculum and computer science. Familiar topics will be viewed in a new light as we explore polynomials, discrete math, number theory, sequences, recursion, encryption, binary numbers, and other topics in the context of projects and computational thinking. Lots of math here. No coding experience needed.

Martin Funk, New Trier High School, Winnetka, Illinois
Twitter: Martin Funk
Greg Bushell, Buffalo Grove, Illinois

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NCTM Committee Session
New NCTM Publication Session
Exhibitors Workshop

490 Mathematical Brillance in Our World

Coaches/Leaders/Teacher Educators Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 152B

Our scholars should view and identify themselves as mathematicians. Yet in many mathematics classes, textbooks, and instruction, scholars do not encounter mathematicians who share similar identities. Representation matters. In this session, we integrate mathematics and literature to broaden our worldview of mathematicians, share the impact and influence of their mathematical contributions, and examine ways to include them in our mathematical instruction.

Christa Jackson, Saint Louis University, St. Louis, Missouri

491 Opening up Math Classrooms through Learning Walks

Coaches/Leaders/Teacher Educators Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 207B

How often do you get a chance to watch your colleague teach? Learning Walks offer teachers opportunity to visit each other classrooms, observe student learning, and watch math in action! Participants will learn how Learning Walks are structured and help focus teachers in their own learning. A Learning Walk professional development tool kit will be provided.

Marissa Sciremammano, Farmingdale Public Schools, New York
Twitter: @Marissab213
Jennifer Olsen, Farmingdale Public Schools, New York

492 Orchestrating a K–12 Data Revolution: The Power of Networked Communities

Coaches/Leaders/Teacher Educators Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 207A

Buzzword or revolution? Data science education is increasing in states, districts, and schools nationwide. How can leaders build effective networks to prepare students for the data deluge? How can we foster collaborations among research, practice, and policy that ensure we get it right? Join us as we tackle these challenges and learn together.

Chad Dorsey, The Concord Consortium, Massachusetts
Twitter: @chaddorsey
Zarek Drozda, Data Science for Everyone, Chicago, Illinois
Lindsey Henderson, Utah State Board of Education, Salt Lake City

493 A Case for Linear Algebra

General Interest Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Chinatown

Students need as many pathways to mathematical success as we can give them, and linear algebra offers a flexible and versatile course option that can fit alongside an established sequence or help define a new one. Come learn about the whys and the hows of teaching linear algebra and see where the core ideas pop up in the classes you already teach.

Patrick Honner, NYC DOE, Brooklyn, New York
Twitter: @MrHonner

494 Girls Who Game: Using Mathematics in Minecraft to Model Solutions to the 17 UN Sustainability Goals

General Interest Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Mount Vernon

The worldwide gaming industry generates over $200 billion each year, yet only 30 percent of the industry workforce is female. Through the Girls Who Game program, female and nonbinary students are given the chance to model mathematically, collaborate, use critical thinking skills, demonstrate creativity, and communicate—all through Minecraft.

Hannah Oldham, Sprayberry High School, Cobb County School District, Atlanta, Georgia
Twitter: @matholdham

496 Promoting Mathematical Thinking and Reasoning for Students with LD

General Interest Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 102AB

This session will focus on developing high-level mathematical thinking and reasoning skills for students with disabilities. Emphasis will be placed on teaching methods that support the cognitive and language skills needed for mathematical problem solving.

Dawn Pilotti, Currey Ingram Academy, Brentwood, Tennessee

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Friday Afternoon Bursts

4:30 PM–5:00 PM

497 Structural Barriers to Equity in High School Mathematics: The Case of Teacher Tracking

General Interest Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 204AB

We share findings from statewide teacher tracking research focused on how high school teachers were assigned courses with respect to their relative experience. We hope to spur participants to initiate critical conversations in their school about how teacher assignments are made and the implications these assignments have on students and teachers.

Wayne Nirode, Miami University, Oxford, Ohio
Twitter: @wnirode
Brian Boyd, Wright State University, Dayton, Ohio

498 Where's the Math? Finding Math Right under Our Noses in Our Neighborhood

General Interest Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Supreme Court

A Math Trail is an activity in which you look at the world around you, taking note of connections to mathematics in everyday objects. The trail is a guide to observe and engage at several stops on a path. We will discuss the math trails we are creating and present ideas for trails for all grade levels on your own campus or in your neighborhood.

Marylu Dalton, Austin Peay State University, Clarksville, Tennessee
Jennifer Yantz, Clarksville, Tennessee

Friday Evening Session

4:30 PM–5:30 PM

498.1 IGNITE! Teacher Appreciation Reception

General Interest Session
SESSION CONTENT LEVEL: FUN!
Walter E. Washington Convention Center, Reception Area in front of Ballroom A

We are so thankful to the dedicated teachers igniting students' passion for mathematics. All attendees are welcome to join the fun at this complimentary reception in advance of IGNITE! to relax, network, and enjoy light refreshments. We celebrate you and all you do to engage and support students and advance their learning and opportunities.

Hosted by the Bill & Melinda Gates Foundation

Friday Evening Session

5:30 PM–6:30 PM

499 IGNITE!

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, Ballroom A

Hear from eight mathematics educators as they are challenged to give a five-minute talk, using 20 slides that auto advance every 15 seconds whether they are ready or not! Kris Childs will emcee this exciting event!

Dr. Kristopher Childs, K Childs Solutions, Winter Garden, Florida
Zandra De Araujo, University of Florida's Lastinger Center for Learning
Dr. Francis (Skip) Fennell, McDaniel College, Maryland
Dr. Amanda (Mandy) Jansen, Michigan State University, Mesa, Arizona
Christina Lincoln-Moore, Los Angeles County Office of Education, Los Angeles, California
Dwaina Sookhoo, Knowles Teacher Initiative, New York, New York
Dr. India White, Big Ideas Learning/National Geographic Learning, Tampa, Florida
Luke Wilcox, East Kentwood High School
Bobson Wong, New York City Public Schools, New York, New York

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500 Climbing the Ladder of Complexity: Using Learning Progressions to Make Sense of Formative Assessment

PreK–2 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 147B

Numeric relational reasoning (NRR) is a foundational and predictive early mathematics construct related to number sense. In this presentation, we share our research and development of classroom assessment resources based on learning progressions of NRR. We focus on using data from these assessments to guide teachers' next steps in instruction.

Leanne Ketterlin Geller, Southern Methodist University, Dallas, Texas
Twitter: @KetterlinGeller
Cassandra Hatfield, Carrollton, Texas
Elizabeth Thomas, Southern Methodist University, Dallas, Texas

501 Deepening Number Sense through Stories: The Power of Context to Expand Students' Thinking

PreK–2 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 150A

Launching lessons with a story context is powerful and engaging! Join us to explore story-related math explorations that deepen students' number sense. Discover a wealth of children's books that set a context for lessons ranging from counting to place value, and gather ideas for rich math tasks that challenge students to think deeply about numbers.

Susan OConnell, Quality Teacher Development LLC, Millersville, Maryland
Twitter: @SueOConnellMath

502 Using Argument-Driven Inquiry to Catalyze Change in Elementary Mathematics

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Treasury

Argument-driven inquiry (ADI) is an approach to teaching elementary mathematics aligned with the multiple purposes for learning mathematics outlined in the Catalyzing Change series. Along with supporting students in learning concepts required by state standards, ADI is designed to foster students' development of an identity as a doer, knower, and sense maker of mathematics.

Monica Wascom, Independent, Austin, Texas
Victor Sampson, The University of Texas at Austin

503 Where Does Math Intervention Belong to Get the Greatest Outcome?

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 146B

If we could have closed the achievement gap during the school day, we would have done so by now. Where does the intervention belong to get the greatest outcome? How do we personalize and track interventions to improve them? How do we use student agency and parent support to move students forward? Come experience our school community intervention program.

Lucy Payne, University of St. Thomas, Minneapolis, Minnesota
Sue Strom, Plymouth, Minnesota

504 Cultivating Students' Mathematical Identity through Probability and Statistics

6–8 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 154AB

When students see how probability and statistics can help them understand and explore the world around them, they see themselves as doers of mathematics and as valuable members of their community. This session will explore the importance of truly relevant contexts in developing students' statistical literacy and mathematical identities.

Gabrielle Mathiesen, Great Minds, Richmond, Virginia
Twitter: @ms_gmath

505 I'm All Ears—Listening to Understand Student's Ways of Thinking in Grades 6–8

6–8 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 151A

By presenting a task and leveraging it to elicit student conversations via clustered questioning, teachers can better understand how students are currently thinking about key ideas in mathematics. Learn how to guide instruction by using a progressive questioning strategy to elicit evidence of students' ways of thinking about a topic or concept.

Ted Coe, NWEA, Scottsdale, Arizona
Twitter: Ted Coe
Desiree Spikings, NWEA, Portland, Oregon

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506 Research into Practice: Fostering the Development of Algebraic Thinking through Problem Posing

6–8 Session
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, 145AB

This research-into-practice session builds on recent research on using a problem-posing approach to develop students' algebraic thinking in middle school. This approach engages students in creating their own mathematical problems. Participants will examine cases of teaching with problem posing and how to develop and use good problem-posing tasks.

Jinfa Cai, University of Delaware, Newark
Stephen Hwang, University of Delaware, Newark
Erin Igo, Stanton Middle School, Newark, Delaware

507 Abstract Algebra in the Secondary Classroom

8–10 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 203AB

Many teacher preparation programs require preservice teachers to take a course in abstract algebra. Why? How can such a course inform our classroom teaching? How can we incorporate abstract algebra content into our secondary classrooms in a way that reinforces the secondary curriculum? We will explore these questions as we examine relevant tasks.

Bethany Noblitt, Northern Kentucky University, Cold Spring

508 Teaching Math and Implementing *All* of the Other Stuff Too: Classroom Structure to Help "Fit" It All In

8–10 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 152A

Access to grade-level content is a student's right. Teachers providing opportunities for students to gain this access while also strengthening prerequisite knowledge each day "seems" taxing. It is probable and highly doable to successfully identify the intended learning as well as facilitate and measure it in a single period.

Afreeka Van, Carnegie Learning, Las Vegas, Nevada
Twitter: Afreeka Miller

509 FOIL, SOHCAHTOA, and Logs: How Our Shortcuts Undermine Student Understanding and What to Do Instead

10–12 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 140AB

Mathematical shortcuts ultimately shortchange our students' ability to construct meaning and appreciate the truth of mathematics. This talk will focus on three shortcuts: FOIL in algebra 1, SOHCAHTOA in geometry, and logarithms in algebra 2, and how to teach these ideas in a way that helps support student understanding.

Joseph Obrycki, Niles Township High School District 219, Skokie, Illinois

510 Using Data to Visualize and Understand Global Warming

10–12 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 101

Reports about climate change often refer to the global average temperature. However, the varying local impacts are often hidden when only a global average is discussed. Using longitudinal climate data from around the world, we will explore how overall and local temperature changes affect us on an individual and global scale.

Nicholas Koberstein, NumWorks, Knightdale, North Carolina
Twitter: @nkoberstein

511 Structuring Math Professional Development That Promotes Teacher Efficacy

Coaches/Leaders/Teacher Educators Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 202A

Hattie's work highlights collective teacher efficacy as one of the highest indicators in supporting student learning. In this session, we will discuss and compare professional development structures and strategies that engage teachers in self-reflection and exploration in best practices in mathematics. We will provide a collection of ready-to-use leadership tools.

Jennifer Olsen, Farmingdale Public Schools, New York
John SanGiovanni, Howard County Public School System, Westminster, Maryland

512 Journeys of Anti-Racist Mathematics Educators: Highlighting the Voices of Major Stakeholders

General Interest Session
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, Ballroom A

In this interactive session, we will discuss the work that students, teachers, parents, administrators, and community leaders have done to create anti-racist mathematics education learning spaces for students from different races/ethnicities, genders, and socioeconomic backgrounds. Activities, vignettes, stories, and action steps will be shared.

Marilyn Strutchens, Marilyn E. Strutchens, Auburn, Alabama
Twitter: @strutchens
Gladys Krause, William & Mary, Williamsburg, Virginia
Jennifer Bay-Williams, University of Louisville, Pewee Valley, Kentucky
Dorothy White, University of Georgia, Athens

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- Expanding the Narrative of Who Belongs
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513 Area, Perimeter, and Visual Patterns in the Thinking Classroom

3–5 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 149AB

Are you curious what a "thinking classroom" looks like? Do your elementary or middle school students struggle to understand area and perimeter? In this interactive session, we will use thinking classroom techniques to engage participants in a sample lesson that uses visual and symbolic patterns to develop deeper meaning for area and perimeter.

Christy Pettis, University of Wisconsin River Falls, Minneapolis, Minnesota
Twitter: @PettisChristy
Terry Wyberg, University of Minnesota, Lakeville
Aran Glancy, Hill-Murray School, Maplewood, Minnesota

514 Math Centers: Explore, Apply, and Extend

3–5 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 151B

Need more math center activities? Come experience activities during which students practice computation skills, explore geometric and spatial tasks, and extend grade-level concepts. All activities use common classroom materials. Receive access to all activity templates, directions, and instructional notes as wells as support and challenge for all learners.

Laurie Boswell, Big Ideas Learning, Franconia, New Hampshire
Twitter: @laboswell

515 What Matters Most: The Power of the High Leverage Concepts

3–5 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 147A

The All Learners Network High Leverage Concepts are the essential understandings that support access to the next grade level's math for *all* learners. HLCs empower educators to focus math support for students. Imagine that power multiplied across every classroom so that everyone in the system has a deep understanding of what matters most!

Katie Jacobsen, All Learners Network, Burlington, Vermont
Twitter: Katie Jacobsen
Erin Oliver, All Learners Network, Winooski, Vermont

518 Create Access to Rigorous Mathematics for Emerging Multilingual Learners

8–10 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 150B

A common misconception is that simplifying language and tasks makes math accessible for emerging multilingual learners (EMLs). Mathematical language routines (MLRs) develop language and mathematical understanding and ensure that EMLs can actively access and succeed with grade-level content. This session offers an opportunity to experience and explore mathematics with MLRs, struggle productively, and reflect on strategies used to position EMLs as valued contributors to an equitable classroom community.

Sharon Rendon, CPM Educational Program, Summerset, South Dakota
Twitter: @srendon2
Astrida Lizins, CPM Educational Program, Honey Brook, Pennsylvania

519 GeoGebra for Student-Centered Discovery-Based Learning

8–10 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 201

GeoGebra's free open educational recourses (OERs) are leading the way for educators to incorporate customizable student-centered discovery-based learning in any teaching modality. Come with your device and learn how to increase access, equity, and engagement as you create your own course-specific Tarsia (9-square) puzzle in GeoGebra.

Robert Pontecorvo, Robert Pontecorvo Inc, Garden City, New York
Twitter: @PontecorvoRob

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520 Art Therapy: Healing in a Math Classroom

10–12 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 207A

Historically, math classrooms have subjected students, especially students of color, to varying levels of anxiety and trauma. What is needed in math classrooms now more than ever is community healing and liberation from damaging math practices. Come explore (and create!) art and how we utilize it as a tool to promote healing in our classrooms!

Gary Chu, Niles North High School, Skokie, Illinois
Twitter: @mrgarychu
Ilma Lodhi, Evanston Township High School, Illinois

521 Creating Space for 2SLGBTQIA+ Students' Mathematical Thriving

10–12 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 102AB

Often left out of diversity, equity, inclusion, and justice initiatives, 2SLGBTQIA+ students are underrepresented at *all* levels of mathematics. What would it look like to create mathematical spaces of thriving for 2SLGBTQIA+ students? In this workshop, we provide an example of such a space and consider applications to other contexts.

Cristabella Fortna, The Queer Mathematics Teacher, West Orange, New Jersey
Dorothy Helmken, The Queer Mathematics Teacher, West Orange, New Jersey

522 Take It to the Limit: One More Time

10–12 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 143AB

We will focus on ways to help precalculus and calculus students conceptualize limits. We will explore geometric and algebraic approaches to make sense of infinite processes and reason about the limits they approach. Participants will engage in classroom-tested activities that offer surprising results related to Ï€, e, and other values.

Tami Martin, Illinois State University, Normal
Roger Day, Retired, Bloomington, Illinois
John Carter, 'Iolani School, Honolulu, Hawaii
Michael Grasse, Retired, Arlington Heights, Illinois

523 The Ladybug Task: Open Access to Statistical Reasoning in K–5

Coaches/Leaders/Teacher Educators Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 207B

We will explore the four-step statistical problem-solving process: formulating a statistical investigative question, collecting data, analyzing data, and interpreting data. We will engage in the modified Ladybug task, an example task from the GAISE II Report, to explore how level A and B statistical reasoning can be developed in K–5 classrooms.

Seyoung Holte, Northeast GA RESA, Bogart, Georgia
Twitter: @SeyoungHolte

524 "I Will Show Up": Community Engagement as a Path to Mathematical Connection

Coaches/Leaders/Teacher Educators Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 144ABC

Family and community engagement is often considered an add-on. But what if honoring the math done outside of school is actually critical for connecting students to the math we do inside our classrooms? Come explore how our environments, communities, and the personal ways we use mathematics hold rich opportunities to build mathematical connection.

Molly Daley, Education Service District 112, Vancouver, Washington
Twitter: @mdaley15
Deepa Bharath, Cambridge Public Schools, Massachusetts

524.1 Turn and Talk, Conversation Clubs, and Hands-Down Conversations: Tools for Building Student-Centered Talk

PreK–2 Workshop
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, 152B

Come learn about structures and tools for mathematical discourse in which students' voices and ideas take the lead, building agency as mathematicians and developing strong content understanding. Participants will engage in discussion, analyze video, and learn some practical tips for getting started in this work right away.

Kassia Omohundro Wedekind, Independent Math Coach & Stenhouse Publishers, Arlington, Virginia
Christy Thompson, Fairfax County Public Schools, Falls Church, Virginia

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- New Teacher Strand
- Equity Strand
- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

Saturday Morning Practice Sessions

8:00 AM–10:00 AM

525 When We See Them: Seeking Out Brilliance to Address Inequities in Math Classrooms

3–5 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 204AB

To truly provide all students with opportunities to engage in grade-level mathematics, we must believe that all students are capable learners. Our beliefs are challenged when addressing unfinished instruction from prior years. Learn impactful instructional moves to seek out students' mathematical brilliance, and help them meet grade-level demands.

Dionne Aminata, MathTrust, Montclair, California
Twitter: @mathtrust_ed @dionnedance

526 The Liberating Experience of Mathematical Freedom

8–10 Workshop
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, 202B

YouCubed summer camps have now been taught across the US and in four different countries, giving students who attend a major boost to their understanding. The experience of pure mathematical freedom—investigating ideas and seeing mathematical connections, without any of the pressures of school, is liberating for students. In this session, you will feel this freedom yourself, getting a taste of the summer camp experience, as you see, create, and experience mathematical connections in new ways.

Jo Boaler, Stanford University, California

Saturday Morning Sessions

9:30 AM–10:30 AM

527 Assessing Student Thinking through Context, Coherence, and the Questions In-Between

PreK–2 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 150A

As more math educators look to embed problem solving and number routines into their toolkits, the struggle to move away from traditional assessment practices can be difficult. Let's examine how the context and coherence of the tasks we choose invite us to ask more meaningful questions that unlock students' thinking.

Graham Fletcher, @gfletchy, McDonough, Georgia
Twitter: @gfletchy
Tracy Zager, Portland Public Schools/Stenhouse Publishers, Maine

528 Learning to Problem Pose with Code: Computer Science as a Means of Fostering Mathematical Creativity

PreK–2 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 152A

Problem posing has the potential to combine higher-level thinking, creative thinking, and equitable opportunities for all students in mathematics instruction. When teachers integrate computer science into the problem-posing phase, it increases student access, heightens their curiosity, and deepens their mathematical understanding.

Shirley Fortenbaugh, Loudoun County Public Schools, Ashburn, Virginia
Anna Payne, University of Wyoming, Laramie

529 Inquiry with a Purpose: Linking Data Analysis and Discipline-Based Literacies

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 146B

How can we use the power of data to create opportunities for students to make authentic connections between math and other subjects, like social studies and science? In this session, we will explore how we used data to investigate three transdisciplinary questions involving ecology, civic responsibilities, geography, and economics.

Rick Hudson, University of Southern Indiana, Evansville
Twitter: @rickahudson
Dionne Cross Francis, University of North Carolina at Chapel Hill
Andrew Gatza, Ball State University, Muncie, Indiana
Jinqing Liu, University of California Irvine
Charles Wilkes, San Diego State University, California

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- New Teacher Strand
- Equity Strand
- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

530 Introducing a Problem-Solving-Based Instructional Protocol Focused on Math Reasoning and Language

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 151A

Participants will learn about the discursive mathematics protocol (DMP) that builds on PÃ³lya's heuristic to incorporate research-based language practices and essential teaching practices. Participants will also engage in problem solving in the workshop, view videos of teachers using the DMP, and learn how to use the DMP with their students.

Richard Kitchen, University of Wyoming, Fort Collins, Colorado
Karla Matute, Los Alamos National Laboratory, New Mexico
Libni Castellon, University of Wyoming, Laramie

533 S³D Approach: Strategies and Tools for Fostering Equitable Small-Group, Student-to-Student Discourse

8–10 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 154AB

Placing students in small groups does not automatically imply that the students will be able to productively interact with each other about the mathematics. In this presentation, you will learn about strategies and tools to examine and improve your practice with respect to fostering equitable small-group, student-to-student discourse.

Sarah Quebec Fuentes, Texas Christian University, Fort Worth
Twitter: @squebecfuentes

534 Write It Down, Talk It Up: Using VNPS and Discourse for Mathematical Fluency and Reasoning

8–10 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 101

Participants will move beyond simply having students write at the whiteboard to learning how to frame problems and lessons so that students are required to engage with one another and justify their reasoning, utilizing both written shared spaces on VNPS (vertical nonpermanent surfaces) and small-group discourse to analyze their reasoning.

Nicholas King, The Ensworth School, Nashville, Tennessee
Julie Steimer
Christian Academy of Knoxville, 529 Academy Way, Tennessee
Joanna Presley, Home School, Knoxville, Tennessee
Chris Collins, Hume Fogg Academic High School, Nashville, Tennessee

535 Beauty, Utility, and Consequence in Mathematics

10–12 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 147B

When handing over the tools of mathematics, we are responsible as educators for teaching their responsible use. Math-based technologies are ubiquitous, often do not work, and are capable of broad and arbitrary harm. Particularly as we consider pathways incorporating data science and new tools, it is crucial that we present math as a human endeavor.

Jedediyah Williams, Nantucket High School, Massachusetts
Twitter: @jedediyah

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- Presidents' Series
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- Exhibitors Workshop

536 Extreme Differentiation of Instruction in High School Mathematics

10–12 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 203AB

Two mathematics educators/researchers, one who focuses on fostering creativity in gifted students and one who focuses on making mathematics accessible to all learners, will demonstrate strategies for creating engaging and accessible lessons when students with very different mathematical abilities are in the same secondary classroom.

Casey Warmbrand, Arizona State University, Phoenix
Twitter: Casey Warmbrand
Jason Farrington, Paradise Valley Community College, Gilbert, Arizona

537 Instructional Leadership for Ambitious Mathematics: Prioritizing Early Math to Accelerate Learning

Coaches/Leaders/Teacher Educators Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 145AB

Reaching higher levels of math achievement requires schools to prioritize the math learning of their youngest learners (ages 3–7). Learn how a large, urban district is building the capacity of school-based leadership teams (principal, lead teacher, coach) to create and support a culture of ambitious mathematics instruction to accelerate learning.

Melissa Hedges, Milwaukee Public Schools, Shorewood, Wisconsin
Sara Cruz, Milwaukee Public Schools, Wisconsin
Danielle Robinson, Milwaukee Public Schools, Wisconsin
DeAnn Huinker, University of Wisconsin-Milwaukee

539 Discover, Describe, and Develop Mathematical Thinking

General Interest Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, Ballroom B

Developing mathematical thinking is an integral part of becoming an effective problem solver. So what does it take for students to build their ability to think mathematically? This session will focus on the pedagogical approach of discover, describe, and develop and the content knowledge needed for teachers to support students' mathematical thinking.

Kurt Salisbury, Desmos Classroom, Woodway, Texas
Twitter: @kurt_salisbury

540 How to Prioritize Student Thinking

General Interest Session
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, Ballroom C

Whose voices are centered in your classroom? How can we create conditions so that our students feel safe enough to unmute, participate in sense making, and experience the joy of mathematics? We'll ponder these questions and share strategies and teacher moves to improve students' confidence in picking up the mic to express their thoughts.

Mario Valdez, Alpaugh Unified, Porterville, California
Twitter: @mvaldez_mario

541 Math Modeling as a Vehicle to Catalyze Change

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, Ballroom A

Math modeling tasks and online collaborative tools can engage each and every student. They provide us with opportunities to invite students into the mathematical conversation, supporting students' identity and agency. Come explore how modeling spans grade bands, fosters inclusion, and aligns with key recommendations set forth by the Catalyzing Change series.

Benjamin Galluzzo, Clarkson University, Potsdam, New York
Maria Hernandez, NC School of Science & Mathematics, Durham, North Carolina
Jennifer Suh, Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; George Mason University Fairfax, Virginia
Megan Wickstrom, Bozeman, Montana

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Expanding the Narrative of Who Belongs
Improving Core Instruction through Deeper Mathematical Content and Pedagogical Knowledge
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542 Engaging Children in Geometry with Hands-On, Minds-On Exploration

PreK–2 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 149AB

Participants will explore ways to build an understanding of polygons and their traits using a hands-on approach. We'll use everyday items (toothpicks, straws, etc.) to low-cost building kits along with meaningful math tasks to make learning fun and meaningful. Participants leave with lesson ideas and the tools to get started in their own room.

Norma Boakes, Stockton University, Galloway, New Jersey
Twitter: @mathed_dr

543 A Meaningful Path to Lasting Multiplication Fact Fluency

3–5 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 143AB

What does it really mean to be fluent with multiplication facts? In this session, we will unpack the meaning of fluency and examine a trajectory for how students master their facts. Come explore how we can use Quick Looks, fact strategies, games, and formative assessment strategies to ensure all students develop lasting multiplication fact fluency.

Gina Kling, Western Michigan University, Kalamazoo
Kate Kline, Western Michigan University, Kalamazoo

544 Empowering Girls in Mathematics: Let's Reveal the Contributions of Historically Excluded Women

3–5 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 151B

We all know the impact of Katherine Johnson, one of the "Hidden Figures" of NASA, but do you know Raye Montague, Margaret Hamilton, Zaha Hadid, or Sophie Germain? Come learn more about women who have made a difference through authentic children's literature books and engage in math learning opportunities that stem from these stories.

Sandra Cooper, Baylor University, Waco, Texas
Twitter: @drcoopermath
Brandy Crowley, Emporia State University, Kansas
Margeaux Smith, Baylor University, Waco, Texas

545 Noticing and Conjecturing about the Arithmetic Operations: Weaving Mathematics and Equity

3–5 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 206

During mathematics discussions, teachers weave students' ideas into a mathematical storyline while considering how to support each student's opportunity to learn. Participants will do math together and view classroom videos to consider the challenges of managing these two commitments to rigorous mathematics and to equitable participation.

Susan Jo Russell, TERC, Somerville, Massachusetts
Deborah Schifter, Education Development Center, Northampton, Massachusetts

546 Active Algebraic Thinking

6–8 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 207B

The Common Core State Standards place an emphasis on algebraic thinking. This includes using algebraic expressions, constructing functions, and solving systems of linear equations. This workshop will present hands-on activities and ideas that develop students' algebraic thinking abilities beyond what is found in the typical middle school curriculum.

Brian Beaudrie, Northern Arizona University, Flagstaff
Barbara Boschmans, Northern Arizona University, Flagstaff

547 We Get By with a Little Help from Our Friends: Finding Community to Support Equity in Unsafe Spaces

6–8 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 209ABC

Do you want to meaningfully engage with issues of equity and inclusion, but it does not always feel safe to do so? Do you sometimes feel like you are walking a tightrope between doing what is right and what you are required to do? Join us to connect with others to discuss our hardships and triumphs and hopefully find a community for this work.

Melissa Troudt, University of Wisconsin – Eau Claire
Lisa Skultety, University of Central Arkansas, Conway
Robin Anderson, North Carolina State University, Raleigh
Candace Joswick, The University of Texas at Arlington

548 Centering Black Girls' Lived Experiences to Promote Mathematical Thinking

8–10 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 147A

Black girl's lived experiences are often invisible in the teaching and learning of mathematics. During this session, participants will engage in high-level mathematics tasks that build on the rich experiences and cultural knowledge of Black girls and their communities and analyze student work samples and written reflections.

Crystal Morton, IU – Indianapolis
Twitter: @drhillmorton
Brea Ratliff, Auburn University, Alabama
Evan Taylor, Indianapolis Public Schools

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Challenging and Advancing Policy and Structures in Mathematics Education
Expanding the Narrative of Who Belongs
Improving Core Instruction through Deeper Mathematical Content and Pedagogical Knowledge
Presidents' Series
New Teacher Strand
Equity Strand
NCTM Committee Session
New NCTM Publication Session
Exhibitors Workshop

549 The Elements of Surprises

8–10 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 150B

Surprises can spark joy, inspire curiosity, and increase retention. Surprisingly (?) surprises take planning! We'll examine math content surprises in grades 6–12: how to use them to enliven daily routines and build deep understandings of math content. Have all students reasoning, questioning, and actively anticipating what might come next!

Ralph Pantozzi, Kent Place School, Summit, New Jersey
Twitter: @mathillustrated

550 What Do You Notice? Strategies for Inquiry with Technology

8–10 Workshop
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Capitol Congress

Noticing and Wondering, Which One Doesn't Belong?, and Action-Consequence-Reflection are among the inquiry strategies we will discuss to build understanding with graphing calculator and computer technology platforms. Increase student engagement and give access to *all* students by implementing sense-making discourse for in-person and online classes.

Karen Campe, Karen Campe, New Canaan, Connecticut
Twitter: @KarenCampe
John LaMaster, Fort Wayne, Indiana

551 Core of the Core: Finding Instructional Efficiencies

10–12 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 102AB

The UCLA Mathematics Department's Curtis Center proposes a minimal subset of the Common Core that still spans the content of California's algebra 1, geometry and algebra 2 courses. The subset leverages efficiencies in overlapping standards to increase student opportunity to learn the application and development of the key grade-level content.

Heather Dallas, UCLA Mathematics Department, Los Angeles, California

552 Using Data and Modeling to Take a Deep-Dive into the Patterns of Daylight

10–12 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 207A

Mathematical modeling is a tool for students to help make sense of the world around us. In this session, participants will engage together in a real-world activity with multiple entry points and opportunities to extend. Through data collection and modeling, mathematics can "shed light" on patterns of daylight experienced throughout the world.

Scott Knapp, Glenbrook North High School, Northbrook, Illinois
Twitter: @_scottknapp
Robin Gapinski, Highland Park High School, Illinois

553 Who's the Cheater? A Fair Game Exploration Using Fair and Loaded Dice–and Tableau

10–12 Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 152B

In this workshop, participants will use experimental probability with loaded and fair dice. Using Google Sheets and Tableau, they will then try to identify the cheaters on the other team. Finally, they create a fair game to determine a winner. This leads to a fantastic discussion about Type I and Type II Errors, and applications to social justice.

Nicole Dubler, Kent Denver School, Colorado
Allie Schreuder, Kent Denver School, Cherry Hills, Colorado
Arty Smith, Kent Denver School, Centennial, Colorado

554 Reaching More Students in Less Time

Coaches/Leaders/Teacher Educators Workshop
SESSION CONTENT LEVEL: In-Depth
Walter E. Washington Convention Center, 201

Let's design learning for all students that is inclusive, engaging, and rigorous. To do that, we must develop/make sense of strategies in mathematics and understand how strategies are different than models and algorithms. Come learn the accessible task called Problem Strings that helps teachers leverage students' strengths to develop reasoning.

Pamela Harris, Texas State University, San Marcos
Twitter: @pwharris

555 Toward a Strength-Based Narrative: Admin/Teacher Partnerships for Equity

Coaches/Leaders/Teacher Educators Workshop
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 144ABC

Participants will explore how to create a strength-based narrative of students through the administrative, coaching, and teaching partnership. We will consider how to plan a task and analyze a task through each of the roles and through the lens of strengths, and we will consider some of the deficit narratives that exist in our system that lead to inequities.

Veronica Del Bagno, Fairfax County Public Schools, Springfield, Virginia
Twitter: @AP_Rockin_Robin
Holly Tate, Fairfax County Public Schools, Springfield, Virginia

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- Challenging and Advancing Policy and Structures in Mathematics Education
- Expanding the Narrative of Who Belongs
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- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

556 Four Engaging Strategies to Build Number Sense in Kindergarten and First Grade

PreK–2 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 152A

Tall ten-frames, human number lines, number bracelets, and partner games will help students subitize, add, subtract, and solve real-world problems. Participants will experience all of the strategies. There are no expensive materials to buy. Handouts will be shared.

Janelle Chisholm, No Teacher Left Behind PD, Glendale, Arizona

557 Decoding Mathematics: Connecting Math and Language for Powerful Problem Solving

PreK–2 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 150A

Whether oral or written, language mediates our experience with math, and successful learners make connections. This session provides structures and experiences for making rich connections between language and mathematics with a particular focus on word problems. Create a more inclusive and engaging classroom by cracking the code of math.

Sara Delano Moore, ORIGO Education, Kent, Ohio
Twitter: @saradelanomoore
William Bintz, Kent State University, Ohio

558 All Students as Sense Makers: Strengths-Based Approaches to Intervention

3–5 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, Ballroom B

How do we create learning environments that are inclusive of all learners, particularly those learners whose strengths are often not recognized in school mathematics? In this session, we will discuss small changes to curriculum, assessment, and instructional practices that can make a big difference in creating sense-making opportunities for all.

Corey Drake, The Math Learning Center, Williamston, Michigan
Twitter: @cjdrake9505

559 Cooking, Currency, and Culture: Inviting Student Stories into Middle School Math

6–8 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 147B

Exploring common middle school math contexts, participants will encounter simple, impactful activities that build community and belonging by inviting student stories into the math classroom. This session combines research on adolescent development and identity formation with practical ideas for teachers to honor their students' unique backgrounds.

Heidi Strate, Great Minds, Washington, District of Columbia
Twitter: @StrateMath

560 Facilitating Rich Mathematical Discourse in Your Virtual Classroom

6–8 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 140AB

For educators, the most joyful experiences are listening to students discuss their mathematical thinking. As we strengthen our practice of Smith and Steins' *Five Practices for Orchestrating Productive Mathematics Discussions*, join us to connect and adapt the key elements of student discourse in our virtual classrooms.

Jaclyn Wood, Great Minds Virtual, Arizona
Frank Wapole, Great Minds, Washington, District of Columbia

561 Student Choice and Voice in Assessment

6–8 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 101

As math teachers, we often find it easy to bring in project-based learning in topics like geometry and statistics, but what about the seemingly more procedural topics? Giving students choice and voice in designing how they are assessed increases engagement and deepens understanding of the connections across mathematical concepts.

Amy Morris, United Nations International School, NY, New York
Jennifer Kelly, United Nations International School, NY, New York

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- Presidents' Series
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- NCTM Committee Session
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562 Transformation Poetry: Illustrating Transformations to Create Meaning

8–10 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 203AB

Students study transformations: translations, rotations, reflections, and dilations. In this session, participants will learn about a cross-curricular project that asks students to illustrate these transformations in the structure of a poem to create meaning, leveraging student language and creativity to build deeper mathematical understanding.

Katherine Lavine, The Expedition School, Hillsborough, North Carolina

563 Yes, All Students Can Learn Calculus in Algebra!

8–10 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 151A

Learn how students who collect, model, and analyze data from linear, quadratic, and exponential functions are also learning calculus! By simplifying math vocabulary and creating engaging hands-on activities through multiple representations of these functions, all learners can discover each function's key characteristics that bring calculus into an algebra classroom and the world around them.

Robin Gapinski, Township District 113, Highland Park, Illinois
Twitter: Robin Gapinski
Scott Knapp, Glenbrook North High School, Evanston, Illinois

564 Be There and Be Square: Completing the Square

10–12 Session
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Treasury

Looking for a way to help your students understand completing the square? We will share how to use Desmos with Polypad, so your students can build on prior knowledge of area models to grasp and generalize the formula. You will engage in a Desmos task, watch students engage in the same task, and learn how to build your own task.

Demet Yalman Ozen, Middle Tennessee State University, Murfreesboro
Nina Bailey, University of North Carolina at Charlotte
Purity Muthitu, North Carolina State University, Raleigh
Charity Cayton, East Carolina University, Greenville, North Carolina

565 IGTDTWMK: I Got to Do This with My Kids: 25 Innovative Notice and Wonder Activities

10–12 Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 146B

Improve core instruction by providing activities that encourage deep conceptual understanding. Twenty-five "outside of the box" lessons use graphing technology to promote mathematical thinking and reasoning in algebra 1 through Calculus. A completely hands-on session with student and teacher PDFs provided with a two-minute video of each activity.

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

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- Challenging and Advancing Policy and Structures in Mathematics Education
- Expanding the Narrative of Who Belongs
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- Presidents' Series
- New Teacher Strand
- Equity Strand
- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

566 Context-Problem-System-Model: An Engaging K-12 Mathematics Disciplinary Approach

Coaches/Leaders/Teacher Educators Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 202A

Traditional mathematics teaching worked in the past, but today it does not respond to our students' characteristics. Through the CPSM Mathematics Disciplinary Approach (context-problem-system-model), about 60 K–12 schools of our network in Mexico and Central America seek to standardize common teaching and assessment practices to enhance mathematical thinking by solving contextualized problems, addressed systemically, and promoting the students' production and explanation of models.

Samuel Zapién Castillo, Semper Altius School Network, Naucalpan, Mexico
Héctor Carsolio-Mata, Semper Altius School Network, Naucalpan, Mexico

567 Conferring in the Math Classroom

General Interest Session
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, Ballroom C

Conferring with mathematicians is a practice that can help build a classroom community in which students see themselves and their peers as valued members of a math community with important ideas to share. Come join us as we talk about two conferring structures that can nudge students toward active learning and deeper understanding.

Gina Picha, Amplify, Austin, Texas
Twitter: @ginapicha

569 President Series: What Does Algebra Look Like across the K-12 Curriculum: Experience the Progression!

General Interest Session
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, Ballroom A

Presidential Awardees will share creative ideas for teaching algebra and showing how fundamental algebraic concepts connect throughout a student's career from elementary, middle, and high school, to the university. Let's look at why algebra is important and examples of what developing algebraic ideas means across the grade levels.

Gail Burrill, Past President, National Council of Teachers of Mathematics, Reston, Virginia; Michigan State University, Hales Corners, Wisconsin
Regina Kilday, West Greenwich Regional Schools, Rhode Island
Jana Dean, Olympia School District, Olympia, Washington
Lisa Conzemius, Detroit Lakes Public Schools, Moorhead, Minnesota

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- Expanding the Narrative of Who Belongs
- Improving Core Instruction through Deeper Mathematical Content and Pedagogical Knowledge
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- New Teacher Strand
- Equity Strand
- NCTM Committee Session
- New NCTM Publication Session
- Exhibitors Workshop

570 Fractions for Everyone: Learning Trajectory Tasks for Fractions in a Measurement Context

3–5 Burst
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 143AB

Research shows that students struggle with advanced fraction topics if their concept of fractions is limited to part-whole. Come explore task sequences designed in a measurement context informed by research and analyze student work. Discover how to enhance your fraction instruction by promoting conceptual understanding to your entire classroom.

Melike Kara, Towson University, Maryland
Twitter: Melike Kara

571 From Data to STEM and Beyond: Building Connections for Math across the Curriculum

6–8 Burst
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 206

We* will present strategies, frameworks, and case studies to support teachers in integrating data investigations across the curriculum. Our materials are developed for teachers at the middle school level, with special focus on connections between mathematics and science, social sciences, and the visual arts.

(*We hope to invite teacher partners)

Michelle Wilkerson, UC Berkeley School of Education, California

572 Math in Nature with Motion by Planes, Trains, and Automobiles

6–8 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 102AB

Educators will learn how to incorporate national parks and mathematics to create engaging STEM lessons and use project-based learning to help students become concerned citizens about the environment. This is an opportunity for students to use research skills and digital tools to enhance their national park knowledge along with navigation abilities.

Bridget Johnson, MSD Wayne Townships, Indianapolis, Indiana

573 The Growing Triangle Task: Using Desmos to Support Understandings of Graphs and Nonlinear Change

6–8 Burst
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 207A

We present the Growing Triangle task, which is designed to support middle school students' developing understandings of graphs. The task also supports students in conceiving of and representing nonlinear relationships between the varying quantities. Situated in the Desmos Activity Builder Platform, the task is freely available.

Teo Paoletti, University of Delaware, Newark
Twitter: tjpaoletti
Allison Gantt, University of Delaware, Newark
Srujana Acharya, Newark, Delaware
Elizabeth Bieryla, Cheltenham, Pennsylvania
Robert Hood, Phifer Middle School, Pennsauken, New Jersey

574 Mathematics Teachers Questioning: Interventions to Promote Equityâ€"Link to Students' Ways of Knowing

8–10 Burst
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 152B

In our presentation, we focus on teachers' questioning as a practice that empowers students with the confidence that mathematics is for all. We analyze teachers' questioning from three perspectives: identity-forming, strategy-sharing, and unpacking students' mathematics.

Ana-Maria Haiduc, Purdue West Lafayette, Indiana
Twitter: Ana-Maria Haiduc
Signe Kastberg, Purdue University, West Lafayette, Indiana

575 Systems of Equations Treasure Maps

10–12 Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 204AB

We will look at student-created systems of equations with specific solutions correlating to locations of student-selected images on a student-designed coordinate plane, using the website desmos.com. Students will create a systems of equations with intersections at clip art on a unique background then present their "maps" to the class and evaluate peer work.

Sara Bracken, Medina County Career Center, Ohio

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- Expanding the Narrative of Who Belongs
- Improving Core Instruction through Deeper Mathematical Content and Pedagogical Knowledge
- Presidents' Series
- New Teacher Strand
- Equity Strand
- NCTM Committee Session
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- Exhibitors Workshop

576 Reimagining Mathematics Education through Socially Informed Instructional Environments

Coaches/Leaders/Teacher Educators Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 209ABC

Imagine an instructional environment that uplifts and encourages educators to show pride in their cultures, race, and history. Join us as we share practices school leaders could implement to help establish socially informed instructional environments that empower mathematics educators to create equitable learning environments for their students.

Tandrea Fulton, University of Central Florida, Sanford
Twitter: @tandreafulton
Treshonda Rutledge, University of Central Florida, Orlando

577 You Can Teach Any and Everyone

Coaches/Leaders/Teacher Educators Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 207B

The content of this proposal will stem from research of a mixed-reality simulation comparing the outcomes of an experienced educator and a future educator. This investigation will examine their success in learning new teaching and management strategies, giving them the ability to teach students of all different abilities together as one. The simulation will show a diverse group of students as well as show the inclusion of all students with accommodations and modifications used for all.

Hope Scruggs, Alabama A&M University, Huntsville
Nathan Blom, Alabama A&M University , Huntsville

578 Exploring the Challenges of Culturally Relevant Pedagogy Using a Family Pizza Problem

General Interest Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Marriott, Capitol Congress

Participants will create a word problem concerning a real-world task involving their personal definition of family and fair share. These word problems will be compared with previous answers and analyzed for possible hidden culturally relevant ideas and challenges related to this and other similar tasks. A possible framework will be proposed.

Enrique Ortiz, University of Central Florida, Orlando
Twitter: @ortizenrique01

579 Random Rendezvous: Using Simulation with Desmos to Calculate Probabilities

General Interest Burst
SESSION CONTENT LEVEL: Intermediate
Walter E. Washington Convention Center, 150B

Two friends arrive at a random time between noon and 1 PM to meet for lunch. If they agree to wait only 15 minutes for the other person to arrive, what are the chances they will actually meet for lunch? In this session, we will explore how to create a simulation by hand and with the Desmos graphing calculator to explore the answer to this question.

S Leigh Nataro, Moravian University, Bethlehem, Pennsylvania
Twitter: @mathteacher24

580 Working to Overcome Our Students' Anxieties toward Mathematics

General Interest Burst
SESSION CONTENT LEVEL: Introduction to the Topic
Walter E. Washington Convention Center, 201

Mathematics anxiety can develop at any age but often manifests while students are in school. It sets a path of avoidance of mathematics as students mature in their academics and everyday life. This presentation will explore common causes of mathematics anxiety and offer remediation tips for teachers to help diffuse students' feelings of angst.

Stephanie Quan-Lorey, University of Redlands, California

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582 Closing Session: "I Don't Belong": Changing the Narrative of Who Does Math

General Interest Session

SESSION CONTENT LEVEL: Introduction to the Topic

Walter E. Washington Convention Center, Ballroom A

Dr. Danny Bernard Martin tells us, "A consequence of ignoring historically excluded identities, especially race and ethnicity, is the perpetuation of the hierarchy of who does and deserves to access a quality education." For many youth, a sense of belonging is a prerequisite for authentic relationships and, ultimately, developing positive math identities. How do the ways we currently do math class set young people up for failure before they even have a chance to deeply engage? We will unpack what belonging and math identity are, why they are both important in our conversations about mathematics improvement, who can and should change the narratives of who does and experiences math, and how we do that from wherever we are.

Crystal M. Watson, Cincinnati Public Schools, Ohio

Twitter: @_CrystalMWatson

- Uplifting and Inspiring the Mathematics Educator
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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 an opportunity to link with teachers in your state, region, or city for support, professional development opportunities, community outreach, political advocacy, and information sharing.

The Host Affiliates for this conference and the Affiliates-at-Large appear below. To join one of these organizations, email the Affiliate contact for membership information. NCTM has more than 135 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**.

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Association of Mathematics Teacher Educators
Lisa Poling, polingll@appstate.edu

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Conni Crittenden, crittec@gmail.com

TODOS: Mathematics for ALL
Linda Fulmore, lmfulmore@yahoo.com

Women and Mathematics Education
Patricia Frey, freyp@aol.com

About Host Organizations

The Maryland Council of Teachers of Mathematics (MCTM) is the state-affiliate of the National Council of Teachers of Mathematics (NCTM). The Council's rich history dates back to over 100 years ago, with a group of educators that called themselves the Association of Teachers of Mathematics of the Middle States and Maryland. This group of dedicated professionals met regularly and published a professional journal called The Mathematics Teacher, which is now published by the National Council of Teachers of Mathematics and widely read by thousands of teachers worldwide.

In 1933, that group became one of the NCTM's earliest affiliates and called themselves the Maryland Council of Teachers of Mathematics (MCTM). MCTM is a public voice of mathematics education, inspiring vision, providing leadership, offering professional development, and supporting equitable mathematics learning of the highest quality for all students. The Council's members represent all levels of mathematics educators, from preschool through college.

The Virginia Council of Teachers of Mathematics (VCTM) is an organization for ALL mathematics teachers in Virginia, from Elementary through College, from public or private, from pre-service to veteran. If you are not currently a member, please consider joining today!

VCTM is the public voice of mathematics education in Virginia,supporting teachers to ensure equitable mathematics learning at the highest quality for all students through leadership, professional development, and research.

Vision Statement: VCTM is the state's leading community of educators, by educators, for the benefit of all K-16 mathematics educators. VCTM members are connected, valued, and supported to ensure all VA students have access to the highest quality mathematics teaching and learning. We envision Virginia students who are inspired by the usefulness and beauty of mathematics, empowered by the opportunities mathematics affords, and prepared as confident doers of mathematics in the changing Digital Era.

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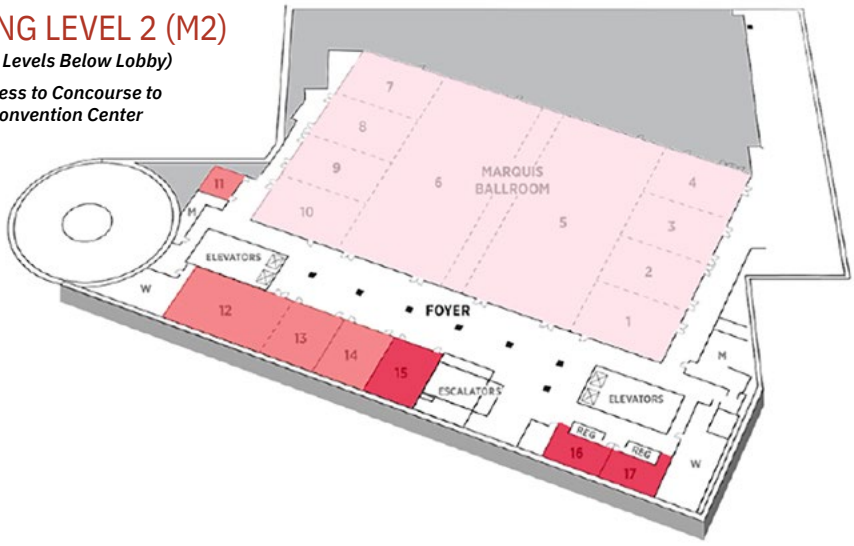
Marriott Marquis Headquarters Hotel Floor Plans

MEETING LEVEL 2 (M2)

(Two Levels Below Lobby)

Access to Concourse to Convention Center



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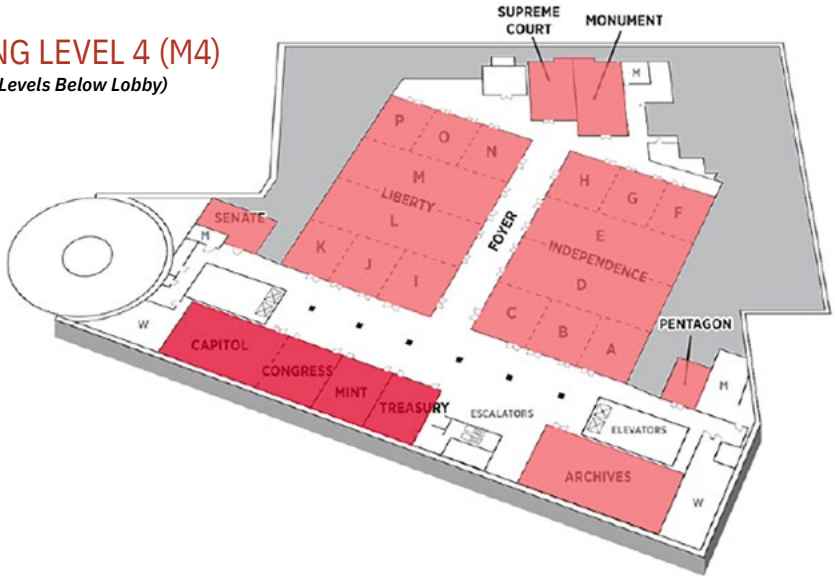

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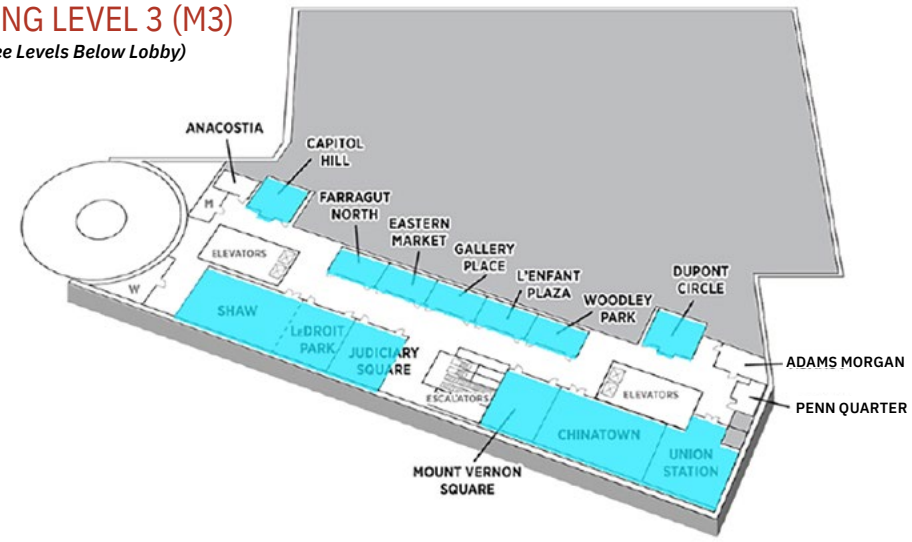


Walter E. Washington Convention Center Floor Plans

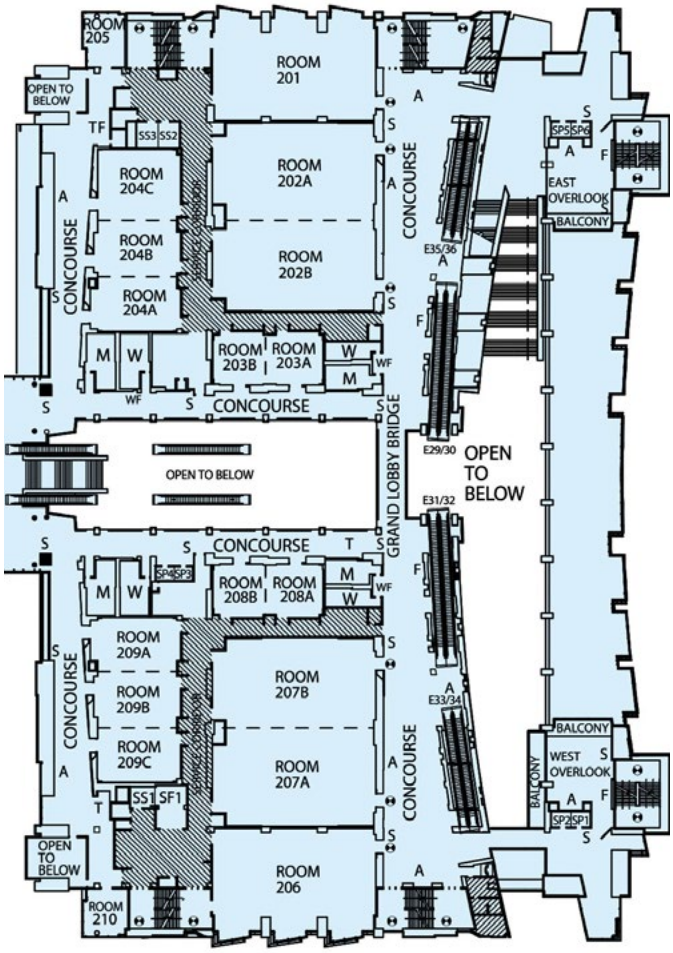
Street Level/Level One

Grand Lobby/Registration/Salons A–I
Meeting Rooms 101–103 & 140–160

Walter E. Washington Convention Center Floor Plans

Level Two

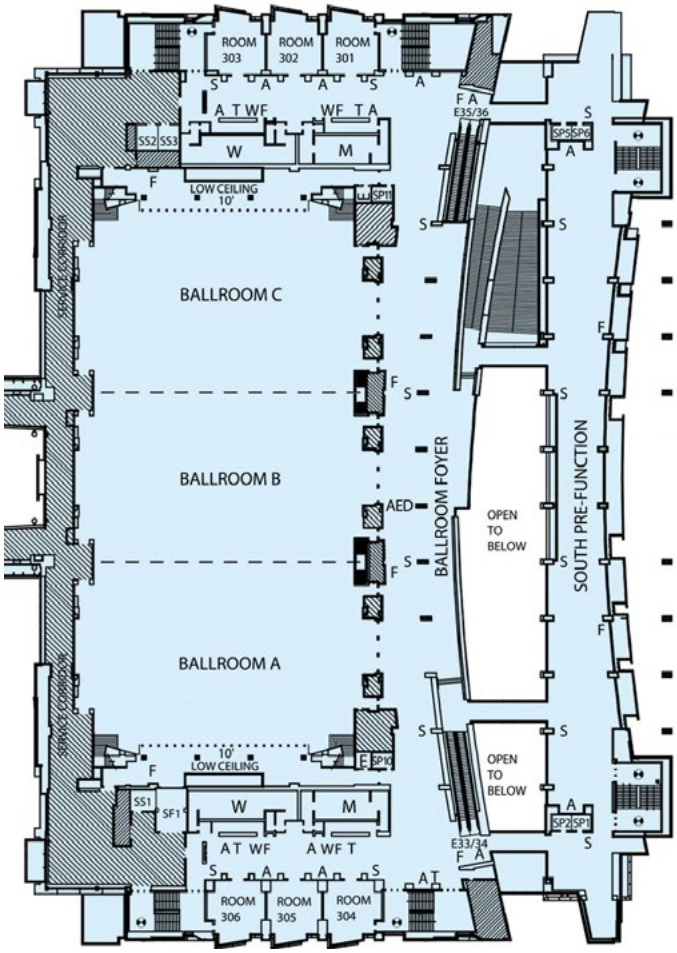
Meeting Rooms 201–210



Level Three

Ballroom

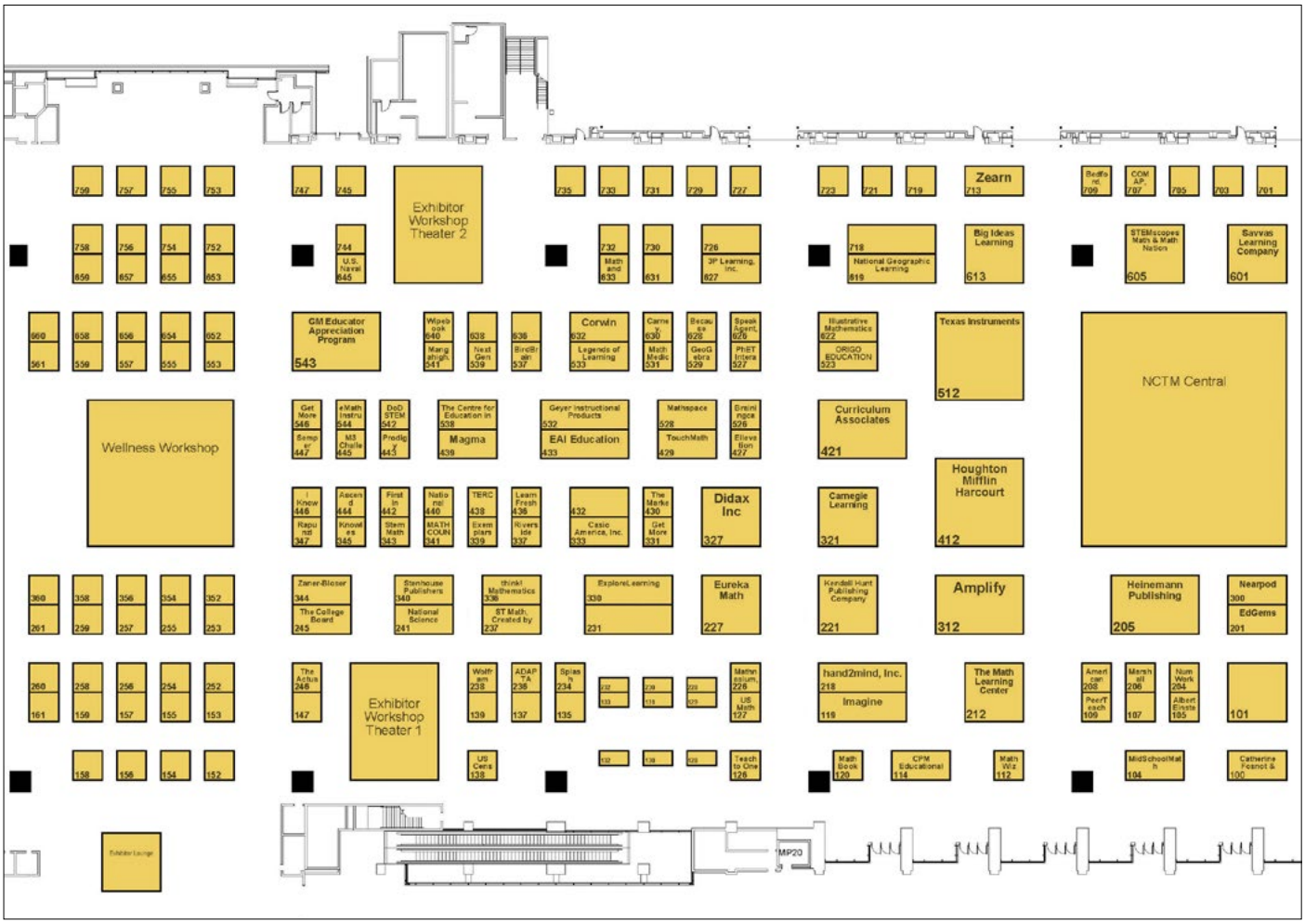
Meeting Rooms 301–306



Walter E. Washington Convention Center Floor Plans

Level Two

Exhibit Hall D



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BOOTH 107

Schaumburg, IL

http://BeAnActuary.org

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https://www.benjaminbannekerassociation.org/

The Benjamin Banneker Association, an equity affiliate of the National Council of Teachers of Mathematics (NCTM), is a national non-profit organization concerned with the mathematics education of ALL children, and more specifically to empowering Black children by actively pursuing effective solutions to the challenges hindering their access to equal opportunities in mathematics education and achievement.

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https://www.bigideaslearning.com/

Big Ideas Learning publishes content-rich educational programs that provide a cohesive, coherent, and rigorous mathematics curriculum to empower teachers and support student learning from kindergarten through high school. From the instructional design to the flexible technology, these programs are intentionally created to inspire confidence in both teachers and students to achieve success in math. Big Ideas Learning partners exclusively with National Geographic Learning.

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https://www.birdbraintechnologies.com/

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http://www.comap.com

COMAP is an award-winning mathematics education non-profit organization that has worked with educations, students, businesses, and industry to support and create learning environments where mathematics is used to investigate and model real issues in our world. Since 1980 COMAP's mission has been to improve mathematics education with an emphasis on increasing student proficiency in mathematical modeling via worldwide math modeling contests, textbooks, newsletters and discrete modules.

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BOOTH 201

Spring Lake, NJ

http://www.edgems.com

EdGems Math is dedicated to empowering a rich community of middle school math teachers – and the diverse learners they support – in class, online, all the time. Our program fosters skill-building and deeper conceptual understanding in all levels of learners through differentiated resources in an engaging visual environment – helping students discover mathematical concepts, apply or practice standards in a variety of methods, and engage in and develop the eight mathematical practices.

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http://www.ellevationeducation.com

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Quarryville, PA

https://getmoremath.com/

Will a student retain new concepts next week — or next year? Get More Math is designed by a math teacher to ensure that the answer is: yes! Take practice to the next level with on-demand spiraled review that BUILDS proficiency on newer content and MAINTAINS previous content gains. Real-time data for just-in-time intervention. The Exams feature makes every assessment actionable. Accelerate learning as never before with a complimentary site-license lasting through July 31 for qualifying schools!

Geyer Instructional Products

BOOTH 532

Cincinnati, OH

https://www.geyerinstructional.com/

With a rich legacy spanning more than six decades, Geyer Instructional has been a pioneer in providing classroom tools. Our comprehensive selection of K–12 classroom supplies is a testament to our commitment. Rooted in our mission to enhance the educational environment, Geyer is dedicated to providing products that serve as catalysts for your success and that of your students.

GM Educator Appreciation Program

BOOTH 543

Sterling Heights, MI

Maybe you bought extra classroom supplies instead of concert tickets this school year, or you missed a big evening out because you were helping students study. Whatever role you play at your school, you deserve the GM Educator offer. Visit booth #905 or https://www.gmeducatorappreciation.com to learn more about our special offer on the purchase or lease of eligible, new Chevrolet vehicles.

Great Minds

BOOTH 227

Washington, DC

http://greatminds.org

Eureka Math2® is a revolutionary math program for grade levels PK–Algebra I or Mathematics I that advances equity in the math classroom by helping students build math knowledge. You'll find the consistent math models, rigor to support the productive struggle, and coherence across grades that premiered in Eureka Math®, only exponentially greater. You'll also find digital interactives, increased student discourse, and improved flexibility to make math instruction more teachable and engaging.

hand2mind, Inc.

BOOTH 218

Vernon Hills, IL

http://www.hand2mind.com

Children learn best by doing! Visit our booth to learn more about hand2mind's most-loved programs and manipulatives. Discover simple, standards-based solutions to integrate hands-on learning into your classroom for Daily Math Fluency, Differentiated Math Instruction, Guided Math Lessons, and more. Learn about fun, new ways to use the hand2mind manipulatives you already have in your classroom and get a sneak peek at exciting new products, too.

Heinemann Publishing

BOOTH 205

Portsmouth, NH

https://www.heinemann.com/math

Heinemann Publishing math resources are written by educators, for educators, to support student-centered teaching and learning. Our authors start with curiosity about students' thinking and numerical reasoning. By learning about student understanding, teachers can be responsive to individual needs. The goal of our resources is to elevate teacher expertise, increase their comfort and confidence with math, and provide support for helping students make sense of the math they're learning. www.Heinemann.com

Houghton Mifflin Harcourt

BOOTH 412

Austin, TX

http://hmhco.com

HMH is a learning technology company committed to delivering connected solutions that engage learners, empower educators and improve student outcomes. As a leading provider of K–12 core curriculum, supplemental and intervention solutions, and professional learning services, HMH partners with educators and school districts to uncover solutions that unlock students' potential and extend teachers' capabilities. For more information, visit www.hmhco.com

I Know It

BOOTH 446

Tonawanda, NY

http://www.iknowit.com

I Know It math is a comprehensive, interactive math practice site (levels K to 5) for elementary students and for middle/high school students as an intervention program. This online resource can be used during class or at home for independent practice, remediation, assessment, or homework. The site enables teachers & parents to differentiate assignments for students, allowing them to work at their own level & pace towards mastery of concepts and skills aligned with national and state standards.

Illustrative Mathematics

BOOTH 622

Tucson, AZ

http://www.illustrativemathematics.org

Illustrative Mathematics is a discerning community of educators dedicated to the coherent learning of mathematics. We collaborate at illustrativemathematics.org, sharing carefully vetted resources for teachers and teacher leaders to give our children an understanding of mathematics and skill in using it. We provide expert guidance to states, districts, curriculum writers, and assessment writers working to improve mathematics education.

Imagine Learning

BOOTH 119

Scottsdale, AZ

https://www.imaginelearning.com/

Imagine Learning provides digital-first PreK–12 learning solutions for core instruction, supplemental and intervention, courseware, and virtual school services. Our mission is to ignite learning breakthroughs with forward-thinking solutions at the intersection of people, curricula, and technology. We serve 15 million students — partnering with more than half of districts nationwide.

Innovamat

BOOTH 139

Union Cty, NJ

Kendall Hunt Publishing Company

BOOTH 221

Dubuque, IA

https://k12.kendallhunt.com

Kendall Hunt is the provider of educational products for math, science and talented and gifted for grades K–12. Full core curriculum math offerings include Illustrative Mathematics for K–12, the Discovering Mathematics Series (Discovering Algebra, Discovering Geometry and Discovering Advanced Algebra) as well as advanced mathematics offerings PreCalculus, Calculus and Statistics. A wealth of supplemental math offerings are also available for all grade levels.

Knowles Teacher Initiative

BOOTH 345

Morrestown, NJ

https://www.knowlesteachers.org

The Knowles Teacher Initiative, a 501(c)(3) nonprofit, was established by Janet H. & C. Harry Knowles in 1999 to increase the number of high quality high school science & math teachers in the U.S. Through the Teaching Fellows Program, Senior Fellows Program & the Knowles Academy, Knowles seeks to support a national network of math & science teachers who are collaborative, innovative leaders improving education for all students in the U.S. Visit www.knowlesteachers.org to learn more.

Learn Fresh

BOOTH 436

Philadelphia, PA

http://learnfresh.org

NBA Math Hoops, our flagship program runs in partnership with NBA Cares, features a comprehensive community program, digital and physical board game, mobile app, and curriculum that allows students to learn fundamental math and social-emotional skills through the game of basketball. All program content is developed in alignment with Common Core State Standards and 21st Century Learning Skills, and has been shown to improve students' foundational math and social-emotional skills.

Legends of Learning

BOOTH 533

Washington, DC

http://www.legendsoflearning.com

Legends of Learning creates standards-aligned digital games to foster deeper engagement, increase content retention and increase test scores; all backed by research from Vanderbilt University. We have over 2,000 standards-aligned games supporting K–8 math and science instruction, so teachers can personalize learning to meet all students where they are. Use Legends to integrate an exciting game-based learning platform into your curriculum to give your students the superpower of knowledge!

Link-Systems International, Inc.

BOOTHS 631 & 730

Tampa, FL

http://www.link-systems.com

Link-Systems International (LSI) provides online learning services that support educators to build student confidence, ensure academic progression, and restore human connection. LSI has provided effective and intuitive online learning solutions that help students confidently progress in the classroom and beyond since 1996. Every student deserves meaningful learning opportunities to fulfill their academic goals. Let's discuss how Sofia and NetTutor may support your students' goals!

M3 Challenge/a Program of SIAM

BOOTH 445

Philadelphia, PA

http://m3challenge.siam.org

MathWorks Math Modeling Challenge (M3 Challenge) is a free contest for high school juniors and seniors in the U.S. and sixth form students in England and Wales. The Challenge is entirely Internet-based with no registration or participation fees. Scholarships totaling $100,000 (>£75,000) are awarded annually. Our website, m3challenge.siam.org, offers loads of free resources for learning about math modeling, including handbooks, videos and practice problems.

Magma Math

BOOTH 439

Palo Alto, CA

https://www.magmamath.com/

Magma Math has its roots in the Nordics and offers an innovative digital math platform with an aligned curriculum in the K–12 space. The platform combines the power of handwriting with the advantages of digitalization to enhance communication and collaboration, provide real-time student data, and make formative assessment a natural part of math class. Magma Math is on a mission to provide equitable, accessible, and engaging math education to revolutionize the learning journey for all students.

Mangahigh.com

BOOTH 541

London, UK

http://www.mangahigh.com

Mangahigh is an adaptive, standards-aligned, supplemental math program that sets the standard for game-based learning across K–10. The device agnostic platform supports learning through in-the-moment feedback, personalized hints and interactive tutorials. It invites risk-taking and supports growth mindset through reframing mistakes as opportunities to try again. The unique reporting framework focuses on demonstrating understanding, not chasing grades. Get your FREE trial: www.mangahigh.com

Marshall Cavendish Education

BOOTH 206

Tarrytown, NY

http://mceducation.us

Marshall Cavendish's core programs are built upon the science of how students learn and empower educators to inspire engagement, persistence, and achievement in all learners. We are committed to giving teachers the tools, resources, and support they need to produce meaningful learning gains for all students. Marshall Cavendish is Singapore's leading educational publisher. Our programs are tailored for the U.S. to create rigorous, meaningful learning experiences for all students.

Math and Movement

BOOTH 633

Freeville, NY

http://www.mathandmovement.com

Math Books By Dan

BOOTH 120

Dallas, TX

http://calculusbook.net

Authors of Calculus & Differential Equations material are often so brilliant & knowledgeable in their field that they make incredible & unfounded assumptions about the readiness of their audience. We present a trilogy of books written using techniques acquired by a career of teaching grades 5–12: anticipatory sets, interactive applets, reinforcement schedules, repetition, real-world applications, pacing, concept spiraling, color coding, parallel concepts, illustrations, & copious use of visuals.

Math Medic

BOOTH 531

Grand Rapids, MI

http://www.Mathmedic.com

Math Wiz Flashcards

BOOTH 112

Green Valley, AZ

http://www.mathwizflashcards.com

High School content, AP and IB excellent quality Math Flashcards. You could make all these 3500 cards with 3000 hours of labor as I did. All that work has been done for you! Your school Admin will support your purchase of a collection of these decks. They will last for years. They cover all the key concepts you teach, and they're fun for your students to use.

MATHCOUNTS Foundation

BOOTH 341

Alexandria, VA

http://www.mathcounts.org

MATHCOUNTS provides fun and engaging programs for 6th, 7th and 8th grade students. Through 2 great programs—the MATHCOUNTS Competition Series and the National Math Club—we strive to foster talent, curiosity and a love of math in all students. Stop by the MATHCOUNTS booth to register for the National Math Club for free!

Mathnasium, The Math Learning Center

BOOTH 226

Los Angeles, CA

http://www.Mathnasium.com

Mathspace

BOOTH 528

New York, NY

http://www.mathspace.co

Mathspace is a space to... LEARN FEARLESSLY Personalized learning and adaptive support encourages students to see mistakes as opportunities to grow. TEACH COMPREHENSIVELY Engage learners with interactive lessons. Differentiate instruction with adaptive tasks. Track student performance with built-in reporting. ASSESS EFFORTLESSLY Use the latest diagnostics to get the information you need on student growth, without taking time out of class. Learn more at: mathspace.co/us

Michigan State University

BOOTH 232

East Lansing, MI

https://prime.natsci.msu.edu/

The doctoral program in mathematics education at Michigan State University is designed for those who show promise of becoming leaders in local, state, national and international mathematics education communities. We prepare researchers and leaders to address critical mathematics education issues by developing analytical perspectives for research, engaging in reflective teaching, and deepening mathematical knowledge. Assistantships and fellowships are available!

MidSchoolMath

BOOTH 104

Taos, NM

http://www.midschoolmath.com

With the highest scores possible on EdReport's latest criteria, Core Curriculum by MidSchoolMath is a multi-dimensional growth mindset curriculum that blends film, software and print-based materials to bring math to life. "I love that students are pulled in with an imaginative problem. Math is solved through group and class discussion. There is a lot of joy learning math this way. The best thing is that students are engaged each and every day." –Daniel Rose, Salt Lake Arts Academy

National Assessment of Educational Progress (NAEP)

BOOTH 440

Washington, DC

http://www.nationsreportcard.gov

The National Assessment of Educational Progress (NAEP) is the largest continuing and nationally representative assessment of what students across the United States know and can do. NAEP is administered by the National Center for Education Statistics within the U.S. Department of Education. The results are released as The Nation's Report Card.

National Geographic Learning

BOOTH 619

Boston, MA

http://www.ngl.cengage.com

National Geographic Learning, a part of Cengage Group, provides quality PreK–12 instructional solutions for math, science, social studies, ESL/ELD, reading, Advanced & Electives, and Career & Technical Education. In partnership with Big Ideas Learning, we offer Kingergarten through high school core math solution from author Ron Larson.

National Museum of Mathematics

BOOTH 137

New York, NY

http://www.momath.org

Come visit the National Museum of Mathematics to learn how you can win $25,000! The Museum runs an annual contest for innovative math lessons, and we want YOU to participate: rosenthalprize.momath.org. We'll also have some unique math manipulatives to share that help math come alive.

National Science Foundation

BOOTH 241

Arlington, VA

http://nsf.gov

The President of the United States recognizes outstanding teachers of mathematics and science (the elementary level in even-numbered years, and the secondary grade level in odd-numbered years) and bestows upon them the Presidential Awards for Excellence in Mathematics and Science Teaching (PAEMST). Awards are given to teachers in each state, the District of Columbia, the Commonwealth of Puerto Rico, the Department of Defense Education Activity schools, and the U.S. Territories.

NCSM

BOOTH 132

Aurora, CO

http://mathedleadership.org

NCSM is a mathematics education leadership organization that equips and empowers a diverse education community to engage in leadership that supports, sustains, and inspires high quality mathematics teaching and learning every day for each and every learner. Our bold leadership in the mathematics education community develops vision, ensures support, and guarantees that all students engage in equitable, high-quality mathematical experiences that lead to powerful uses of mathematical understanding

Nearpod

BOOTH 300

Dania Beach, FL

https://nearpod.com/math

Nearpod is an interactive instructional platform that merges real-time formative assessment and dynamic media for live and self-paced learning experiences inside and outside of the classroom. We are excited to showcase a new supplemental K–8 math program that provides a targeted math instruction powered by the signature Nearpod platform!

Next Gen Personal Finance

BOOTH 539

Palo Alto, CA

NGPF provides FREE curriculum and resources that weave personal finance with algebraic rigor. You'll have a clear answer when students ask: When am I ever going to use this? NGPF offers a 10-unit Financial Algebra Course, engaging standalone math activities, a library of Desmos Classroom interactives, and no-cost professional development. Create an account and start using NGPF materials today. www.ngpf.org/math

NumWorks

BOOTH 204

Raleigh, NC

https://www.numworks.com/

NumWorks is on a mission to simplify math learning with the graphing calculator, reinvented. NumWorks is the first calculator created with 21st-century students in mind with a modern aesthetic, thin design and an intuitive app-based interface, allowing users to just focus on the math. With belief in the power of education and a strong community of teachers, students, and developers, NumWorks' goal is to make everyone a math person.

ORIGO EDUCATION

BOOTH 523

Earth City, MO

http://www.origoeducation.com/

ORIGO Education delivers Elementary Math Curriculum, Supplemental Resources, and Professional Learning that addresses the needs of learners from Pre–K through elementary school. We provide resources from traditional printed products to digital and interactive materials. ORIGO Stepping Stones enhances your teachers and students learning journey with a program aligned to the Common Core State Standards and rated all-green on EdReports. Our supplemental resources complement any core curriculum.

PeerTeach

BOOTH 109

Albany, CA

http://PeerTeach.org

PhET Interactive Simulations

BOOTH 527

Boulder, CO

http://phet.colorado.edu/

Interact, Discover, Learn! PhET simulations actively engage students in math and science, impacting millions of students today and pioneering innovations in teaching, learning, and assessment. Our new HTML5 sims run in any modern web browser including iPads and Chromebooks and are translated into over 120 languages. Visit PhET at booth 527 to get a sneak peek of new math simulations in development!

Prodigy Education

BOOTH 443

Burlington, ON

http://www.prodigygame.com

Prodigy Education is a global leader in digital game-based learning. Our mission is to help every student in the world love learning, motivating millions worldwide via fun, secure and accessible standards-aligned gameplay experiences. At Prodigy Education, we believe maximizing student motivation helps develop a lifetime love of learning. Prodigy's approach to fun, game-based learning means kids no longer have to choose between homework and playtime. Visit www.prodigygame.com to learn more.

Rapunzl

BOOTH 347

Chicago, IL

http://www.rapunzlinvestments.com

Rapunzl is an award-winning financial literacy platform that's transforming the way we teach kids about money. Students can leverage our free web and mobile platform to simulate investment portfolios in real-time, enter into national scholarship competitions, and interact with a comprehensive financial literacy curriculum. Our educator portal then provides teachers with access to our entire 250+ hour curriculum and allows educators to administer assessments directly to students' smartphones.

Riverside Insights

BOOTH 337

Itasca, IL

http://www.RiversideInsights.com

Savvas Learning Company

BOOTH 601

Paramus, NJ

http://www.savvas.com

At Savvas, we believe learning should inspire. Our next-generation learning solutions, developed by top authors and educators, leverage the power of data and advanced technology to deliver immersive, personalized, and flexible content that connects teachers and students with real-world learning experiences, helping all learners discover their greatness. Visit us at savvas.com.

Semper Smart Games

BOOTH 447

Arlington, VA

http://www.sempersmartgames.com

Maker of award-winning math and learning games that use innovative designs, memory science, engaging content and game play to teach essential skills and knowledge.

Speak Agent, Inc.

BOOTH 626

Rockville, MD

http://www.speakagent.com

Speak Agent is a research-based K–12 platform that boosts math achievement by empowering all students to learn content through language. Our digital Math+LanguageSM programs develop academic language, content knowledge, math reasoning, and both verbal and written communication skills. Speak Agent supports both students and teachers with highly engaging, classroom-ready activities that integrate with your existing math curriculum, from kindergarten up to Algebra II.

Splash Party, Inc.

BOOTH 234

Cerritos, CA

Focused on creating the perfect toys to meet the needs of children and educators, Splash Party Inc has spent the past 5 years brainstorming, designing, and rethinking its products. The result is Numblocks, a game that can be played at home or in the classroom, with parents or teachers, and designed to help children develop critical thinking skills, learn to problem solve, understand fundamental math concepts, and most importantly, have fun while playing!

ST Math, Created by MIND Education

BOOTH 237

Irvine, CA

http://stmath.com

ST Math is a PreK–8 visual instructional program that leverages the brain's innate spatial-temporal reasoning ability to solve mathematical problems. The program's unique, patented approach provides students with equitable access to learning through challenging puzzles, non-routine problem solving, and informative feedback. Time spent on ST Math is time spent learning. Learn more at stmath.com.

STEMscopes Math & Math Nation

BOOTH 605

Houston, TX

http://www.stemscopes.com/math

STEMscopes Math and Math Nation are part of Accelerate Learning's suite of results-oriented STEM curriculum and professional development solutions. STEMscopes Math uses the 5E model to provide a meaningful learning experience for K–Algebra I students. Math Nation helps students master middle and high school math with 24-hour access to high-quality instructional videos, workbooks, collaborative learning tools, and adaptive assessments and support. For information, visit acceleratelearning.com.

Stenhouse Publishers

BOOTH 340

Portsmouth, ME

http://www.stenhouse.com

Stenhouse provides quality classroom resources and professional development materials by teachers, for teachers. Visit booth 110 to learn about Building Fact Fluency: A Toolkit for Addition & Subtraction and Building Fact Fluency: A Toolkit for Multiplication & Division—two research-driven, engaging, ready-to-use resources—in your school to create cohesion in your math instruction by using common routines and formative assessment strategies that students will recognize across the grades.

Stern Math

BOOTH 343

Rochester, VT

https://sternmath.com/

Stern Structural Arithmetic is a comprehensive program for teaching the foundations of mathematics and number sense. Stern Math is a hands-on, multisensory approach to learning, where students actively discover math concepts and number patterns. Using colorful blocks representing the numbers one to ten, students begin to make connections from the concrete materials to the abstract representations through interactive lessons and engaging games.

Teach to One

BOOTH 126

New York, NY

http://www.teachtoone.org

It's time to redefine what's possible in math education. Set aside the notion that all students need to learn the same thing at the same time. Teach to One's learning model and digital solutions allow students to follow a pathway created just for them: a unique blend of on-grade skills and building-blocks from previous years. These pathways enable them to accelerate to grade level and beyond based on their unique strengths and needs. Find out what's possible at teachtoone.org or Booth #126

TERC

BOOTH 438

Cambridge, MA

http://www.terc.edu

TERC is a nonprofit made up of teams of math and science education and research experts dedicated to innovation and creative problem solving. At the frontier of theory and practice, TERC's work encompasses research, content and curriculum development, technology innovation, professional development, and program evaluation. TERC has a passion for social justice and strives to create level playing fields for all learners, reaching more than three million students every year.

Texas Instruments

BOOTH 512

Dallas, TX

http://education.ti.com

Designed by teachers for teachers, Texas Instruments calculators are dedicated tools built specifically for teaching and learning math, durable enough to withstand the demands of the classroom and distraction-free so that students stay focused on learning. Teachers trust TI calculators to help students succeed in class and on important exams.

The Actuarial Foundation

BOOTH 246

Schaumburg, IL

http://www.actuarialfoundation.org

The Actuarial Foundation The Actuarial Foundation supports mathematics achievement through an array of hands-on, real-world math resources. All of the lesson plans, materials, posters, online activities and competitions are free! www.actuarialfoundation.org The Foundation's mission is to enhance math education and financial literacy through the talents and resources of actuaries. Our vision is an educated public in pursuit of a secure financial future.

The Centre for Education in Mathematics and Computing

BOOTH 538

Waterloo, ON

http://www.uwaterloo.ca

The Markerboard People

BOOTH 430

Lansing, MI

http://www.dryerase.com

Student dry erase markerboards and response boards in class sets. Great for instant response and instant assessment. Unbeatable prices! Single- and double-sided available. Perfect for math, science, language arts, graphing, handwriting and more. Long-lasting, non-toxic, ultra-low odor markers too!

The Math Learning Center

BOOTH 212

Salem, OR

http://www.mathlearningcenter.org

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

think! Mathematics

BOOTH 336

Neptune Beach, FL

https://www.mathodology.com

We are educators. Our mission is to inspire and nurture creative forces within each of us – one student, one teacher, and one school at a time. We are innovators. We are believers. Our methods and strategies are backed by empirical evidence. We deliver and create a collaborative environment where students and teachers reason, problem solve, communicate and think mathematically together with passion.

TODOS: Mathematics for ALL

BOOTH 230

Venice, CA

https://www.todos-math.org/

MISSION The mission of TODOS: Mathematics for ALL is to advocate for equity and high quality mathematics education for all students — in particular, Latina/o students. TODOS' goals include advancing educators' knowledge and ability that leads to implementing an equitable, rigorous, and coherent mathematics program that incorporates the role language and culture play in teaching and learning mathematics and to develop and support educational leaders who continue to carry out the mission of TODOS.

TouchMath

BOOTH 429

Colorado Springs, CO

https://www.touchmath.com

See It, Say It, Hear It and Touch It! TouchMath helps students of all abilities and learning styles master the foundations of math – from number sense to algebra – empowering them to achieve their full potential. Educators around the world rely on TouchMath for its proven strategies to maximize student potential, prepare for state tests, and achieve AYP benchmarks. Celebrate our 48th Anniversary and learn more about our expanded family of Special Education and Intervention products at booth 719.

U.S. Naval Academy STEM Center

BOOTH 645

Annapolis, MD

http://www.usna.edu/stem

US Census Bureau

BOOTH 138

Alexandria, VA

The Statistics in Schools (SIS) program of the U.S. Census Bureau provides data, tools, and activities that educators can incorporate into their lessons to help teach statistics concepts and data analysis skills to students. The activities and resources are segmented by subject (geography, history and social studies, mathematics and statistics, and sociology) and grade (from kindergarten through high school) so statistics education can be brought to any classroom.

US Math Recovery Council

BOOTH 127

Eagan, MN

http://www.mathrecovery.org

We empower educators to advance students' mathematical thinking and success. Math Recovery® transforms numeracy education through customized and unique professional learning with meaningful assessment and instruction.

Wipebook

BOOTH 640

Ottawa, ON

https://wipebook.com/conference

Wipebook is a Canadian company that offers reusable Flipcharts and notebooks for educators and students. Our products are made with high-quality materials and a patented UV Hypergloss film that makes it easier to erase, and reuse, and can be digitally saved into your cloud by using our free Wipebook Scan App. With Wipebook, besides avoiding paper-waste, you will save money by reusing them and avoiding purchasing flipcharts & notebooks every time knowing that will end up in the trash.

Wolfram Research

BOOTH 238

Champaign, IL

https://www.wolfram.com/education/high-schools/

Best known for Mathematica and Wolfram|Alpha, Wolfram Research has been innovating in STEM education worldwide and is expanding education and computational learning tools. The new Wolfram|Alpha Notebook Edition makes basic computer programming easy with conversational language input to give advanced computation and dynamic visualization into a single, unified tool perfect for teaching and learning.

Zaner-Bloser

BOOTH 344

Grandview Heights, OH

https://www.zaner-bloser.com/

At Zaner-Bloser, we create tools for teachers that help students become more joyful and creative learners, thinkers, and communicators.

Zearn

BOOTH 713

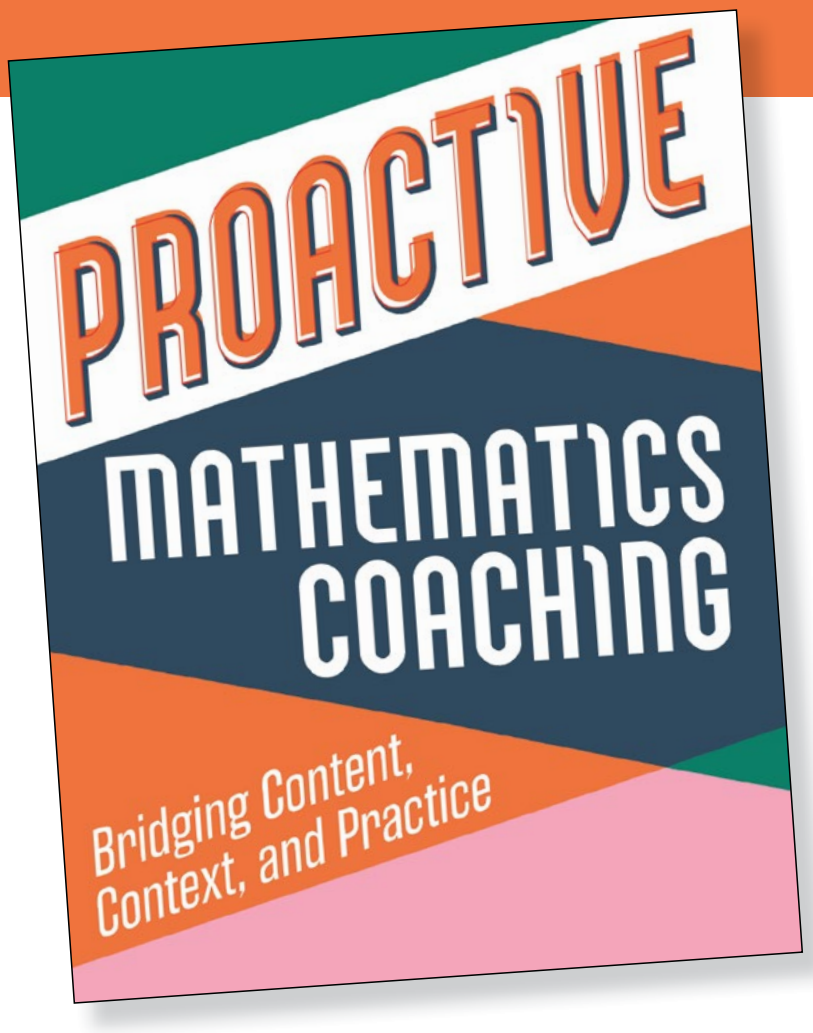
New York, NY

https://about.zearn.org/

Zearn is the 501(c)(3) nonprofit educational organization behind Zearn Math, the top-rated math learning platform used by 1 in 4 elementary-school students and by more than 1 million middle-school students nationwide. Everything we do is driven by the belief that every kid is a math kid. Free for teachers—always. Learn more and sign up at about.zearn.org.

AVAILABLE IN THE NCTM BOOKSTORE

Elevate your Math Coaching and Leadership Skills



Elevate your Math Coaching and Leadership Skills with the power of the Proactive Coaching Framework – where context meets content for intentional professional growth!

Reflecting on their own work as mathematics leaders, the authors believe that shifts in instructional practice should center on both the context of one's position and the related mathematics content. In Proactive Mathematics Coaching: Bridging Content, Context, and Practice, they introduce the Proactive Coaching Framework — PCF — to help those in formal and informal mathematics leadership positions intentionally refine and advance their practice through goal setting and planning for professional learning.

Proactive Mathematics Coaching: Bridging Content, Context, and Practice

By Courtney Baker and Melinda Knapp

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Attend session 296
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Speaker Index

A

Abassian, Aline 335
Acharya, Srujana 120, 573
Acosta, Kristen 479
Adeolu, Adewale 104, 290
Aguirre, Julia 168, 356
Aion, Justin 243
Akwaji-Anderson, Comfort 45
Alafa, Arcy 319
Alexander, Nathan 476
Almarode, John 444
Amatulli, Kevin 136
Amaya, Maria Elena 5
Amick, Lisa 310
Amidon, Joel 68
Aminata, Dionne 525
Amplify 70.2, 194.3, 442.3
Anderson, Robin 160, 188, 547
Andrews, Delise 294, 325
Anstett, Samantha 383
Appova, Aina 240
Arnold, Elizabeth 288
Arrington, Katherine 273
Ashe, Lisa 23
Ashurst, John 10, 416
Asturias, Harold 74
Avineri, Tamar 371, 475

B

Bailey, Nina 208, 564
Baker, Courtney 296
Baker, Melodie 475.1
Balbi, Kristin 136
Bandemer, Karla 294, 362
Barkley, Candice 42
Barlow, Angela 70
Barlow, Elizabeth 183, 244
Barnes, Brett 136.1
Bartkovich, Kevin 102
Bateson, Heather 29
Battey, Dan 28, 306
Baumann, Tammy 215
Baytops-Paul, Adrienne . . . 445
Bay-Williams, Jennifer 24, 512
Bean, Joshua 211
Beatini, Thomas 84
Beaudrie, Brian 406, 546
Beckett, Erica 380
Beirne, Nicole 114
Belcher, Michael 160
Bell, Kimberly 220
Bellman, Allan 158
Bender, Kimberly 446
Benoff, Rachel 303
Bernal, Ashley 153
Berry, III, Robert Q. 145
Bertelsen, Lei-Anna 262
Bertling, Joy 242
Beske, Barbara 103, 180
Bezaire, Joel 485
BFW Publishers 112.2, 149.1, 236.1
Bharath, Deepa 524
Bidwell, Carla 121, 142
Bieryla, Elizabeth 120, 573
Big Ideas Learning 401.2
Bintz, William 557
BirdBrain Technologies 359.3
Bishop, Ben 334
Bland, Shakiyya 180
Blanke, Barbara 278
Bliese, Carol 456
Blom, Nathan 577
Blyman, Kayla 38
Boakes, Norma 542
Boal, Matthew 347
Boaler, Jo 526
Bond, Jen 346
Borden, Margaret 160
Borowski, Rebecca 381
Boschmans, Barbara 406, 546
Boston, Melissa 309
Boswell, Laurie 514
Bowden, Carly 398
Bowman, Charles 112
Boyd, Brian 497
Bracken, Sara 575
Brafford, Tasia 190
Brannegan, Andrew 442.1
Brass, Amber (Amy) 290
Broadwater, Alicia 421
Brooks, Lisa 135
Brown, Amanda 373
Brown, Anita 484
Brown, Kyndall 411
Bruce, Jennifer 245
Bruce, Nichole 89
Brunner, Megan 7
Bryant, Samantha 47
Bryant Hare, Emily 285
Brzezinski, Timothy 226
Bukalov, Larisa 265
Bullock, Audrey 451
Burke, Kristen 383
Burrill, Gail 105, 569
Burris, Justin 464
Burroughs, Elizabeth 288
Bush, Sarah 186, 282
Bushell, Greg 489
Butler, Dan 336
Byrd, LaToya . . . 154, 255, 408

C

Cabales, Isabel 128, 365
Cage, Ph.D., George 279
Cai, Jinfa 506
Call, Susan 383
Campbell, Endeara 114
Campbell, Nichole 103
Campe, Karen . . 416, 435, 550
Candela, Amber 309
Canham, Melissa 385
Carlson, Lisa 89
Carlucci, Dina 237
Carsolio-Mata, Héctor 566
Carter, John 522
Casa, Tutita 202
Case, Joan 449
Casillas, Monica 459
Castellon, Libni 530
Caton, Jennifer 174
Cavey, Laurie 162
Cayton, Charity 564
Cerezci, Bilge 379
Cerrahoglu, Vanessa 413
Chadaz, Susan 221
Champagne, Zachary 424
Chen, Kuan-Chun 366
Chilton, Alicia 42
Chisholm, Janelle 556
Chow, Jay 332
Chowdhury, Madeleine 129
Christensen-Cooper, Mary 377
Christiansen, Matthew 333
Chu, Gary 520
Church, Naomi 216
Chval, Kathryn 48
Cirillo, Michelle 17, 58
Clark, Amanda 426
Clark, Jeneva 367
Clark, Jonathan 367
Clark, Julie 475.1
Clark, Monica 224
Clarke, Tonya . . . 280, 353, 420
Clementi, Megan 455
Cline, Emily 200, 361
CPM Educational Program 112.3
Coe, Peter 261
Coe, Ted 505
Cole, Shelbi 413
Collins, Chris 534
Colon, Ryan 472
Colonnese, Madelyn 202
Condon, Holly 42
Conte, Tracy 419
Contreras, Jose 143, 213
Conzemius, Lisa 569
Cooper, Sandra 544
Corey, Darryl 368
Corley, Nickolas 176
Correll, Megan 37
Corum, Kimberly 159
Covington Clarkson, Lesa 98, 390
Cowan, Lennex 207
Cox, Dana 351
Craig, Jamica 13, 97
Crawford, Deborah 454
Creel, Karen 153
Criollo, Becky 382

Speaker Index

Cross Francis, Dionne 529
Crow, Samantha 466
Crowley, Brandy 200, 361, 544
Cruz, Sara 537
Cuesta, Teresita 195
Cunningham, Matthew 100
Curcio, Tracey 446
Curran, Danielle 404
Curtin, Erin 22
Cutler, Carrie 464

D

Daddario, Daniella . . . 232, 277
Dai, David 434
Daley, Molly 170, 524
Dallas, Heather 551
Dalton, Marylu 498
Dalton, Virginia 128, 365
Danielson, Christopher 170
Dao, Thinh 370
Dare, Emily 483
Daro, Philip 227
Das, Angela 387
Davalos-Lemus, Erika 256
Davidson, Andrew 125
Davis, Kevin 205
Davis, Lisa 354
Day, Roger 522
DCPS Elementary Math and Science Team 401.1
de Araujo, Zandra 108
Dean, Jana 569
Del Bagno, Veronica 555
Delano Moore, Sara 557
DeLeeuw, Bill 254.1, 317.1, 379.1
DeNote, Carrie 126
Desai, Siddhi . . . 186, 335, 407
Di Domenico, Jeanne 477
Dick, Lara 139, 394
Dick, Thomas 61
DiDomenico, Jeanne 382
Dietiker, Leslie 292
Dillon, Fred 107, 437
DiMaria, Sarah 296.1, 311, 441
DiMeglio, Maria 295
Dituri, Philip 125, 417
Dixon, Juli 174, 236, 386
Dolphin, Caitlyn 8
Dolphin, SallySue 344
Dolphin, Sue 50
Donati, Alycia 65
Dorsey, Chad 492
Dougherty, Barbara 175
Drake, Corey 558
Drake, John 71
Drozda, Zarek 263, 492
Dubler, Nicole 553
Dugan, Jamila 2
Dunnack, Jocelyn 83, 415
Dykema, Kevin 147, 299

E

Early, Kathryn 183
Ebanks, Rachelle 58, 207
Ebby, Caroline 197
Edelen, Daniel 335, 465
Edgington, Erin 322
Edwards, Belinda 368
Edwards, Clayton 118
Edwards, Warren 174.1
Eley, Peter 233
Elliot, Joe 339
Elliott, Lucas 340
Ellis, Josh 483
Ellis, Mark 182
Empson, Susan 449
Endo-Peery, Lacy 301
Espinosa, Alison 40
Evans, Rebecca 294
Explore Learning 236.2

F

Fabrega, Judith 426
Falkavage, Meridith 395
Falting, C Kyle 173
Farmer, Bethany 77
Farnham, Chris 151
Farrell, Natalie 254
Farrington, Jason 536
Fender, Tierra 179
Fennell, Francis (Skip) 30
Ferguson, Brent 141
Fernandes, Anthony 82
Fetter, Annie 192
Flahive, Kieran 437
Flessner, Courtney 402
Flessner, Ryan 402
Fletcher, Graham 76, 527
Fletcher, Samantha . . 122, 208
Flores, Jennifer 228
Flynn, Katy 46
Flynn, Mike 315
Foley, Gregory 435
Forde, Elizabeth 483
Forest, Annie 56
Forrester, Jessica 98
Fortenbaugh, Shirley 528
Fortna, Cristabella 521
Fossum, Nolan 289, 413
Fox, Courtney 214
Francisco, Aubrey 7
Franke, Megan 422
Franklin, Christine 450
Fray-Oliver, Tracy 348.1
Free, Megan 307
Freed, Mark 454
Fricchione, Cheryl 466
Frizzell, Julie 152, 453
Fulford, Tywana 73, 280, 323
Fulton, Tandrea 222, 576
Funk, Martin 489
Furuto, Linda 438
Fye, Kristen 122, 394

G

Gael, Andrew 134
Gaffney, Ann 79
Galbraith, Amanda 242
Galindo, Enrique 357
Gallagher, Melissa . . . 163, 345
Gallas, Lindsey 293
Galluzzo, Benjamin 104, 290, 541
Galyean, Haley 34
Gantt, Allison 120, 573
Gapinski, Robin 552, 563
Garrison, Lachanda 376
Gatza, Andrew 529
Gerver, Robert 44, 267
Get More Math 70.5, 317.5
Gibson, Wendy 133
Glancy, Aran 513
Glanfield, Florence 191
Glassmeyer, David 351
Glaze, Andrew 40
Gleason, Jim 62
Goddard, Andrea 399
Gojak, Linda 204
Golan, Kit 410
Gold, Lindsay 10, 416
Goldstein, Mark 389
Gomez Marchant, Carlos Nicolas 345
Gonzalez, Crystal 110.1
Gonzalez Enriquez, Ana . . . 264
Goodsell, Jacquelyn 220
Gough, Jill 231
Gould, Rob 459
Graham, Bruce 392, 474
Graham, Kim 51
Grams, Katie 456
Granados, Mimi 232
Grant, Kayla 120
Grasse, Michael 522
Gray, Paul 109
Greenwood, Alex 290
Greer, Nola 398
Grice, Salandra 235
Grorud, Kelley 395
Gross, Tranaya 337.1
Guarino, Jody 71
Gutierrez, Melanie 301

H

Habecker, Duane 256, 471
Hagge, Julia 240
Haiduc, Ana-Maria 574
Hall, Ronnie 183
Halpin, Kelly 232, 380
hand2mind, Inc. 317.3
Harbour, Kristin 100, 189, 341
Harding, Mahmoud 212
Harper, Suzanne 351
Harris, Pamela 554

Speaker Index

Hartweg, Kim 360
Hasselbring, Cindy 110
Hatfield, Cassandra 500
Hedgepeth, Shauna 485
Hedges, Melissa 92, 537
Heffelbower, Kendra 427
Heinemann Publishing 194.4, 359.5, 442.5
Helming, Luralyn 230
Helmken, Dorothy 521
Henderson, Kathy 332
Henderson, Lindsey 454, 492
Henrie, Andrea 64
Herbst, Patricio 373
Hereth, Ella 251
Herman, Amy 287, 330
Hernandez, Maria 162, 541
Hessney, Sharon 101
Hill, Zack 73, 323
Hillman, Susan 462
Hintz, Allison 425
Hodge, Lynn 242
Holden, Rebecca 196
Holloway, Stephanie 201
Holstein, Krista 329, 375
Holte, Seyoung 523
Honner, Patrick 229, 493
Hood, Robert 573
Horgan, Connie 287, 330
Houston, Michael 10, 416
Howse, Tashana 409, 480
Hu, Jing-Jing 348.1
Huberty, Michael 336
Hudson, Rick 529
Huinker, DeAnn . . 92, 468, 537
Hulbert, Elizabeth 197
Hunsdon, Jessica 28
Hunt-Laubach, Michelle . . . 217
Hurick, McKenzi 319
Hutner, Todd . . 90, 164.1, 347
Hwang, Jinna 227
Hwang, Stephen 506
Hyers, Karen 418
Hylemon, Jennifer 326

I

Id-Deen, Lateefah 58, 222
Igo, Erin 506
Ilaria, Daniel 225
Ishida, Naomi 136
Ivey, Briana 428
Ivory Akpan, Kaiulani 7
Ivy, Jessica 488

J

Jackson, Brent 219
Jackson, Christa 282, 490
Jackson, Traci 286
Jacobs, Jill 123
Jacobs, Vicki 405, 449
Jacobsen, Katie 515
Janes, Robert 121, 142
Jansen, Amanda 69
Jasien, Lara 170
Jenkins, Christine 396
Johnson, Bridget 572
Johnson, Nicholas 148
Johnson, Raymond 23
Jones, Kim 152, 453
Jones, Latisha 445
Jones, Lloyd 88
Jones, Mark 415
Jones, Shelly 269, 480
Jordan, Dream 337.1
Joswick, Candace . . . 188, 547
Julien, Francoise 55

K

Kalinec-Craig, Crystal 33
Kanaskie Grotewold, Kristin 53
Kanold, Timothy 49
Kaplinsky, Robert 442
Kara, Melike 570
Karastamatis, Jackie 283
Karimi, Maral 283
Karp, Karen 175, 429
Kastberg, Signe 462, 574
Katt, Susan 150
Kaufmann, Daniel 155
Kebreab, Lybrya 480
Keith, Julia 253
Kelemanik, Grace 169
Kelly, Jennifer 561
Kenessey, Ana 164.1
Kennedy, Arielle 245
Kersaint, Gladis 439
Ketterlin Geller, Leanne . . . 500
Kilday, Regina 569
Kim, Nick 372
King, Lakesha 403
King, Lisa 113
King, Nicholas 534
Kitchen, Richard 530
Klein, Raymond 59
Klein, Valerie 327
Kline, Kate 543
Kling, Gina 543
Klingensmith, Kristin 106
Knapp, Melinda 296
Knapp, Scott 552, 563
Knighten, Latrenda 72
Knoell, Donna 448
Knowles Teacher Initiative 194.1
Koberstein, Nicholas 510
Kobett, Beth 30, 429
Koehler, Mike 39
Koehn, Katie 471
Koontz, Suzy 6
Korney, Steven 270
Kovel, Rachel 133
Kozlowski, Joseph 276
Krause, Gladys 512
Kraynak, Steve 263
Krejci, Brooke 246
Kriegler, Shelley 177
Krupa, Erin 160
Kuehl, Barbara 299.1
Kuhlman, Adrian 392, 474
Kwon, Faith 258
Kwun, Naehee 411

L

Laib, Jenna 318
LaMaster, John 550
Lambert, Rachel 271
Lancaster, Ron 331
Lange, Karin 431
Larson, Matt 274
Latchana, Jill 376
Laughlin, Connie 260
Lavine, Katherine 562
Learn Fresh 149.4, 359.4
Lee, Hollylynne 263
Lee, Jean 149
Lee, Marsha 420
Leinwand, Steven 140
Lemons-Smith, Shonda . . . 241
Lempp, Jennifer 440
Leng, Low 119
Leslie, Deborah 382, 477
Leslie-Rule, Michaela . . . 178.1
Lev, Sara 426
Lewis, Ally 321
Liljedahl, Peter 316
Lilly, Sarah 238
Lim, Kien 111
Lin, Cheng-Yao 366
Lincoln-Moore, Christina . . 480
Linkous, Charlene 65
Lischka, Alyson 462
Lisciandrello, Jeff 284
Liu, Jian 328
Liu, Jinqing 529
Livers, Stefanie . . 20, 189, 341
Lizins, Astrida 83, 518
Lodhi, Ilma 520
Loftis, Ashley 160, 475
Looney, Susan 302
Lopez, Isai 85
Lott Adams, Thomasenia 75, 337, 386
Loveless, Susan 193
Lovett, Jennifer 139, 394
Luberoff, Eli 358
Lucenta, Amy 338
Lugo, Lisa 136
Lynch, Barbara 12
Lyons, Jessica 263

M

Machado, Suyen 459
Madanat, Dr. Alysha 153
Madden, Claire 403

Speaker Index

Madis, Carlee 441
Magley, Miranda 338
Males, Joshua 314
Males, Lorraine 314
Mamaril, Sarah 159
Mao, Jess 190
Marin, Katherine 93
Marks Krpan, Cathy 467
Markworth, Kimberly 275
Marley-Payne, Jack . . 125, 417
Marlow, Ashley 151
Marr, Janel 438
Marshall, Brittany 306
Martin, Christie 100
Martin, Tami 522
Martin, W Gary 62, 149
Martinez, Glenda 385
Martinez-Cruz, Armando 143, 213
Marvin, Stacie 376
Mason, Erica 271
Massa, Lauren 338
Masunaga, David 272
Mathiesen, Gabrielle 504
Mathspace 112.1, 359.1
Matney, Gabriel 86
Matranga, Anthony 327
Matthew, Charlene 420
Matthews, Lou 305
Matute, Karla 530
Maxwell, Gretchen 383
Mayden, Barbara 11
Mayfield-Ingram, Karen . . . 356
Mazzacane, Tina 454
McAdams, Camsie 217
McCaw, Shannon 363, 452
McConchie, Liesl 441.1
McCulloch, Allison . . . 139, 394
McDonald, Emily 266
McDowell, Denise 27
McGuire, Meghan 223
McPherson, Karen 473
McVicar, Elzena 168
Meadows, Jennifer . . . 64, 250
Melendez, Linda 29
Mello, Alison 31, 223
Melville, Stephanie 454
Merlo, Jacqui 128
Metcalf, Lara 22
Meyer, Dan 99, 297
Meyer, Julien 184
Michalek, Jennifer 23
MidSchoolMath 401.4
Mikelman, Ricky 117
Miles, Jennifer 410
Miles, Rachael 159
Miller, Shannon 369, 436
Miller Bennett, Victoria 20
Milou, Eric 298
Min, Susie 182
Mojica, Gemma 392, 474
Monkoski-Takamure, Antonina 438
Moore, Lauren 5
Moran, Cheryl 382
Morateck, Theresa 395
Morris, Amy 561
Morris, Beth 217
Morrow, Kori 54
Morrow Leong, Kimberly . . 199
Morton, Crystal 548
Muelling, Katherine 374
Mulroe, Sorsha-Maria 325
Munson, Jen 258
Muthitu, Purity 122, 564
Myles, Megan 257

N

Nank, Sean 66
Naresh, Nirmala 407
Nataro, S Leigh 176, 579
National Science Foundation 317.4
NCTM Board of Directors 1, 4, 91, 463
Nealy, Tiffanie 130, 420
Neff, Amanda 200, 361
Neglia, David 446
Neumayer DePiper, Jill 219
Newman, Jeannette . 369, 436
Next Gen Personal Finance 26.2, 274.2
Ngubeni, Lindiwe 174.1
Nho, Chris 170
Nichols, Lynn 159
Nickerson, Rob 447
Nirode, Wayne 497
Nix, Lauren 276
Noblitt, Bethany 507
Nolan, Edward 433
Nolan, William 157
Nomura, Kenji 376
Norland, Ruby 77
Norman, Fawnda 390
Norris, Jessica 158

O

Obrycki, Joseph 509
OConnell, Susan 501
Ogden, Stephanie 460
Oldham, Hannah 494
Oliver, Erin 515
Olsen, James 144
Olsen, Jennifer 237, 491, 511
Olson, Shannon 320
Omohundro Wedekind, Kassia 318, 524.1
Orr, Jon 64.1
Orr, Sheila 441
Ortiz, Enrique 578
Osters, Jonathan 181
Ostmeyer, Marci 194
Osuna, Jennifer 258
Oswalt, Selena 348
Oswalt, Selena 414

P

Pantozzi, Ralph 475.1, 549
Paoletti, Teo 120, 573
Parrish, Mary 63
Parrott, Martha 115
Pascarella, Lorraine 338
Payne, Anna 528
Payne, Lucy 503
Pearce, Kyle 64.1
Peart, Deborah 445
PeerTeach 70.3
Pelesko, John 17
Penny, Kelly 253
Perez, Leticia 450
Peterson, Rebecca 396.1
Pettis, Christy 513
Petty, Elizabeth 19
Peyser, Elizabeth 151.1
Philhower, Joanne 15
Phillips, Shaka 94, 136.1, 173
Picciuto, Jack 38
Picha, Gina 300, 567
Pillai, Sonali 41
Pilotti, Dawn 496
Pittock, Janet 399
Placa, Nicora 352
Pole, Solei 337.1
Pontecorvo, Robert 519
Poras, David 25
Postlethwait, David . . 369, 436
Powell, Sarah 190
Powers, Brooke 321
Pratt, Felicia 174.1
Presley, Joanna 534
Price, Lori 342
Pritchett, Janae 470
Prodigy Education 442.2
Puglisi, Janice 237
Puleo, Marissa 128, 365

Q

Quan-Lorey, Stephanie 580
Quebec Fuentes, Sarah . . . 533

R

Raff, Cynthia 177, 389
Rainwater, Tabatha 367
Ratliff, Brea 548
Rawding, Molly 218
Reardon, Tom 565
Record, AnnElise 146
Record, Kristen 398
Reed, Amarius 174.1
Reigle, Kelly 34
Reinsburrow, Amanda 327
Remijan, Kelly 178
Rendon, Sharon 518
Resanovich, Mary 215

Speaker Index

Reulbach, Julie 60
Reyes, Jessica 81, 452
Richardson, Kathleen 50
Richardson, Kathy 344
Ricker, Whitney 54
Riddell, Claire 424
Riling, Meghan 43
Rimbey, Kimberly 469
Roberds, Anna 79
Robichaux-Davis, Rebecca 118
Robinson, Danielle . . . 403, 537
Robinson, Joe 381
Robinson, Latanya 483
Rodgers, Tanaga 13, 94
Roeder, Daniel 132
Roscioli, Kate 427
Rose, William 458
Rosenhammer, Mariya 62
Roy, George 100, 282
Rubinstein, Gary 229
Runkles, Lauren 16
Russell, Susan Jo 545
Russo, Mark 393
Rutledge, Treshonda . 337, 576
Ryals, Chris 65

S

Sabnani, Heidi 78, 156
Safi, Farshid 186, 283
Sagliano, Candice 334
Sahmbi, Gurpreet 331
Sailer, Carole 459
Salciccioli, Maria 219
Salisbury, Kurt 384, 539
Sampson, Victor 210, 257, 428, 502
Samuel, Molly 134
Sanchez, Maria 57
Sanei, Hamid 212
SanGiovanni, John 150, 343, 511
Savvas Learning Company 26.3, 236.3, 274.1
Scandurra, Jessica . . 281, 304
Schaefer, Sarah 9
Schanzer, Emmanuel 206
Scheafer, Shelly 275
Schefelker, Beth 92, 468
Schifter, Deborah 545
Schmidt, Ashley 26
Schneider, Erin 209
Schreuder, Allie 553
Schulz, Denise 23
Sciremammano, Marissa 365, 491
Scruggs, Hope 577
Seeley, Cathy Lynn 481
Seelke, John 127
Sencibaugh, Joseph 346
Serpa Howe, Kelly 384
Sgroi, Richard 44, 267
Shah, Raj 430
Sharkey, Tara 203
Shaughnessy, J Michael 67, 378
Shave, Meghan 200, 361
Shen, Zhina 190
Shepherd, Chad 432
Sherman, Michael 487
Shuster, Dan 41
Sickles, Bridget 136
Siebenaller, Jordan 124
Sigmon, Stephanie 277
Silbey, Robyn 95, 387
Silverman, Jason 327
Simic-Muller, Ksenija 82
Simon, Leah 351
Skultety, Lisa 188, 547
Skwir, Jessica 103
Smith, Adam 7
Smith, Amy 239
Smith, Antony 425
Smith, Arty 553
Smith, Iesha 279
Smith, Margeaux 544
Smith, Toni 348.1
Sobti, Neha 303
Son, Ji 227, 457
Song, Esther 222
Sookhoo, Dwaina 296.1
Sopala, Dianna 248
Sosenke, Fanny 57
Soto, Hortensia 478
Soumeillan, Bridget . . 348, 414
Spanier, Stacey 65
Speak Agent, Inc 149.3
Speranzo, Laurie 106, 359
Spikings, Desiree 505
Stafford, Angela 364
Starkey, Erin 426
Starnes, Daren 18, 350
Stecher, Sarah 293
Steele, Mike 291
Steimer, Julie 534
STEMscopes/Accelerate Learning, Inc. 149.2, 359.2
Stern Math 70.4
Stevens, Kathleen 285
Stigler, James 227
Stipe, Morgan 321, 323
Stoker, Yanira 328
Strate, Heidi 559
Strayton, Marianne 8
Strom, Sue 503
Strong, Shelby 243, 410
Strutchens, Marilyn 512
Stumpff, Tim 398
Suh, Jennifer 168, 383, 427, 541
Sundrani, Anita 14, 163
Suters, Leslie 64, 250
Sutorius, Janet 164
Swartzentruber, Rita 242
Sylves, Erin 234

T

Tabor, Josh 18, 350
Tadlock, Jennifer 80, 224
Takahashi, Akihiko 313
Takahashi, Sola 442.1
Tang, Zuobin 228
Tate, Holly 168, 421, 555
Taylor, Evan 548
Taylor, Johnathan 270, 354
Taylor, Sharon 460
Teague, Justin 338
Tedesco, Robyn 281, 304
Terwilliger, Cathy 470
Texas Instruments 70.1, 149.5, 194.2, 317.2, 401.3, 442.4
The Math Learning Center 26.1, 401.5
Thomas, Elizabeth 500
Thompson, Christy 524.1
Thompson, David 87
Thrasher, Emily 392, 474
Thunder, Kateri 444
Tilli, Jessica 197
Tiu, Michelle 431
Torres, Olga 33
Trinkle, Mary 258
Troudt, Melissa 188, 547
Turner, Carrie 46
Turner, Erin 168
Tuttle, Katie 405

U

Uncapher, Melina 431
Usiskin, Zalman 355

V

Vakharia, Vanessa 268
Valdez, Mario 130, 540
Van, Afreeka 508
VanBilliard, Jason 185
Vandeberg, Emma 348.1
Velez, Mary 252
Venenciano, Linda 198
Vennebush, Patrick 259
Verti, Claire 192
Virmani, Ritu 388
Vokey, Molly 78, 156
Vora, Maureen 427

W

Waddell, Glenn 149
Walker, Amber 413
Walker, Kaynetha 466
Walker, Lane 47
Wall, Wendy 380
Wallace, Anne 23
Walmsley, Angela 249
Walters, Kirk 442.1
Walton, Mariah 368

Speaker Index

Wan, Anna 379.1, 488
Wandell, Tabitha. 242
Wapole, Frank. 138, 560
Ward, Brady. 254.1, 317.1
Ward, Janene 295
Warmbrand, Casey 536
Wascom, Monica 502
Watkins, Laura 317
Watson, Colleen 35
Watson, Crystal 582
Webb, Allie. 296.1
Webb, Hattie 16
Webster, Caitlin 97
Wees, David. 161
Weiland, Travis . . . 14, 82, 163
White, Dorothy 512
White, Dr. India. 353, 480
Whitney, Sarah 172
Wicinski Reynolds, Margaret 12
Wickstrom, Megan. 541
Wiemken, Rachel 86
Wilcox, Luke. 293
Wilkerson, Michelle. 571
Wilkerson, Trena 186, 400
Wilkes, Charles. 529
Williams, Jedediyah 535
Williams, Kyle 96
Williams, Rita. 32
Wills, Theresa 218, 427
Wilson, Jennifer 154, 408
Wilson, Tiffany 234
Winfrey, Naketa 420
Wolfe, Jennifer 283
Wolfram Research, Inc. 112.4
Wong, Bobson. 265
Wood, Andrea 27
Wood, Jaclyn. 138, 560
Wootton, Karen. 329
Wray, Jon 30
Wyberg, Terry 513
Wyborney, Steve 324

Y

Yagi, Seanyelle 198
Yalman Ozen, Demet 208, 564
Yantz, Jennifer 498
Yeap, Ban Har 9, 55
Yearsley, Julie 385
Yeh, Cathery 411
Young-Saver, Dashiell. 349, 457

Z

Zager, Tracy. 76, 527
Zapién Castillo, Samuel . . . 566
Zbiek, Rose Mary 290
Zelaya, Francia 367
Zheng, Yanjie. 370
Zimmerman, Stacey 131
Zitar, Kerri. 113
Zoellner, Joan 475.1
Zonnefeld, Ryan 230
Zonnefeld, Valorie 230
Zunkiewicz, Kelly 391

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12