



Regional Conference
& Exposition
NEW ORLEANS
FEBRUARY 2-4, 2022



PROGRAM BOOK

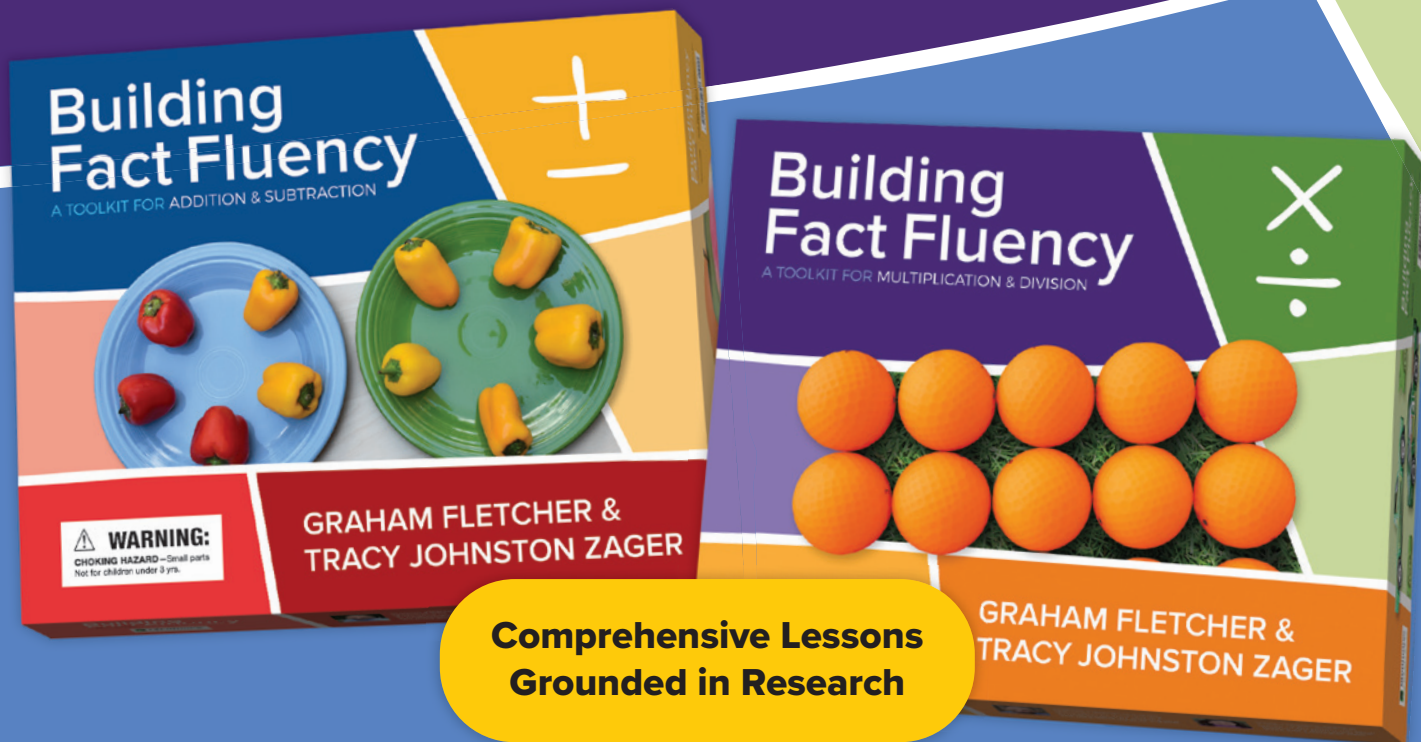


NATIONAL COUNCIL OF
TEACHERS OF MATHEMATICS

#NCTMNOLA22 | nctm.org/NOLA2022



Build Fact Fluency Through Real-World Contexts and Purposeful Practice



By Graham Fletcher
& Tracy Johnston Zager



Visit Booth 601 or scan
the QR code to request
more information.

Contents



Regional Conference & Exposition NEW ORLEANS FEBRUARY 2–4, 2022

HOST

Louisiana Association of Teachers of Mathematics

MEETING FACILITY

All Regional Conference presentations will be held at the New Orleans Ernest N. Morial Convention Center. See pages 56–59 for floor plans.

REGISTRATION

Wednesday	7:30 a.m. – 7:00 p.m.
Thursday	7:00 a.m. – 5:00 p.m.
Friday	7:00 a.m. – 2:00 p.m.

EXHIBITS AND NCTM CENTRAL

Wednesday	4:00 p.m. – 6:00 p.m.
Thursday	9:00 a.m. – 5:00 p.m.
Friday	9:00 a.m. – 2:00 p.m.



Advertisers Guide	53
Affiliates	54
Apps	8
Committees.....	55
Coronavirus Health & Safety Tips.....	10
Exhibits	8
Directory	60
Exhibit Hall Floor Plan	56
Exhibitor Workshops	8
First Aid.....	7
Floor Plans	57
Infinity Bar	8
Information Booth	7
NCTM Central	9
Bookstore.....	8
Classroom Resources	9
Mathematics Education Trust (MET).....	9
Member Services	9
Networking Lounge.....	9
NCTM Officers	55
Online Conference Planner	8
Presentation Handouts	7
Program Information.....	5
Grade Bands	5
Opening Session	11
Thursday Presentations	12
Friday Presentations	34
New and Preservice Teachers Workshop	5
Regional Conference Overview & Orientation	5
Strands.....	6
Types of Presentations.....	5
Registration and Access to Presentations	7
Speaker Index.....	63
Sponsors	53

nctm.org/nola2022

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



NATIONAL COUNCIL OF
TEACHERS OF MATHEMATICS

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Email nctm@nctm.org; Web nctm.org

Welcome to New Orleans!



Welcome to the NCTM Regional Conference & Exposition in New Orleans, Louisiana! In the spirit of Southern hospitality, New Orleans is known as the city “where you are always at home, and you can hear your very soul sigh with peace and happiness” when visiting. After the events of the past year and a half, we are excited to bring the mathematics community back together and return “home” to a face-to-face conference! The program committee worked tirelessly to create a diverse, engaging, and innovative conference experience designed to facilitate equitable teaching practices for teaching and learning mathematics for all learners. This long-awaited in-person conference will allow you to network with peers, share ideas, attend engaging sessions led by motivational speakers, and learn about new and innovative teaching resources. After connecting and reconnecting with peers, your math soul will experience the peace and happiness that happens after networking and learning with and from fellow mathematics educators.

New Orleans native Dr. Calvin Mackie will kick off the New Orleans Regional Conference with his opening keynote address. Dr. Mackie, a charismatic and inspirational speaker, is certain to excite and motivate us all at the beginning of our conference experience. Our theme for the conference is “Refocus, Rejoice, and Reunite.” In the spirit of the conference theme, the program committee selected workshops, sessions, and bursts centered on these five strands:

- Rejoice and Celebrate the Math around Us
- Redesign the Mathematics Classroom through the Lens of Identity, Agency, and Access
- Reboot Assessment: Equitable Empowerment of Student Confidence in Learning
- Refreshen and Deepen Mathematics Content Knowledge for Teaching
- Realign Relationships and Strategies for Supporting and Implementing Instruction

The program committee carefully selected presentations for this phenomenal program to ensure that there’s something for

everyone—classroom teachers, math coaches, administrators, math teacher educators, new and prospective teachers, and math specialists. We invite you to embrace our theme, “Refocus, Rejoice, and Reunite,” as you attend sessions and network with and learn from other educators.

In addition to attending conference sessions, don’t forget to schedule time to visit the Exhibit Hall. You’ll find a variety of exhibits featuring resources and products designed to support student learning and enhance the teaching and learning of mathematics. A popular attraction in the Exhibit Hall is the Infinity Bar, where you have the opportunity to schedule one-on-one sessions with many of our featured speakers to learn more about their work.

Whether it’s your first visit to New Orleans or a return trip, save time at the end of the day to unwind and connect with new and old friends by enjoying the sights and sounds of the Crescent City. New Orleans, home to the world-famous French Quarter, is a festive city full of historic landmarks, incredible museums, and some of the best restaurants in the country. With so many options and things to do in this city that never seems to sleep, there’s something to appeal to everyone’s interests. As the locals say, make plans to “pass a good time” while you’re in the city.

On behalf of the NCTM Board of Directors, the Program Committee, the Volunteer Committee, the NCTM staff, and the many volunteers who worked to make our return to an in-person conference happen, we thank you for joining us and hope you have a wonderful conference experience!



Latrenda Knighten
PROGRAM COMMITTEE CHAIR



Christin Timmons
VOLUNTEER COMMITTEE CHAIR

Program Information

New and Preservice Teachers Workshop

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

Thursday and Friday, Presentations 40 and 125

9:45 a.m.–11:00 a.m.

Room: Thursday – 294, Friday – 293

Types of Presentations

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

Sessions (60 minutes) represent a common format during which speakers relate their ideas to an audience. Rooms are either theater style or classroom style and vary in size.

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

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

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

Grade Bands

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

- 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)
- Research
- Coaches/Leaders/Teacher Educators
- General Interest—issues of interest to multiple grades and audiences

Overview and Orientation

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

Thursday and Friday

7:15 a.m.–7:45 a.m.

Room: New Orleans Convention Center, New Orleans Theater B

Program Information

Focus Strands



REJOICE AND CELEBRATE THE MATH AROUND US

NCTM's Catalyzing Change series advocates for a mathematics program that expands opportunities for all learners and for learners to experience the joy and beauty of mathematics. Mathematics is the basis for all human development, progress, and beauty. It can be used to model and predict behavior, describe nature, enhance art, and shine light on inequities in our world. Sessions in this strand focus on the joy of doing mathematics; using mathematics to help observe and respond to the world around us; and providing ways to guide our students to love, appreciate, and do mathematics.



REDESIGN THE MATHEMATICS CLASSROOM THROUGH THE LENS OF IDENTITY, AGENCY, AND ACCESS

NCTM advocates for the empowerment of each and every student to be an author of mathematics through equitable or culturally sustaining teaching practices and inclusive classrooms. By dismantling barriers, we allow students to experience school mathematics as a whole person by drawing on their cultural and linguistic resources. Presentations in this strand will explore how to build student agency, foster student identity, and promote access for each and every student in mathematics.



REBOOT ASSESSMENT: EQUITABLE EMPOWERMENT OF STUDENT CONFIDENCE IN LEARNING

NCTM advocates for the empowerment of all students in the mathematics classroom. Assessment, both formative and summative, should be used as a tool to equitably bolster every student's confidence and identity in the mathematics classroom. Sessions will focus on the use of assessment in promoting purposeful ways to amplify students' voices and mathematical ideas.



REFRESHEN AND DEEPEN MATHEMATICS CONTENT KNOWLEDGE FOR TEACHING

NCTM's Effective Mathematics Teaching Practices call for students to develop procedural fluency from conceptual understanding. To actualize this goal, teachers must have a deep conceptual understanding of the mathematics they teach, along with knowledge of the progression of concepts between grade bands. Presentations in this strand highlight innovative methods of developing mathematics content knowledge for teaching that make an impact on student learning.



REALIGN RELATIONSHIPS AND STRATEGIES FOR SUPPORTING AND IMPLEMENTING INSTRUCTION

"The only constant in life is change." The world of education changed drastically when many districts were forced to transition to remote or hybrid learning. Teachers, leaders, parents, and other stakeholders were forced to shift and pivot their practices to support students. Sessions in this strand focus on how teachers, leaders, and other stakeholders pivoted their practices in the areas of implementing instruction, supporting teachers, community partnerships, engaging caregivers as partners, coaching, and expanding networks beyond traditional walls and spaces.

Program Information

Insightful Education Sessions, Dynamic Exhibits

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

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

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

Tips for a Rewarding Regional Conference & Exposition

- Access the **conference app** for program and speaker information, to connect with other attendees, and to share your feedback. Visit nctm.org/confapp.
- Get available speaker handouts at nctm.org/planNOLA.
- Keep the conversation going! Follow us on social media at **#NCTMNOLA22**.
- If you're experiencing the conference with your colleagues, attend different presentations and share ideas with one another after the conference.
- Silence your cell phone during presentations.
- Be safe! Remove your name badge when you leave the conference facilities.

Registration and Access to Presentations

Check in for registered attendees will be located at the New Orleans Convention Center in Exhibit Hall J. 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.

Information Booth

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

First-Aid Station

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

Presentation Handouts

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




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

Program Information

Exhibits

Make time to visit the Exhibit Hall. The hours allow ample opportunity to explore, test, and purchase resources for your classroom. You'll also be able to meet product specialists, get fresh ideas, and watch demonstrations on how products will help you in your classroom. We've provided dedicated time to visit the exhibits; no presentations will take place from 12:00 p.m. to 1:00 p.m. on Thursday and Friday. Check out the map of the Exhibit Hall on page 56 and the list of exhibits on pages 59–61.

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.

NCTM App

Start planning early and stay connected throughout the event with the NCTM mobile app. Whether you have an iPhone, iPad, Android, or tablet, the app is your onsite sidekick! Get the app and select your event to access these features and more.

- **Notifications**—View event alerts and up-to-the-minute information.
- **Schedule**—Search sessions and speakers, create your own itinerary, download handouts, take notes, and make personal appointments.
- **Exhibitors**—Search, filter, take notes, and contact and mark exhibitors to visit.
- **Directory**—Create your own profile and search for and message other attendees.
- **Maps**—View floor plans and maps.

Visit nctm.org/confapp for more information.

Online Conference Planner

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

Wi-Fi

Complimentary wi-fi will be available for NCTM Regional Conference & Exposition attendees in NCTM Central in the Exhibit Hall.

Username: NCTM

Password: NCTM2022

Infinity Bar

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

Program Updates

Visit nctm.org/NOLA2022 for program updates, including all the latest changes, cancellations, and additions. You can also follow along with the conference app to view event alerts and up-to-the-minute information.

Bookstore

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

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

Contactless Payments

As part of our health and safety protocols, 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. 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 for their onsite payment policies.

Program Information

NCTM Central

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

Wednesday 4:00 p.m.–6:00 p.m.

Thursday 9:00 a.m.–5:00 p.m.

Friday 9:00 a.m.–2:00 p.m.

Learn how NCTM supports you and the field of mathematics education:

- Get sample journals and more at **Member Services**. Take the opportunity to update your membership information and learn about your benefits.
- Discover available funding and resources to support you in your career and professional development through the **Mathematics Education Trust (MET)**.

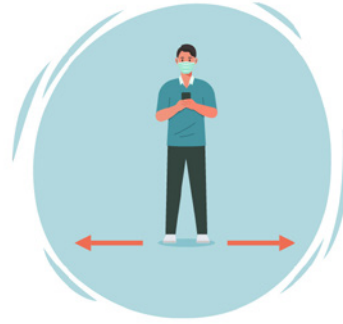
- Check out **Classroom Resources** and learn about NCTM's collection of lesson plans, problems, and more.
- The **Networking Lounge** is a prime location to meet up with colleagues between presentations! Whether you want to make connections with fellow conference goers, exchange teaching tips, or catch up with friends, you'll find a comfortable spot in the Networking Lounge. Relax and recharge—make use of charging stations while you reflect with colleagues.
- Learn about NCTM's **Professional Development** offerings. Information will be available about NCTM's Professional Learning Services and upcoming Regional Conferences & Annual Meetings.



Coronavirus Health & Safety Tips



Wear a mask that covers your nose and mouth



Maintain proper social distancing of 6 feet/2 meters



Wash your hands often



Use hand sanitizer



Avoid shaking hands, high-fives, and hugs



Clean your electronics



Use your own supplies

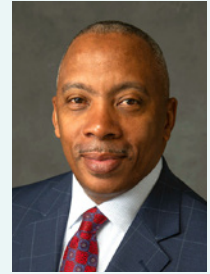
1 Opening Session

General Interest Session

New Orleans Convention Center, New Orleans Theater B

Dr. Calvin Mackie has inspired millions with his journey from remedial reading classes to a PhD in engineering. The internationally recognized motivational speaker, inventor, entrepreneur, prominent African American community leader, and former tenured Tulane professor is now changing lives through the advancement of STEM education for children and communities everywhere. Since 2013, STEM NOLA has engaged 70,000+ students, mostly underserved low-income students, in hands-on STEM project-based learning. As NCTM's 2022 opening keynote speaker, his story and infectious delivery will excite you, inspire you, and motivate you to continue making your own difference in the world.

Calvin Mackie, STEM NOLA, New Orleans, Louisiana



Thursday Morning Session

2 Regional Conference Overview and Orientation

General Interest Session

New Orleans Convention Center, New Orleans Theater B






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

Desiree Harrison, Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; Farmington Public Schools, Michigan
Twitter: @kidsmathtalk

Melissa Boston, Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; Duquesne University, Ellwood City, Pennsylvania
Twitter: @MBostonMath



Stop by NCTM Central to ask questions and learn about **Mathematics Teacher: Learning and Teaching PK–12!**

-  Rejoice and Celebrate the Math around Us
-  Redesign the Mathematics Classroom through the Lens of Identity, Agency, and Access
-  Reboot Assessment: Equitable Empowerment of Student Confidence in Learning
-  Refreshen and Deepen Mathematics Content Knowledge for Teaching
-  Realign Relationships and Strategies for Supporting and Implementing Instruction

3 Responsive Mathematics Classrooms: Building Community to Promote Engagement for All Students



PreK–2 Session

New Orleans Convention Center, 397

Come learn how to create an engaged community of learners using responsive classroom-based mathematical practices. A responsive classroom facilitates discourse using equitable classroom norms and routines. You will learn how to maximize student engagement with conceptually based mathematical learning goals grounded in responsive classroom norms.

Jeremy Lynch, Slippery Rock University, ,
Sararose Lynch, Westminster College, New Wilmington, Pennsylvania

4 How Do You Get to Know Your Students?: Advancing Equity by Mathematizing Students’ Lives



3–5 Session

New Orleans Convention Center, New Orleans Theater C

During an interview a student stated, “It’s hard to learn from my math teacher if I don’t have a good relationship with them.” Listening to students’ perspectives can help teachers connect on an interpersonal level with their students to provide greater access to mathematics. During my session, I discuss ways mathematics teachers can use students’ perspectives to cultivate a sense of belongingness, build positive student-teacher relationships and connect mathematics to students lives.

Lateefah Id-Deen, Kennesaw State University, Georgia
Twitter: Prof_IdDeenL

5 You Can’t Escape Math



6–8 Session

New Orleans Convention Center, 292

Increasing motivation to learn math can be a daunting task! In this session, you’ll learn how to incorporate active learning in the middle school math classroom, which increases student engagement and ownership of their learning. Participants will see example lesson ideas and even learn how to create and take part in a digital escape room!

Sandra Leiterman, University Arkansas Little Rock
Twitter: @saleiterman

6 A Look at Some *Fun* and *Amazing* Geometry Theorems



8–10 Session

New Orleans Convention Center, 295

Dynamic geometry software allows students to explore many fun and amazing geometry theorems not easily accessible by hand. This hands-on session will look at some theorems that are not often covered in a standard geometry course and that are relatively easy for students to discover on their own. We will prove some of these theorems and just marvel at others.

Raymond Klein, retired, Glen Ellyn, Illinois

7 Empowering Student Self-Confidence Using Self-Assessment and Standards-Based Grading



8–10 Session

New Orleans Convention Center, 396

Do your students’ grades align with their learning? Do you struggle to assess learning in equitable ways? Do you empower your students through assessment? Come explore a standards-based mindset for teaching and learning and discuss aspects of standards-based grading in practice using student self-assessment to foster learning in the classroom.

Janet Andreasen, University of Central Florida, Orlando
Twitter: JanetAndreasen
Ashley Schmidt, University of Central Florida, Orlando

8 Number Talks, A Routine That Brings to Life Student Voice, Ownership, and Sense of Belonging



8–10 Workshop

New Orleans Convention Center, 383–385

Join us in a few number talks built for secondary students. Number talks empower students’ math identity, invite powerful mathematical discourse, celebrate mistakes, and value every students’ thinking. We will watch, engage in, and do number talks together. You will leave armed with resources and energized to implement the routine in class tomorrow.

Jacqueline Palmquist, Indian Prairie School District 204
Metea Valley HS, Naperville, Illinois
Twitter: @thumbsupmath
Patricia Baltzley, Independent Mathematics Consultant, Gardiner, Montana
Sue Ellen Vozza, Stevenson High School, Lincolnshire, Illinois



Rejoice and Celebrate the Math around Us



Redesign the Mathematics Classroom through the Lens of Identity, Agency, and Access



Reboot Assessment: Equitable Empowerment of Student Confidence in Learning



Refreshen and Deepen Mathematics Content Knowledge for Teaching



Realign Relationships and Strategies for Supporting and Implementing Instruction

9 Creating a Personalized, Collaborative Approach to Teaching Math



10–12 Session

New Orleans Convention Center, New Orleans Theater B

This session will share how we need to shift to a student-centered classroom where students are given the freedom to learn at their own pace; are empowered to believe that they have the ability to be successful in math; and are provided with challenging, deep, and interconnected math tasks that allow them to struggle, persevere, discover, and grow.

Lesley Schooler, Carondelet High School, Concord, California
Twitter: LesleySchooler

10 Playing with Quadratics in Standard Form and a Cubic Curiosity



10–12 Session

New Orleans Convention Center, 296

How can we engage our students in the joy of learning and doing 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 worlds of quadratics, cubics, and equilateral triangles.

Curtis Brown, Texas Instruments Inc., Sachse
Twitter: @cbmathguy

11 Creating the Capacity for Change: Structures for Empowering Elementary Teachers



Coaches/Leaders/Tea Session

New Orleans Convention Center, 286–287

We will share lessons learned from our journey to transform the elementary math program and shifts we made to empower teachers and students as mathematicians, including learning about structures to increase collaboration, support professional development, foster equitable practices, and sustain reflective practice to bring about systemic change.

Melissa Pearson, West Windsor-Plainsboro Regional School District, New Jersey
Twitter: @DrMJPearson
Susan Totaro, West Windsor-Plainsboro Regional School District, New Jersey

12 Five Essential Strategies That Ensure Access and Foster Students' Mathematical Identity and Agency



General Interest Session

New Orleans Convention Center, New Orleans Theater A

Creating classrooms where all students see themselves as powerful math thinkers requires implementing equitable teaching practices. Attend and learn five immediately implementable teaching strategies that promote students' mathematical agency and identity and reposition them to contribute meaningfully to the collective knowledge of the class.

Grace Kelemanik, Fostering Math Practices, Natick, Massachusetts
Twitter: @gracekelemanik

Amy Lucenta, Fostering Math Practices, Natick, Massachusetts

13 Uncovering Implicit Biases to Use More Equitable Teaching Practices



General Interest Session

New Orleans Convention Center, 291

In this session we will share how teachers can use implicit association tests (IATs) and the Equity Quantified in Participation (EQUIP) rubric to uncover implicit biases or inequitable teaching practices. Come learn how to use data to create a more equitable math classroom.

Liza Cope Bondurant, Delta State University, Florida, Mississippi
Twitter: @lizacope1234

Joel Amidon, University of Mississippi



Rejoice and Celebrate the Math around Us



Redesign the Mathematics Classroom through the Lens of Identity, Agency, and Access



Reboot Assessment: Equitable Empowerment of Student Confidence in Learning



Refreshen and Deepen Mathematics Content Knowledge for Teaching



Realign Relationships and Strategies for Supporting and Implementing Instruction

14 Developing and Assessing Young Learners’ Mathematical Sense Making with Number Racks



PreK–2 Workshop

New Orleans Convention Center, 293

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 PreK–2 activities, and investigate a comprehensive assessment tool that supports systematic observation of students’ development to guide instruction.

Kimberly Markworth, The Math Learning Center, Bellingham, Washington

Shelly Scheafer, Buckingham Elementary School, Bend, Oregon

15 Teaching Algebraic Thinking and Problem Solving without the Xs



PreK–2 Workshop

New Orleans Convention Center, 393–394

Strategies to develop algebraic thinking, including use of the equals sign, other representations, patterns, and solving for unknowns will be the focus for this hands-on workshop. Attendees will actively engage with manipulatives, effective questioning strategies, and the exploration of real-life problems that promote algebraic thinking.

Donna Knoell, self, Shawnee Mission, Kansas

16 Fluency Practice with Fractions and Decimals = More Than an Activity Sheet



3–5 Workshop

New Orleans Convention Center, 288–290

Fluency in mathematics involves more than automaticity with basic facts and computational procedures. It involves reasoning and strategic thinking. We will share instructional activities, routines, and games that target fractions and decimals and encourage work with all components of fluency: efficiency, flexibility, appropriateness, and accuracy.

Sherri Martinie, Kansas State University, Manhattan

Jennifer Suh, Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; George Mason University, Stone Ridge, Virginia

17 Quadrilateral Quandary



3–5 Workshop

New Orleans Convention Center, 395

Do you have students who get in a quandary when asked whether a square is always a rectangle or a rectangle is always a square? Join us in exploring a scaffolding lesson that uses hands-on manipulatives and online activities to focus on properties and solve your students’ quadrilateral quandary questions.

Adam Harbaugh, Missouri State University, Springfield

Gay Ragan, Springfield, Missouri

Kurt Killion, Springfield, Missouri

18 Alternative Assessments to Support Standards-Based Grading



6–8 Workshop

New Orleans Convention Center, 294

Our presentation shares assessments used to support student learning in secondary math classes. In conjunction with standards-based grading, these assessments provide students with the opportunity to authentically demonstrate their understanding and receive feedback on their thinking, which helps build confidence and a positive mathematical identity.

Barbara Swartz, West Chester University, Pennsylvania

Twitter: @baswartz23

Brad Swartz, Unionville-Chadds Ford School District, Kennett Square, Pennsylvania

Holly Pinter, Western Carolina University, Cullowhee, North Carolina

19 Appreciation of the Math around Us through Applications and Decision-Making



10–12 Workshop

New Orleans Convention Center, 386–387

Participants will engage in application/decision-making activities that are suitable for the classroom. Students appreciate mathematics when they see its use in the world. Activities may include the design of a mini-golf course, filling a swimming pool, carrying an object through a hallway, or designing a water bucket system for a water park.

Tena Roepke, Ohio Northern University, Ada

21 Coaching Discourse Actions to Promote Access and Create Space for Student Voice



Coaches/Leaders/Tea Workshop

New Orleans Convention Center, 283–285

Discourse actions promote student access and engagement in high-quality mathematics. Participants will explore strategies for coaching discourse actions to elicit student thinking and create space for more student voice. Activities include using rubrics and checklists as well as practice providing feedback around teachers’ use of discourse actions.

Amber Candela, University of Missouri–St. Louis, Saint Louis

Twitter: @amcan36

Melissa Boston, Duquesne University, Pittsburgh, Pennsylvania



Rejoice and Celebrate the Math around Us



Redesign the Mathematics Classroom through the Lens of Identity, Agency, and Access



Reboot Assessment: Equitable Empowerment of Student Confidence in Learning



Refreshen and Deepen Mathematics Content Knowledge for Teaching



Realign Relationships and Strategies for Supporting and Implementing Instruction

22 Does Race Matter in Mathematics Teaching and Learning?



General Interest Session

New Orleans Convention Center, New Orleans Theater C
Historically excluded learners are positioned in policy documents as deficient and in need of “fixing.” Too often, policies and reforms are more about protecting the interests of those with privilege and less about moral obligations to historically excluded learners. This session examines how policy and reforms in mathematics education address historically excluded learners’ needs. This session is relevant to teachers and leaders because it provides a framework for unpacking how policy and reform narratives position historically excluded learners’ mathematics competency. Teachers and leaders will be challenged by their assumptions about race and how practices and policies reify beliefs about historically excluded learners.

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

23 Building Fluency with Basic Facts (Addition and Subtraction)



PreK–2 Session

New Orleans Convention Center, 295

Do your students struggle to develop fluency with basic facts? Come to this session and leave with PreK–2 number sense routines, activities, games, and practical ideas about how to make their use most effective. Learn how to provide all students with experiences necessary to succeed. Participants will have access to all information after the session.

Carol Kuchta, retired from Austintown Local schools, carolkuchta4@gmail.com

24 Games and Activities for Numerical Fluency

6–8 Session



New Orleans Convention Center, New Orleans Theater B

This is a fast-paced, highly motivating workshop designed to help teachers engage all students in the classroom experience. Games help students develop mathematical skills to increase their positive identity as a thinker and learner of math. Participants will play some games and discuss how games may be adapted.

Shelly Baumann, Big Ideas Learning, Erie, Pennsylvania
Twitter: @sbaumannBIL

25 Seeing the Stats: A Visual Approach to Statistical Concepts in High School



8–10 Session

New Orleans Convention Center, New Orleans Theater A

A deep understanding of data science and statistics is more important than ever. However, key concepts like standard deviation and correlation coefficient are either presented as dramatically complicated or overly simplified (or removed from curriculum altogether). In this presentation, these concepts will be presented in a fresh, visual way.

Zachary Wissner-Gross, Amplify Education, Brooklyn, New York
Twitter: @xaqwg
Jactyn Claiborne, Plain City, Ohio



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Reboot Assessment: Equitable Empowerment of Student Confidence in Learning



Refreshen and Deepen Mathematics Content Knowledge for Teaching



Realign Relationships and Strategies for Supporting and Implementing Instruction

26 Q: “When Will I Ever Use This?” Advanced Algebra with Financial Applications



10–12 Session

New Orleans Convention Center, 291

We’ve all heard that question before! In this session, you will learn ways to use financial applications in an advanced algebra course with only an algebra 1 prerequisite that is open to all ability levels. This third- and fourth-year elective draws on topics from algebra 2, precalculus, statistics, and probability, all within engaging financial situations.

Richard Sgroi, Bedford Schools (Ret.), New York

27 Teaching Artificial Intelligence: Beyond the Hype



10–12 Session

New Orleans Convention Center, 296

Artificial intelligence, machine learning, and big data have had a significant impact on current and emerging technologies, but where does it fit in existing math curriculum? In this session, I will share my school’s journey in developing a rich course in AI and computational modeling, combining a wide range of mathematics and technology.

Greta Mills, Oxbridge Academy, West Palm Beach, Florida

Twitter: @mathteacher671

28 How to Lead with a Focus on Equity



Coaches/Leaders/Tea Session

New Orleans Convention Center, 286–287

Equity in mathematics education is not optional. So, how do we as mathematics leaders ensure that all students are engaged in equitable instruction and experience meaningful and relevant mathematics? Join the discussion on leadership actions needed to be a guardian of equity and ensure every student learns at high levels.

Mona Toncheff, NCSM: Leadership in Mathematics

Education, Phoenix, Arizona

Twitter: @toncheff5

29 X, Y and Devices: Using Technology to Create Inclusive Math Classrooms



Coaches/Leaders/Tea Session

New Orleans Convention Center, 396

Technology integration? In a math classroom? Yes, it’s completely possible! Come learn how technology can help provide academically safe environments for mathematics teaching and learning—environments where students feel secure and confident in engaging with one another, their teachers, and math!

Victoria Thompson, Technology Access Foundation, Tacoma, Washington

Twitter: @VictoriaTheTech

31 Problem Solving Is More Than an Activity Sheet



General Interest Session

New Orleans Convention Center, 292

What do you think of when you hear the words *problem solving*? *Activity sheets*? *Step-by-step problem-solving plans*? Problem solving is more than algorithms and steps. True problem solving allows our students to use their creativity and thinking to tackle math problems. Join us as we learn new ways to create true math problem solvers!

Staci Erickson, Perryton Ind School District, Texas

Twitter: @mathcoachminute



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32 Empowering Students and Teachers with Interview-Based Assessment



PreK–2 Workshop

New Orleans Convention Center, 395

Interview-based assessment is a critical tool not only for understanding student thinking, but also for supporting the development of students' mathematical identities. We will share how taking the time to develop and implement interviews in elementary school has helped us develop a stronger and more inclusive mathematical culture.

Amanda Fox, Presidio Knolls School, San Francisco, California

Twitter: @amanda_renard

Kate Guo, Presidio Knolls School, San Francisco, California

33 Assessment for All: How to Make Assessments Culturally Responsive



3–5 Workshop

New Orleans Convention Center, 293

Culturally responsive teaching is a crucial component to providing all students with an equitable education. This session will explore this important but underrepresented aspect of culturally responsive pedagogy by sharing the results of panel discussions consisting of leaders who are defining and creating culturally responsive assessment.

Tammy Baumann, NWEA, Erie, Pennsylvania

Sarah Whitney, NWEA, Portland, Oregon

34 The Joyful Power of Connections: Deeper Learning through Connected Representations



3–5 Workshop

New Orleans Convention Center, 393–394

Personal connections are powerful. Connecting mathematical ideas and representations is powerful. Deep learning happens through deliberate connections. This session shares five strategies to support connecting representations to foster both deeper personal connections and deeper learning. Join us for hands-on engagement with a variety of tools and ideas.

Sara Delano Moore, ORIGO Education, Kent, Ohio

Twitter: @saradelanomoore

35 Empowering Students through the Use of Open Middle Problems



6–8 Workshop

New Orleans Convention Center, 383–385

Participants will explore open middle problems designed for middle-grades students. Open middle problems are multiple entry level and can be used to differentiate instruction. A variety of middle-grades mathematical concepts and the Standards for Mathematical Practice will be discussed as we solve problems and discuss student responses.

Marilyn Strutchens, Marilyn E. Strutchens, Auburn, Alabama

36 Algebra Tiles + Area Model = Conceptual Understanding



8–10 Workshop

New Orleans Convention Center, 288–290

Manipulatives can be successful in a secondary math classroom! See how to build on students' understanding of an area model for multiplication using algebra tiles to multiply and factor polynomials, complete the square, and divide polynomials. This tactile engaging experience will increase conceptual understanding leading to procedural fluency.

Rhonda Pierre, CPM Educational Program, Indianapolis, Indiana

37 Experiencing the Joy of Math on the Floors of Buildings in San Francisco, Dallas, London, and Abu Dhabi



8–10 Workshop

New Orleans Convention Center, 386–387

Architecture is a field in which teachers can build a sense of joy for their students one floor at a time. It is a place where students can appreciate the beauty of math. This is especially true when students explore math in buildings that have unusual shapes and where the floor space, number of windows, and so much more vary from the ground up.

Drorit Weiss, The Anne & Max Tanenbaum Community Hebrew Academy of Toronto, Ontario

Twitter: @MsWeissMath

Ron Lancaster, University of Toronto, Hamilton, Ontario



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38 Climate Change: Math Activities Using Data from Al Gore’s Climate Project and the US Climate Report



10–12 Workshop

New Orleans Convention Center, 283–285

Obtain the most current climate change data, causes, and consequences. Model this shocking data obtained from attending the 3-Day Climate Reality Training (see Gore’s latest PowerPoint slides). Students become aware of this important issue by modeling applied mathematics. Obtain all materials: data, student sheets, teacher notes, and detailed instructions.

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

39 Redesigning Struggle in the Classroom to Foster Doers of Mathematics



Coaches/Leaders/Tea Workshop

New Orleans Convention Center, 391–392

The workshop starts with an overview of productive struggle incorporating research on the shame-pride axis and equitable mathematics teaching. Teachers will be shown how to reposition struggle, minimize shame, and foster students identifying themselves as doers of mathematics; ending with a brainstorming session on five strategies.

Candies Cook, Oxford School District, Mississippi
Twitter: @candies_cook
Dr. Joel Amidon, The University of Mississippi
Dr. Ann Monroe, The University of Mississippi

40 New and Preservice Teachers’ Workshop



General Interest Workshop

New Orleans Convention Center, 294

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

David Barnes, NCTM, Reston, Virginia
Twitter: @DavidBarnes360



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- Redesign the Mathematics Classroom through the Lens of Identity, Agency, and Access
- Reboot Assessment: Equitable Empowerment of Student Confidence in Learning
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41 President’s Address: Bringing Joy to Teaching and Learning Mathematics

General Interest Session

New Orleans Convention Center, New Orleans Theater C
 What brings you joy in teaching and learning mathematics? What new mathematical connections have we made? Where have we encountered mathematics to see and understand our world? How have we engaged others in doing mathematics? Are there things keeping the joy from our world of mathematics? Let’s look reflectively and deeply at what we love about doing mathematics, engaging with mathematics, sharing mathematics with others, and what might be inhibiting that joy. We will explore problem solving, look at mathematics in our world, examine ways to empower our students and ourselves in learning mathematics, and identify structures or practices that may be inhibiting our joy in mathematics. Come share and rekindle that joy in mathematics!

Trena Wilkerson, President, National Council of Teachers of Mathematics, Reston, Virginia; Baylor University–School of Education CI, Waco, Texas
 Twitter: @TrenaWilkerson

42 The Elephant in the Room: “Help! I Don’t Understand All the Math They Want Me to Teach!”



PreK–2 Session

New Orleans Convention Center, 286–287

Many elementary teachers often are uncomfortable with the math they are teaching either because they have gaps in their knowledge from when they were elementary school students or they don’t have math confidence. This session will engage teachers in a progression of K–5 Numbers and Operations activities to strengthen their base-ten confidence.

Teresa Joiner, Retired, SEABROOK, Maryland
 Twitter: Saabmom@twitter.com

44 Don’t Let Distancing Take Away from Discourse!



6–8 Session

New Orleans Convention Center, 396

Recent restrictions on distance between students, sharing of manipulatives, and the complexity of hybrid learning have made group work a challenge. However, the shared problem solving and discourse that comes out of group work is invaluable in math class. This session will provide ways to reclaim this shared space and overcome these obstacles.

Kevin Davis, Great Minds, Syracuse, New York
 kevin.davis@greatminds.org
 Twitter: mr_davis_math

45 Hands-on Problem-Based Learning to Engage Middle Schoolers in Math.



6–8 Session

New Orleans Convention Center, 295

During the presentation we will participate in one of the activities and discuss how they were developed to enrich learning. Georgia Tech’s CEISMC has created a suite of nine (three per grade level) problem-based learning math materials to help teachers engage students and guide them on developing their own addition materials.

Jeffrey Rosen, Georgia Institute of Technology-CEISMC, Atlanta

46 Desmos for All Classrooms



8–10 Session

New Orleans Convention Center, 296

Are you teaching in person? Are you teaching online? Desmos is a helpful tool for either scenario. This session will help you integrate Desmos’s activities into your daily lessons to increase engagement and understanding in your classroom.

Kathy Henderson, Seven Hills School, Kensington, California
 Twitter: @kathyhen_
Jay Chow, Desmos, San Francisco, California



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47 A Deep Dive into Systems of Equations—Using Linear Algebra to Create Sports Ranking Systems



10–12 Session

New Orleans Convention Center, 291

In this session, we will use systems of equations to build a model ranking system for sports teams. We will look at two methods, the Colley and Massey. These systems are used to create ranking models such as the ESPN Power Rankings and the NET ranking used for the NCAA Tournament bracket.

Patrick Wilcher, Mississippi Gulf Coast Community College, Perkinston

Twitter: @patrickwilcher11

48 Designing Pathways for Student Success Using *Catalyzing Change in High School Mathematics*



10–12 Session

New Orleans Convention Center, New Orleans Theater A

The mathematical experiences of high school students not deemed “advanced” all too often focus on credits needed to graduate, rather than what they need for future success. In this session, we will discuss innovative ways to refocus the secondary mathematics curriculum based on the recommendations in *Catalyzing Change in High School Mathematics: Initiating Critical Conversations*.

W. Gary Martin, Auburn University, Alabama

Twitter: @wgarym

49 Neither Here nor There: Supporting Teachers in Hybrid Environments



Coaches/Leaders/Tea Session

New Orleans Convention Center, 292

How do you engage students you have never seen? How do you teach virtual and face-to-face students in the same class at the same time? These were questions facing teachers in our networked improvement community. Come learn how we faced this challenge together to ensure that all our students engage in math learning.

Melinda Griffin, American Institutes for Research, Waltham, Massachusetts

50 Teaching Latinx Emergent Bilinguals with Learning Disabilities: Teachers Perceptions and Experiences



Research Session

New Orleans Convention Center, 397

This presentation will discuss the findings of a study that looked at general and special educators’ experiences teaching mathematics to English learners who have learning disabilities. The findings indicated that educators faced similar challenges in educating diverse students and often positioned the students as deficient.

Gerardo Tobon, University of Illinois at Chicago

Twitter: @Mr_Tobon

Marie Tejero Hughes, University of Illinois at Chicago

50.1 Connecting Coding to Algebra



10–12 Exhibitor Workshop

New Orleans Convention Center Room: 390

Coding is a skill that is in high-demand. But how does computational thinking connect to my math class? See how to promote critical thinking and boost engagement by using programming in your algebra classes. No prior programming experience is required.

Texas Instruments

Dallas, TX



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51 Minion Mathematics: Make It Fair
3–5 Burst
 New Orleans Convention Center, 288–290
 Help the minions fairly divide a cake and learn about fractions, equal parts, and geometric representations. A real-life and apparently simple task that allows success for all students also challenges all students by asking them to explore the beauty and power of the underlying mathematics. A hands-on, minds-on experience!
Robert Mann, Western Illinois University, Maomb
Anita Reid, Lewistown HS, Illinois






52 Creating a Culture of Statistical Skeptics with CODAP
 *6–8 Burst*
 New Orleans Convention Center, 393–394
 Students as young as middle school are inundated with data and statistics every day through social media platforms like TikTok. CODAP is a free, powerful, game-changing 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


54 The Big Picture: Math in Graphic Novels
 *8–10 Burst*
 New Orleans Convention Center, 283–285
 A collaboration between a prospective art educator and a math teacher educator, sharing big mathematical ideas to be found in published graphic novels and a graphic story of their own, is made available to participants. Plus we share a math and art project for your learners to engage them in the culture of mathematics.
John Golden, GVSU, Grand Haven, Michigan
 Twitter: @mathhombre
Xavier Golden, Grand Valley State University, Allendale, Michigan

55 Meeting the Needs of Introverts in the Collaborative Math Classroom
 *10–12 Burst*
 New Orleans Convention Center, 391–392
 Participants will reflect on their own personality type, analyze behavior and characteristics of introverts in their classrooms, learn strategies for engaging introverted students and develop a plan for implementation in a future lesson, and find ways to create a balanced instructional environment that increases the engagement of all learners.
Megan Dubee, Academy of the Holy Names, Tampa, Florida
 Twitter: @megandubee

56 Change, Averages, and Slopes: What’s the Big Deal?
 *General Interest Burst*
 New Orleans Convention Center, 386–387
 Take a look at how the concepts of change, averages, and slopes appear in mathematics curriculum from kindergarten through calculus!
Nicole Justice, Chesterfield County Public Schools, Virginia
 Twitter: @MathAndJustice
Penelopia Hobbs, Norfolk, Virginia
Jacqueline McCarty, Norfolk Public Schools, Virginia
Connie Moore, Norfolk Public Schools, Virginia


57 Let’s Be Trailblazers! Finding Hidden Math in Our Own Neighborhoods
 *General Interest Burst*
 New Orleans Convention Center, 383–385
 Allow your students to rejoice and celebrate the mathematics they see in everyday objects. In this session, we will share ideas to create a math trail in your own neighborhood. Math trails can provide students with a view that highlights the structure and beauty of math that is ever-present in the world around us.
Marylu Dalton, Austin Peay State University, Clarksville, Tennessee

-  Rejoice and Celebrate the Math around Us
-  Redesign the Mathematics Classroom through the Lens of Identity, Agency, and Access
-  Reboot Assessment: Equitable Empowerment of Student Confidence in Learning
-  Refreshen and Deepen Mathematics Content Knowledge for Teaching
-  Realign Relationships and Strategies for Supporting and Implementing Instruction

59  **LT-Squared— Learning and Teaching with a Learning Trajectories Tool: Support for Professional Learning**


PreK–2 Session
New Orleans Convention Center, New Orleans Theater B
Differentiation is powerfully realized through formative assessment. Learning and Teaching with Learning Trajectories is a research-based tool for delving deeply into understanding children’s thinking, with videos embodying each level of learning trajectories (all topics) and instructional activities fine-tuned for each, including videos and pdfs.

Douglas Clements, University of Denver, Colorado
Twitter: DHClements
Julie Sarama, Denver, Colorado

60  **I’m All Ears— Listening to Understand Students’ Ways of Thinking in a Formative Setting**


3–5 Session
New Orleans Convention Center, 295
By presenting a formative assessment task to students and leveraging it to elicit student conversations, teachers can better understand how their 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.

Desiree Spikings, NWEA, Portland, Oregon
Fenesha Hubbard, NWEA, Portland, Oregon

61  **Powerful Ways of Thinking: Blowing Things out of (or into) Proportion**


6–8 Session
New Orleans Convention Center, New Orleans Theater A
High-quality mathematics instruction involves combining ways of doing with ways of thinking. In this session we will illustrate the joyful power of thinking by examining how a single—and often missed—key way of thinking can easily and wonderfully connect otherwise cluttered ways of doing that are associated with proportional relationships.

Ted Coe, NWEA, Scottsdale, Arizona
Twitter: @drtedcoe
April Strom, Phoenix, Arizona
Kyle Pearce, Belle River, Ontario

62  **Developing Mathematical Literacy through Young Adult Literature**






8–10 Session
New Orleans Convention Center, 396
Reading young adult literature in mathematics classrooms can motivate students’ learning and enhance mathematical understanding. Students can solve math problems posed in the text as a way to consider the possibilities of mathematics in their world and future. We share lesson plans for teaching mathematics concepts through young adult literature.

Holly Anthony, Tennessee Tech University, Cookeville
Paula Greathouse, Tennessee Tech University, Cookeville

63  **I See You! Building on Student’s Cultural Identities to Promote Inclusive Mathematics Classrooms**

8–10 Session
New Orleans Convention Center, 286–287
Let’s engage in mathematics discourse that attends to students’ identities, promotes agency, and fosters community to develop deep, meaningful learning. We’ll explore pedagogical strategies for creating a safe space for critical conversations grounded in rigorous mathematics, and we’ll practice building community that centers students’ brilliance.

Paula Santana De Tice, University of Central Florida, Orlando
Twitter: @SantanaMathEd
Lybrya Kebreab, University of Central Florida, Oviedo

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-  Reboot Assessment: Equitable Empowerment of Student Confidence in Learning
-  Refreshen and Deepen Mathematics Content Knowledge for Teaching
-  Realign Relationships and Strategies for Supporting and Implementing Instruction


64 Create Assessments with Desmos
10–12 Session
 = New Orleans Convention Center, New Orleans Theater C
 Come learn how to 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, Cannon School, Mooresville, North Carolina
 Twitter: @Jreulbach

65 3, 2, 1 Liftoff with NASA STEM Engagement!
General Interest Session
 ⓘ New Orleans Convention Center, 397
 In this session, you will be provided with an overview of how-to best guide STE(A)M learning in K–12 using mathematics, culturally responsive teaching tips and strategies, engineering design processes, and NASA educational resources. Take advantage of NASA’s free STEM resources and encourage all students to reach for the stars!
LaTina Taylor, NASA EPDC–Texas State University, Flossmoor, Illinois
Susan Kohler, NASA Glenn Research Center, Sheffield Village, Oklahoma






66 Math Portfolio Journals: An Alternative to Traditional Assessments of Student Learning
 = *General Interest Session*
 New Orleans Convention Center, 296
 The transition to online teaching made me reevaluate my teaching practices. Why do I assess? Would a traditional assessment really showcase my students’ thinking in this new online world? I needed a new way to view student thinking on high-quality math tasks that demonstrates their understanding. The portfolio journals provided a solution.
Jennifer White, UNCSA High School Academic Program, Winston Salem, North Carolina
 Twitter: @JennSWhite

67 Take It to the Limit: Strategies for Teaching Limits
Higher Education Session
 ⓘ New Orleans Convention Center, 292
 Start with a challenging task to connect students’ learning about functions and rational functions to create the basis for a deep understanding of limits and build fluency for their use so that students will reduce their struggle when acquiring the concept of limits.
Frederick Dillon, Strongsville, Ohio
 Twitter: @fdizzle1955

122 Transitioning to Standards-Based Grading: What We Learned
 = *8–10 Session*
 New Orleans Convention Center, 291
 Our presentation depicts our separate journeys transitioning toward a standard-based grading model in our secondary math classes to develop students’ identities as mathematicians as well as their performance. We share where we started, what we’ve learned, the impact this has had on our students, and our plans for the future.
Brad Swartz, Unionville-Chadds Ford School District, Kennett Square, Pennsylvania
Barbara Swartz, West Chester University, Pennsylvania
Holly Pinter, Western Carolina University, Cullowhee, North Carolina



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-  Redesign the Mathematics Classroom through the Lens of Identity, Agency, and Access
-  Reboot Assessment: Equitable Empowerment of Student Confidence in Learning
-  Refreshen and Deepen Mathematics Content Knowledge for Teaching
-  Realign Relationships and Strategies for Supporting and Implementing Instruction

68 Figuring Out Fluency: Beyond Facts and Algorithms (Elementary)



PreK–2 Workshop

New Orleans Convention Center, 391–392

Fluency is complex. Teaching it well is challenging. Teaching it equitably is nonnegotiable. This session examines what procedural fluency is and what it isn't. It addresses myths, strategies, and assessment. It establishes what we must do to teach fluency equitably. Participant learning will be complemented with ready-to-use classroom resources.

John SanGiovanni, Howard County Public School System, Westminster, Maryland

Twitter: @JohnSanGiovanni

Jennifer Bay-Williams, University of Louisville, Pewee Valley, Kentucky

69 If the Rules Expire, You Must Inquire: Teaching Mathematics for an Unknown Tomorrow



PreK–2 Workshop

New Orleans Convention Center, 293

The increased rigor of new standards and assessments challenges teachers to reflect on their content knowledge and pedagogy. This session will focus on substituting rules and procedures that often expire with rich tasks and inquiry to incorporate the process standards in daily instruction. Strategies will be appropriate for K–5.

Lisa Coffman, Newport News Public Schools, Virginia

Twitter: @thatssolisa

Kelly Kent-Johnson, Retired Math Supervisor, Smithfield, Virginia

70 Patterns with a Purpose: Building Conceptual Understanding of $y = mx + b$



6–8 Workshop

New Orleans Convention Center, 283–285

In this highly engaging and hands-on session, participants will have the opportunity to explore problem solving with patterns as they shift between the multiple representations of the linear web.

Ashley Boyd, CPM Educational Program, Olive Branch, Mississippi

Twitter: @Coach_aBoyd

71 Culturally Responsive Teaching Strategies That Create an Environment to Support Independent Learners



8–10 Workshop

New Orleans Convention Center, 386–387

Learners thrive through mathematics that is meaningful, relevant, and accessible in a safe space. This session will provide you with an opportunity to learn as a mathematician in an equitable environment by engaging in productive struggle, experiencing mathematics, and reflecting on the strategies used to support you as a learner.

Sharon Rendon, CPM Educational Program, Summerset, South Dakota

Twitter: @srendon2

72 The Mathematics of Gerrymandering: Engaging and Authentic Tasks with Civic Significance



8–10 Workshop

New Orleans Convention Center, 393–394

Gerrymandering refers to manipulating district boundaries to provide a political advantage and is ideal for mathematical study in grades 7–12. This workshop will engage participants in three hands-on tasks exploring the mathematics of gerrymandering, including redistricting puzzles as well as examining numerical and geometric measures of fairness.

Kimberly Corum, Towson University, Maryland

Sandy Spitzer, Towson University, Maryland

Kristin Frank, Towson University, Maryland

73 Extend Your Geometric Dimensions: Integrating Critical Thinking through Geometric Puzzles and Games



10–12 Workshop

New Orleans Convention Center, 395

Participants will explore several easy and uncommon geometry extensions using games, puzzles, and challenges to create surprising twists drawing everyone into the joy of mathematical discovery. Be prepared to explore with your mind, manipulatives, and your computer/handheld device.

Thomas Marlowe, Hawken School, Gates Mills, Ohio



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Realign Relationships and Strategies for Supporting and Implementing Instruction

74 Using Trigonometry to Solve the World Water Crisis



10–12 Workshop

New Orleans Convention Center, 288–290

This workshop gives participants an outline of a full unit in trigonometry that covers right triangle trigonometry, the law of sines, and the law of cosines. In addition, this unit introduces the world water crisis, how it affects women and children the most, and why this is so.

Courtney Fox, Clermont Northeastern Schools, Batavia, Ohio

75 Let’s Give Them Something to Talk About



Coaches/Leaders/Tea Workshop

New Orleans Convention Center, 294

Do you want students to leave class talking about what they did and what they learned? Do you want students to see the beauty of math in the classroom and beyond? Do you want students to overcome negative feelings about mathematics? This session will be jam packed with activities, strategies, and routines to help our students do just that!

Andrea Wood, Mid-Del Public Schools, Moore, Oklahoma

Twitter: @AWoodLovesMath

76 Multiplication for Every Age



3–5 Workshop

New Orleans Convention Center, 383–385

Too often as teachers, we focus on what we are teaching this school year—and that’s about it. How often do we critically look at what students are learning outside of our grade band? In this session, we will follow the progression of multiplication as a concept and a skill from the foundations in kindergarten through algebra 2.

Shelby Strong, Gretna, Louisiana

Twitter: @sneffleupagus

Justin Aion, Environmental Charter School, Pittsburgh, Pennsylvania



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77 Grants, Scholarships, and Awards for NCTM Members

General Interest Session

New Orleans Convention Center, 286-287

Looking for funding for a special project, coursework, or professional development? NCTM’s Mathematics Education Trust (MET) has over 30 different grants, scholarships, and awards available to NCTM Members. Get information on all of these different opportunities to improve the mathematics teaching and learning in your classroom, school, or district.

Suzanne Mitchell, Trustee, MET Board of Trustees.

78 Elementary Mathematics Specialists: Connecting Math Teaching and Learning for Positive Change



3–5 Session

New Orleans Convention Center, 292

Elementary mathematics specialists (EMS) influence mathematics teaching and learning by enhancing the mathematical knowledge, teaching practices, and efficacy of elementary school teachers. This session will provide an overview of the roles and work of EMS professionals. The presenters will share learning activities EMS may use as they work with teachers.

Marilyn Cannon, University of Central Missouri, Warrensburg & Raytown School District, Raytown, Missouri
Twitter: @m5cannon

Ann McCoy, University of Central Missouri, Warrensburg

79 What’s Brilliant Here? Using Student Thinking and Identity as the Center of a Classroom Experience



6–8 Session

New Orleans Convention Center, 296

How do we create a learning culture where all students see themselves as powerful and valuable learners? This session introduces teachers to new technologies, new pedagogies, and new curriculum for amplifying the voices of every student and developing their identities as mathematicians, helping them see their own value and the value of their peers.

Faith Moynihan, Desmos, Pipersville, Pennsylvania
Twitter: @_faithmoynihan

81 Yes, You Can Teach Calculus in Algebra! Comparing Linear, Exponential, and Quadratic Functions



8–10 Session

New Orleans Convention Center, 397

In this session, participants will collect, plot, and model data from linear, exponential, and quadratic functions kinesthetically and with technology. Connections among multiple representations of these functions will lead to interesting discoveries and a deeper understanding of each function’s key characteristics that brings calculus into algebra.

Robin Gapinski, Township District 113, Highland Park, Illinois

82 Notice, (CDC) Wonder: Using CDC Wonder to Explore Public Health with Regression Activities



10–12 Session

New Orleans Convention Center, New Orleans Theater C

Participants will be introduced to the datasets available from CDC Wonder, which houses information on various environmental factors, including diseases and conditions that affect public health. A class activity in regression modeling will be explored as well as conversations on geographic, racial, and socioeconomic disparities evident in the data.

Brianna Kurtz, Piedmont Virginia Community College, Charlottesville

Twitter: @BriannaAKurtz

Siddhi Desai, University of Central Florida, Oviedo

Farshid Safi, Oviedo, Florida



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- Rejoice and Celebrate the Math around Us
- Redesign the Mathematics Classroom through the Lens of Identity, Agency, and Access
- Reboot Assessment: Equitable Empowerment of Student Confidence in Learning
- Refreshen and Deepen Mathematics Content Knowledge for Teaching
- Realign Relationships and Strategies for Supporting and Implementing Instruction

83 Increasing Desmos Love in Your Mathematics Community



Coaches/Leaders/Tea Session
New Orleans Convention Center, 396

Do you love Desmos? Would you like teachers to bring the full, transformational potential of Desmos to their classrooms? Presenters and participants will share their experience coaching Desmos implementation; participants will walk away with strategies to spread Desmos love to their teachers while avoiding common pitfalls of technology integration.

Chris Wright, Baltimore County Public Schools, Towson, Maryland
Twitter: @cwright4math
Brett Parker, Baltimore County Public Schools, Towson, Maryland

84 Engaging in the Deep Work of Mathematics: Supporting High-Cognitive Work in the Age of Distraction



General Interest Session
New Orleans Convention Center, New Orleans Theater B

Are your students able to engage in complicated tasks for long periods of time without distraction? Are you? In this session you will learn strategies to support your students' (and your own) abilities to think, work, and learn deeply in mathematics and beyond.

Michael Flynn, Mount Holyoke College, South Hadley, Massachusetts
Twitter: @MikeFlynn55

85 Leading Culturally Relevant Instruction in Mathematics



General Interest Session
New Orleans Convention Center, New Orleans Theater A

Culturally relevant instruction empowers students to see themselves and other cultures in the mathematics they are learning. As teachers, we can modify our instructional tasks to be more culturally relevant to our students. As leaders, there are ways we can guide teachers through this process. Let's study some tools to do just that!

Paul Gray, NCSM: Leadership in Mathematics Education, Dallas, Texas
Twitter: @Dr_PaulGray

86 Online Connections Seminar: A Revamped Course for Secondary Math Teachers



Higher Education Session
New Orleans Convention Center, 295

We will discuss the important connections prospective teachers need to make between the mathematics they learned in college and what they will teach. Problems, activities, and recent innovations in technological platforms will be discussed as part of the pedagogy of the course and also tools that newer teachers can use in their classrooms.

John Kerrigan, Rutgers University, Piscataway, New Jersey
Twitter: @kerrigan_john


86.1 Transformational Graphing








10-12 Exhibitor Workshop
New Orleans Convention Center Room: 390

This session will use technology for inquiry to discover generalizations for graphing parent functions and their transformations. We'll highlight a new video series that explores methods for learning to graph these transformations by hand. We'll dive into multiple strategies to illustrate a variety of transformations for 16 parent functions.

Texas Instruments
Dallas, TX



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88 Digging Deeper into Students’ Geometric Thinking



3–5 Workshop
New Orleans Convention Center, 294

What do students mean when they talk about geometric shapes? Are they saying what we think they’re saying? Create minilessons tasks to encourage classroom discussions of geometric ideas. Explore examples of students’ geometric thinking and develop strategies for using information on student thinking to make an impact on instruction.

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

90 “A Square Is a Special Rectangle” and Other Reasons to Celebrate



6–8 Workshop
New Orleans Convention Center, 391–392

You can know the definition of a term, yet still not feel its meaning in your bones. Our math thinking develops in part from examples we encounter in our worlds in and out of school. Let’s examine these examples closely, celebrate their role in supporting student learning, and use them to develop more rigorous definitions.

Christopher Danielson, Desmos, Inc., Saint Paul, Minnesota
Twitter: @Trianglemancsd

91 Number Strings: Building a Math Community for All Kids



6–8 Workshop
New Orleans Convention Center, 386–387

In this dynamic session we will experience the power of number plus algebra strings, a whole-class or small-group routine designed to develop students’ strategic sense making, while building a mathematical community. You will leave with specific teacher moves to invite all children into the routine and to see themselves as vital mathematical contributors.

Kara Imm, Hunter College, New York, New York
Twitter: @karalouiseimm

92 Supporting Students Who Struggle: Inspiring All Students to Achieve



6–8 Workshop
New Orleans Convention Center, 293

All students struggle. Productive struggle is encouraged and expected, yet some students struggle unproductively more than others. How can you support the students who may need intervention without removing the productive struggle? In this session, you will experience activities and teaching strategies to support all of your students.

Mark Ray, CPM, Elk Grove, California
Twitter: @meray00

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[NCTM.org/Annual2022](https://www.nctm.org/Annual2022)
[#NCTMLA22](https://twitter.com/NCTMLA22)

93 The Joy Is in the Math: Building Student Agency in Mathematics Learning Spaces



8–10 Workshop

New Orleans Convention Center, 395

In this session, participants will experience mathematics in a manner that makes the learner want to engage. By experiencing this agency, students are more likely to identify themselves as mathematicians. That’s important because mathematicians demonstrate grade-level readiness on state exams and because mathematics is a gateway to college and career.

Jessica Ancrum, TenSquare Group, Washington, District of Columbia

LaRita Williams, Washington, District of Columbia

94 Conic Sections: Put the Power of Discovery in Your Students’ Hands with Desmos



10–12 Workshop

New Orleans Convention Center, 393–394

Get ready to hear your students exclaim, “Conics are fun!” Engage in classroom-tested Desmos activities that get students conjecturing and drawing connections about graphs and equations of conics all without memorizing formulas. Head back to class with activities that bring conics to life and expose the richness of this often-confusing topic.

Nolan Fossum, Trabuco Hills High School, Vista, California

Twitter: @NolanFossum

95 Achieving Equity through Teaching Mathematics for Social Justice




Coaches/Leaders/Tea Workshop

New Orleans Convention Center, 383–385

Every student deserves a high-quality equitable mathematics experience. In this session participants will discuss students’ current mathematics learning opportunities, learn about teaching mathematics for social justice, and make sense of key strategies that can be implemented in their respective educational environments.

Kristopher Childs, K Childs Solutions, Winter Garden, Florida
Twitter: @DrKChilds



Hear what’s new from exhibitors—attend an **exhibitor workshop**. Look for the  symbol throughout the program book or in the mobile app.



Rejoice and Celebrate the Math around Us



Redesign the Mathematics Classroom through the Lens of Identity, Agency, and Access




Reboot Assessment: Equitable Empowerment of Student Confidence in Learning





Refreshen and Deepen Mathematics Content Knowledge for Teaching





Realign Relationships and Strategies for Supporting and Implementing Instruction

96  **Real (Kid) World Measurement: Culturally Responsive Measurement Tasks for PreK–2**
PreK–2 Session
 New Orleans Convention Center, New Orleans Theater C
 Wondering how to make measurement more relevant for all students? You’ll leave this session with 15+ kid-world tasks that promote home cultures as pathways to rich mathematical thinking through Three-Act Tasks, small-group lessons, and hands-on workstations.
Carrie Cutler, University of Houston, Texas
 Twitter: @DrCarriecutler
Gabrielle Salton, Spring, Texas






97  **Celebrating Student (Mis)Conceptions as Opportunities to Learn Math with Understanding**
3–5 Session
 New Orleans Convention Center, 292
 Explore strategies to elicit and use students’ mathematical (mis)conceptions to promote mathematical understanding through formative assessment. Revisit and revise some of your (mis)conceptions about key concepts. Learn strategies to create a nonevaluative safe space for sharing, questioning, and refining student thinking.
Mark Ellis, CSU Fullerton, California
 Twitter: @EllisMathEd

98  **Patterns, Pythagoras, Perfects, and Primes: Powerful Pathways to Learning, Loving, and Doing Mathematics!**
6–8 Session
 New Orleans Convention Center, 396
 Mathematics abounds everywhere around us, but we often fail to leverage opportunities to help students to see it. Join this session as we explore various problems and activities designed to engage students and enhance mathematics learning opportunities, at the same time inviting them to love, celebrate, and recognize mathematics around them.
Cynthia Bryant, Greater Ozarks Cooperating School Districts, Springfield, Missouri
 Twitter: @MoMathgal

99  **Welcoming All Students into the Middle School Classroom with Culturally Responsive Tasks**
6–8 Session
 New Orleans Convention Center, 295
 Culturally responsive problem-solving tasks invite great conversations in the middle school mathematics classroom. When students have multiple entries points for ideas about effective and efficient ways of approaching a task, great things happen—especially when everyone is connecting with the lesson on the basis of their own cultural experiences.
Lloyd Jones, Curriculum Associates, Hendersonville, North Carolina

100  **Misconceptions versus Gaps: Creating Intentional Pathways to Readiness Success**
8–10 Session
 New Orleans Convention Center, New Orleans Theater B
 As educators, we look at data and identify students’ misconceptions, knowledge gaps, and readiness for a math course; but then what? Join the discussion as we look at strategies to focus on each student’s mathematical needs and how to enact differentiated just-in-time intervention for grade-level success.
Sarah Galasso, Carnegie Learning, Anaheim, California
 Twitter: @SarahGMath



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102 Creating Equitable Assessments in the High School Classroom



10–12 Session

New Orleans Convention Center, 397

This session will provide ideas on equitable assessments. The collection contains assessment ideas that allow for student choice. The assessments are standards-based and consider students' culture and backgrounds.

Dianna Sopala, Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; Northern Valley Regional High School–Demarest, New Jersey
Twitter: @DiannaNJMathEdu

103 An Instructional Routine for Your Professional Learning Community



Coaches/Leaders/Tea Session

New Orleans Convention Center, 286–287

If we have instructional routines that help our students engage in learning, could we also have a routine for us, as educators, to deepen our own mathematical knowledge? Learn an instructional routine for your professional learning community that will deepen understanding of the mathematical concepts we teach.

Loryn Lenartowicz, Curriculum Associates, Oakland Park, Florida
Twitter: @llenartowicz

Tim Kenney, Curriculum Associates, Jacksonville, Florida

105 Supporting Professional Learning Communities to Enhance Mathematics Instruction by Leveraging Data



General Interest Session

New Orleans Convention Center, 291

Discover the power and potential of PLCs. This session will include concrete practices to facilitate and structure a high quality PLC for teachers by doing the following:

- Ensuring content aligns to teachers' authentic practice
- Centering on student work and data
- Supporting strong teacher engagement






These ideas emerged from our research on a virtual PLC.

Tina Cardone, Lesley University, Cambridge, Massachusetts
Twitter: @TinaCardone

Cristina Heffernan, The ASSISTments Foundation, Shrewsbury, Massachusetts



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

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106 Engaging Elementary Students in Developing Proportional Reasoning through Trade Books



3–5 Burst

New Orleans Convention Center, 393–394

Are you looking for ways to engage your students in mathematics while also reinforcing literacy skills? This session will demonstrate ways to use two trade books to engage elementary students in beginning the process of developing proportional reasoning skills while exploring the actual size of different animals.

Jackie Vogel, Austin Peay State University, Springfield, Tennessee

107 The Joy of Cooking, Crafting, and Fractions



6–8 Burst

New Orleans Convention Center, 386–387

Cooking, crafting, and building present great opportunities to explore fraction division and multiplication using authentic problems. Come join the fun as participants rotate through activities inspired by international recipes and crafts, children’s literature, and community garden planning.

Cindy Ticknor, Columbus State University, Georgia
Twitter: @CindyTicknor

108 Creating Student Voice in Assessments: Having Students Test Together



8–10 Burst

New Orleans Convention Center, 288–290

Teachers encourage students to talk about mathematics during group work and to facilitate learning. Yet when we test students, they are expected to accomplish this individually. This session presents an alternative to traditional testing: testing students in groups. This allows students to have a voice and empowers them to achieve more.

Kent Hoffman, Elko County School District, Nevada

109 Project-Based Assessment: Ditching Tests to Deepen Learning



10–12 Burst

New Orleans Convention Center, 283–285

We will discuss the benefits and challenges of project-based assessments, with a focus on statistics. You will leave with a list of crowdsourced projects to download and use. Projects allow us to hear student voices, deepen learning, and foster the next generation of problem posers, problem solvers, and critical consumers of data!

Susan Zielinski, St. Paul’s School, Concord, New Hampshire
Twitter: @zski11

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



10–12 Burst

New Orleans Convention Center, 395

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, Financial Life Cycle Education Corp (FiCycle), New York, New York

Twitter: @jackmarleypayne

Philip Dituri, Financial Life Cycle Education Corp (FiCycle), New York, New York

111 I Am Whatever You Say I Am



General Interest Burst

New Orleans Convention Center, 391–392

In this session, participants will be challenged to identify their beliefs, values, biases, and stereotypes. Educators cannot fully begin to understand the students they teach if they do not start to understand themselves. Attendees will participate in a few challenges to begin the process of exposing and understanding themselves.

Stephanie Castaneda, CPM Educational Program, Round Rock, Texas

Twitter: @ed_for_future

112 Hidden in Plain Sight: Black Girls’ Desire for Advanced Mathematics



Research Burst

New Orleans Convention Center, 383–385

Centered on the phenomenology of girls of diverse cultural backgrounds in an accelerated math program, this session provides a voice to one that is often unheard. Gaining from the experiences of 11 brilliant mathematicians, I offer an in-depth look at the pressures associated with their dual marginalization and provide solutions to their plight.

Natalie Holliman, GIRLSwSTEAM, Little Rock, Arkansas

Twitter: @N_Holliman



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Refreshen and Deepen Mathematics Content Knowledge for Teaching



Realign Relationships and Strategies for Supporting and Implementing Instruction

113 Regional Conference Overview and Orientation

General Interest Session
 New Orleans Convention Center, New Orleans Theater B

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

Melissa Boston, Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia;
 Duquesne University, Ellwood City, Pennsylvania
 Twitter: @MBostonMath

Desiree Harrison, Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia;
 Farmington Public Schools, Michigan
 Twitter: @kidsmathtalk

Friday Morning Sessions

114 Geometry around Us: A Cultural Exploration

PreK–2 Session
 New Orleans Convention Center, 283–285

Participants will engage in mathematical tasks through an intentional lens of culture and identity. The primary focus will be on rejoicing and celebrating the mathematics around us and our students as we support their mathematical learning, and foster and promote a sense of belonging for all students within our mathematics classrooms.

Siddhi Desai, University of Central Florida, Orlando
 Twitter: @SiddhiDesai311
Janaki Nagarajan, Kent School District, Seattle, Washington
Farinaz Safi, Seminole County Public Schools District, Oviedo, Florida

115 Using “Stuck Points” and Equitable Practices to Develop All Students into Effective Problem Solvers

PreK–2 Session
 New Orleans Convention Center, 291

How do teachers help students who get “stuck” without telling them what to do? Why are “stuck points” celebrations for learning? Come learn about effective and equitable teaching strategies to engage all students in persevering while problem solving. See these ideas in action in class videos and walk away with strategies you can use immediately.






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


116 Empowering Girls in Mathematics: Let’s Reveal the Contributions of Historically Excluded Women


3–5 Session
 New Orleans Convention Center, New Orleans Theater A


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. Engage in math learning opportunities that stem from these stories.


Sandra Cooper, Baylor University, Crawford, Texas
 Twitter: @drcoopermath
Melissa Donham, Waco, Texas
Kenley Bailey Ritter, Waco, Texas


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117 Manipulatives, Real and Virtual: Effectively Teaching the Standards
 *3–5 Session*
 New Orleans Convention Center, 286–287
 Are you looking for ways to help your students develop a strong conceptual understanding in math and to better engage them in their learning? Discover benefits of using virtual and traditional manipulatives in your class to help every student better understand math as well as some ways to use a variety of manipulatives.
Kevin Dykema, President-Elect, National Council of Teachers of Mathematics, Reston, Virginia; Mattawan Middle School, Michigan
 Twitter: @kdykema


118 Designing Inclusive Mathematics Learning Environments: Discourse Is Key
 *6–8 Session*
 New Orleans Convention Center, 396
 This session will explore features of the mathematics instruction that reinforce inclusivity in the classroom. Specifically, participants will consider how facilitating meaningful mathematics discussions can facilitate all students’ access and opportunities to learn.
Gladis Kersaint, University of Connecticut, Vernon Rockville
 Twitter: @Gkersaint






119 Want to Develop Fluency with Functions? Algebrafy Patterns!
 *6–8 Session*
 New Orleans Convention Center, 292
 Participants will be provided with classroom-ready, hands-on lessons that enable students to connect patterns and recursive rules to functions. Emphasis will be placed on connecting concrete, pictorial, and abstract representations to help students develop conceptual understanding, refine procedural fluency, and analyze change in various contexts.
Tom Beatini, Union City Board of Education, New Jersey
 Twitter: @BeatiniTom

120 From Gatekeeper to Gateway: Meeting Students Where They Are to Improve Success in Algebra
 *8–10 Session*
 New Orleans Convention Center, 295
 Why are so many students underperforming in algebra? This question grounded my action research as I used instructional strategies from my role as an elementary educator in secondary classrooms. I will share my findings and learnings from three 7–12 high school classrooms.
Taajah Witherspoon, University of Alabama at Birmingham, Hoover
 Twitter: tspoon1000

121 Linear Models versus Linear Functions: A Mathematical Conundrum
 *8–10 Session*
 New Orleans Convention Center, 397
 A quick internet search for data for linear models can lead to a wide variety of data sets and activities for students. But upon closer inspection, many resources are inappropriate for the task at hand. Participants in this session will examine data sets and activities and determine the best use in a classroom setting.
Kathleen Mittag, The University of Texas at San Antonio, Retired
Sharon Taylor, Georgia Southern University, Statesboro

123 Catalyzing Change in High School through Four Pivotal Understandings
 *10–12 Session*
 New Orleans Convention Center, New Orleans Theater B
 As noted in NCTM’s Catalyzing Change series, high school mathematics continues to leave many students behind. To experience the joy, wonder, and beauty of mathematics, students must be able to see mathematics as a meaningful, coherent whole. I share four pivotal understandings that serve to unify and bring coherence to the content of high school math.
Mike Steele, University of Wisconsin–Milwaukee
 Twitter: @mdsteele47

124 Identity-Building Assessment: From a Number to a Showcase of Knowledge
 *General Interest Session*
 New Orleans Convention Center, New Orleans Theater C
 How can we create a system of assessment that promotes math identity? Most assessment structures detract from the joy of math while harming students’ motivation. In this session, we’ll look at rich tasks and student portfolios: an alternative system of assessment that yields better information about what students know while enhancing self-worth.
Geoff Krall, University of Wyoming, Fort Collins, Colorado
 Twitter: @geoffkrall

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-  Realign Relationships and Strategies for Supporting and Implementing Instruction

125 New and Preservice Teachers' Workshop

Workshop

New Orleans Convention Center, 293

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

David Barnes, NCTM, Reston, Virginia
Twitter: @DavidBarnes360

126 Developing a Problem-Solving Culture in the Elementary Grades



3–5 Workshop

New Orleans Convention Center, 393–394

Developing a problem-solving culture requires a combination of selecting challenging yet accessible problems and making appropriate instructional moves. We'll investigate problems that can instigate mathematical excitement in the elementary grades. Come have some fun and find out what part you can play.

Patrick Vennebush, The Math Learning Center, Portland, Oregon
Twitter: @pvennebush

127 Transform Tasks to Bring Curiosity, Surprise, and Joy into Math



3–5 Workshop

New Orleans Convention Center, 294

Curiosity, surprise, and joy—three words most students (and teachers) don't associate with math class. Let's change that! Learn four simple frameworks proven to transform boring, routine tasks into rich, open tasks that spark curiosity, surprise, and joy for all. Rediscover how amazing school math can be!

Raj Shah, Math Plus Academy, Powell, Ohio
Twitter: @drrajshah



Thank you to all of the volunteers who have helped make this conference a success!

128 Mathematics Interventions: Determining the Appropriate Supports for Students



6–8 Workshop

New Orleans Convention Center, 391–392

The purpose of teaching is student learning. Student learning is measured using various assessments. The results of such assessments provide information that we cannot ignore. During this workshop, participants will engage in deep thought regarding learning progressions that enable teachers to identify the appropriate interventions for students.

Tashana Howse, Georgia Gwinnett College, Lawrenceville
Twitter: @tdhowse_math

129 Experiencing Mathematics: Arts Integration to Build School Community



8–10 Workshop

New Orleans Convention Center, 395

Stemming from a 10-year partnership with high school students, teacher Tricia Stanley and artist Ellie Balk will share integrated arts projects that engage school and local community through visualizing mathematics. Participants will be guided through the various experiences and create projects that can be introduced to the classroom.

Ellie Balk, Williamsburg High School of Arts and Technology, Brooklyn, Missouri
Twitter: @elliebalk

Tricia Stanley, Williamsburg High School of Arts and Technology, Brooklyn, New York

130 Using Apps, Collaborative Groups, and Constant Assessment to Build a Class in Which All Students Thrive



8–10 Workshop

New Orleans Convention Center, 288–290

Learn about free apps that support the collection, compilation, and display of classroom-level assessment data. With a focus on equity, student voice, and differentiation, use data from an algebra class to discuss the various ways data can inform instruction. Collaborative groups and monitored work periods as well as other methods will be discussed.

Allan Bellman, University of Mississippi, Oxford
Twitter: @abellman17

Kayton Hosket, Jackson, Mississippi

Melissa McCann, Biloxi Public Schools, Mississippi



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131 Let the Sun Shine! Using Trigonometry to Model Daylight Data
 *10–12 Workshop*
 New Orleans Convention Center, 386–387
 In this session participants will collect, plot, and model data for the hours of daylight for various world cities using trig functions and technology. Comparisons between cities lead to interesting discoveries, mathematical connections, and perspective of world daylight differences. Leave with an activity that “sheds light” on student learning!
Scott Knapp, Glenbrook North High School, Evanston, Illinois
 Twitter: @_sknapp


132 Math Is Not Neutral, We Are Not Neutral: Our Voices for Justice and Equity in Mathematics Education
 *Coaches/Leaders/Tea Workshop*
 New Orleans Convention Center, 383–385
 Our conversations with mathematics educators and researchers across the United States and beyond have raised increasing tensions around our professional and personal approach to justice and equity. This panel represents a cross section of voices seeking to reexamine equity in the face of racial injustice, police brutality, and white supremacy.
Lou Matthews, Urban Teachers, Washington, District of Columbia
 Twitter: @loumatthewslive
Cathery Yeh, Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; Seal Beach, California
Brian Lawler, Kennesaw State University, Georgia
Maria Zavala, Oakland, California






Friday Morning Sessions

133 Infusing Meaningful Argumentation and Reasoning Tasks in K–2 Classrooms
 *PreK–2 Session*
 New Orleans Convention Center, 286–287
 Learn how to infuse practical argumentation tasks that empower K–3 students to think deeply and apply their math knowledge in diverse ways. These tasks support areas such as number talks as well as geometric and proportional reasoning. They help all learners identify patterns and make key connections in their learning. Leave with ideas you can use tomorrow!
Cathy Marks Krpan, University of Toronto, Ontario
 Twitter: @CathyMarksKrpan

134 Show Up and Show Off: Mathematical Practices 1 and 3 in Action
 *3–5 Session*
 New Orleans Convention Center, 291
 This session will focus on how teachers can create a mathematics classroom culture to ensure that all students “show up and show off” their deep understanding of mathematics through daily math talk structures and the use of high-quality tasks. Participants will engage in math tasks as learners to experience two Common Core State Standards for Mathematical Practice, SMP 1 and 3, in action.
Labonnie Wise Smith DCPS, Culpeper, Virginia
Sharon Welch, District of Columbia Public Schools, Washington
Annetra Peete, District of Columbia Public Schools, Washington

135 How to Teach Math on YouTube Like a Legend
 *6–8 Session*
 New Orleans Convention Center, New Orleans Theater B
 I currently operate two YouTube channels focused on math: (1) Scalar Learning and (2) Math Puzzles, with a subscriber count of ~21,000 and more than 2 million views. Teaching math to students via YouTube has been one of the most rewarding experiences of my life, and I will teach others how to (a) launch a math channel and (b) create quality content.
Huzefa Kapadia, Scalar Learning LLC, Culver City, California
 Twitter: @scalarlearning

136 How Do You Teach Stats? Plan for the Statistics Progression in Your Core Classes
 *8–10 Session*
 New Orleans Convention Center, 296
 Do you need help teaching/incorporating Common Core State Standards for statistics and probability in grades 8–12? Would you like to see and participate in some activities that promote them? Come spend an hour with us to see ready-to-implement activities that truly follow the progression. Traditional or Integrated pathway? We can help either way!
Chad Shepherd, Pontiac Township High School, Illinois
 Twitter: @cshep75

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137 Using Multiple Representations to Make Sense of Rate of Change and Accumulation



10–12 Session

New Orleans Convention Center, New Orleans Theater A
Getting lost in teaching procedures and losing sight of the bigger picture are easy to do. We will consider what can and cannot be learned from each of the “rule of four” representations of contextual problems in calculus, discuss reasons why student thinking can be misdirected, and consider rate of change and accumulation in the context of the pandemic.

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

138 Surveying Preservice Teachers’ Dispositions about Math through Emoji Exit Tickets



Coaches/Leaders/Tea Session

New Orleans Convention Center, 397

Positive dispositions are essential to student learning. This session will discuss research on preservice teachers’ dispositions toward math collected through exit tickets at the start and end of the semester. We will also share specific activities that encourage future teachers to love, appreciate, and engage in authentic mathematics.

Jill Davis, University of Central Oklahoma, Edmond
Darlinda Cassel, Edmond, Oklahoma

139 Allies, Bridges, Creations: The ABC’s of Realigning Math Lessons



General Interest Session

New Orleans Convention Center, 396

How do you start a movement within your community to make math fun and engaging for parents, students, and teachers? Follow our journey to rejuvenate parental engagement in elementary mathematics, provide equitable opportunities, decrease the achievement gap, and eradicate the fixed mindset about mathematics.

Karin Lee, Mountain View High School, San Jacinto, California
Twitter: @karannlee3

140 Mission Math: *Escape* the (Class)Room



General Interest Session

New Orleans Convention Center, 292

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 understanding in a variety of math concepts. Perfect for grades 3–12.

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

141 You Have to Choose: Uncovering Implicit Bias, Removing Barriers, and Creating Inclusive Classrooms.



General Interest Session

New Orleans Convention Center, New Orleans Theater C
Inclusivity occurs when we proactively address implicit biases. Come engage in “You Have to Choose,” where we use vignettes of actual occurrences in education to foster discussion about lessons learned while removing barriers for colleagues and students. Vignettes will address covert and overt racism, bullying, identity, belonging, and other topics.

Sean Nank, California State University San Marcos, Carlsbad
Twitter: @Sean_Nank
Jaclyn Murawska, Skokie/Morton Grove School District 69, Palos Park, Illinois

142 What Does a Successful Mathematics Methods Course for Grades 6–12 Preservice Teachers Look Like?



Higher Education Session

New Orleans Convention Center, 295

Let’s discuss the components of a mathematics methods course for middle school and high school preservice teachers. I will share what I have learned after teaching this course for more than 25 years, including activities, techniques, topics, and lessons. Come ready to share your own ideas for this essential course.

Christine Larson, South Dakota State University, Brookings
Twitter: @CLL2718

142.1 Curiosity and Exploration – Passing the Legacy to Our Students



10–12 Exhibitor Workshop

New Orleans Convention Center Room: 390

How do we turn the phrase “Exploring our world through math” on its head? By exploring math through 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 math, and consider ways to pass a legacy of curiosity to our students.

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- Making Meaning for Operations (K-8)
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- Catalyzing Change in Middle School Mathematics (6-8)

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143 Building Culturally Relevant Math Tasks for Early Childhood Students
PreK–2 Workshop
 New Orleans Convention Center, 395
 Creating math tasks that connect to the lives of our students brings relevance and meaning to sometimes arbitrary mathematics content and skills. In this session, we will discover the power of a culturally relevant task, learn and implement steps in planning one, and ultimately see how it can engage students in important and meaningful ways.
Amy Wendel, Johns Hopkins University, Washington, District of Columbia
Elizabeth Pefaure, Urban Teachers, Washington, District of Columbia






145 The Hidden Power of Multiple Strategies: Connect Properties and Students’ Thinking with Number Talks
3–5 Workshop
 New Orleans Convention Center, 386–387
 How can you use the various strategies that emerge during Number Talks as an opportunity to help students see powerful connections? Exploring these connections will help students develop foundational place value and algebraic understandings. In this session, you’ll explore these connections so you can elevate Number Talks in your classroom.
Nicole Rigelman, Portland State University & Math Learning Center, Oregon
 Twitter: @nrigelman
Kimberly Markworth, The Math Learning Center, Bellingham, Washington


146 Mathematical Modeling, an Imperative in 2022: Preparing All Students to Mathematize a Complex World
6–8 Workshop
 New Orleans Convention Center, 288–290
 Teaching our students to mathematize contexts and analyze models has never been more imperative. We’ll explore an instructional routine that leverages relevant contexts, includes designs that provide access and support for all learners and, when implemented regularly, develops student agency and capacities as modelers and empowered citizens.
Amy Lucenta, Fostering Math Practices, Natick, Massachusetts
 Twitter: @AmyLucenta
Grace Kelemanik, Fostering Math Practices, Natick, Massachusetts


147 Engaging in Mathematics and Integrated STEM: Connecting and Understanding Our World
8–10 Workshop
 New Orleans Convention Center, 293
 Math is the language of STEM, and through STEM students can make sense of our world. Learn, use, and apply mathematics through Science, Engineering, and Technology integrative STEM activities. Experience meaningful learning that applies math, builds understanding, and cultivates students’ identity in math and STEM.
David Barnes, NCTM, Reston, Virginia
 Twitter: @DavidBarnes360
Elizabeth Allan, Arlington, Virginia
Scott Bartholomew, Provo, Utah
Philip Reed, ITEEA / Old Dominion University, Norfolk, Virginia
Geraldine Gooding, American Society for Engineering Education, Washington, District of Columbia
Christine Royce, Shippensburg University, Pennsylvania





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-  Refreshen and Deepen Mathematics Content Knowledge for Teaching
-  Realign Relationships and Strategies for Supporting and Implementing Instruction

148  **Fighting a Pandemic: Hands-On Models to Teach the Mathematics of Pooled Testing**
8–10 Workshop
 New Orleans Convention Center, 393–394
 Engaging in a real-world problem, we will explore the benefits of pooling COVID-19 test samples to save lives, time, and money. We'll simulate testing using hands-on lab kits, and create math models using functions, statistics, and algebraic and geometric methods. Join us as we share free student and teacher materials to explore this relevant problem.
Maria Hernandez, The NC School of Science and Mathematics (retired), Durham, North Carolina
 Twitter: @mathmodeling
Lauren Siegel, MathHappens, Austin, Texas
Usha Kotelawala, Developing a Mathematical Toolkit, New York, New York






149  **Inviting Students In: Improving Gender, Racial, and Ethnic Diversity in Textbook Exercises**
10–12 Workshop
 New Orleans Convention Center, 391–392
 As the field of mathematics focuses on diversity, equity, and inclusion initiatives, research shows that textbooks can create barriers by reinforcing stereotypes and underrepresenting women and people of color. Our workshop will teach participants to “invite students in” by noticing these instances and rewriting exercises to be more inclusive.
Alison Marzocchi, California State University, Fullerton
Alexis Di Pasqua, California State University, Fullerton
Evelyn Pohle, California State University, Fullerton
Emily Rumaldo, California State University, Fullerton

151  **We Teach What We Assess: Writing Common Assessments to Shift Instruction across Classrooms**
Coaches/Leaders/Tea Workshop
 New Orleans Convention Center, 283–285
 How can the collaborative development of high-quality exams improve math instruction? When common assessments are designed to push past procedural fluency and assess students’ conceptual and contextual understanding, teachers shift their curricular and instructional practices. We explore how this fits into improvement efforts, and we model the process.
Joseph Agron, Summit View Learning, Shelburne Falls, Massachusetts
 Twitter: @summitviewlearn
Michael Hayes, Summit View Learning, Shelburne Falls, Massachusetts
Emily Williams, Summit View Learning, Shelburne Falls, Massachusetts
Claudine Margolis, Summit View Learning, Ann Arbor, Michigan

204  **I Have a Block to Teach Math: Now What?**
6–8 Workshop
 New Orleans Convention Center, 383-385
 Whether you have been teaching in a math block or your school is switching to a math block, the question always comes up: “Now what?” This session will dive into effective ways to implement strong instructional strategies to maximize student learning in a math block.
Rob Baier, Intermediate Unit 1, Coal Center, Pennsylvania
 Twitter: @Rob_Baier



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152 Breaking the Math Anxiety Cycle: Implementing Engaging Practices That Empower Young Minds

3–5 Session

New Orleans Convention Center, 292

Do you have students in your classroom who have math anxiety? Ever wonder what you can do to help reduce this fear or help stop this anxiety before it ever starts? Join this session to learn three practices to implement tomorrow that build more positive math experiences for students in your face-to-face or virtual classroom.

Desiree Harrison, Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; Farmington Public Schools, Michigan
Twitter: @kidsmathtalk

153 Formative Assessment and Feedback: Guiding and Informing Mathematics Teaching and Student Learning

3–5 Session

New Orleans Convention Center, New Orleans Theater C

Participants will be engaged in discussing the implementation of classroom-based formative assessment techniques, including observation, interviews, show me, hinge questions, and exit tasks. They will also discuss the link between formative assessment and feedback, including teacher-to-student, student-to-teacher, and student-to-student feedback.

Francis (Skip) Fennell, Past President, National Council of Teachers of Mathematics, Reston, Virginia; McDaniel College, Westminster, Maryland
Twitter: @SkipFennell

Jonathan Wray, Howard Co Pub Sch Sys, , Maryland

154 Creating and Implementing High-Level Mathematics Tasks in the Middle Grades

6–8 Session

New Orleans Convention Center, 286–287

This presentation will focus on tasks that have a high level of cognitive demand that can be used in the middle grades. We will discuss how to analyze the cognitive demand of sample tasks, as well as how to transform lower-level tasks into high-level tasks. Finally, we will share helpful strategies for maintaining rigor when implementing the tasks.

Audrey Bullock, Austin Peay State University, Clarksville, Tennessee

Rebecca Darrough, Austin Peay State University, Clarksville, Tennessee

155 Cultivating Joy in Mathematics with Interactive Lessons

8–10 Session

New Orleans Convention Center, 396

Interactive digital lessons promote joy in learning mathematics. Examples from algebra 1 show how digital activities increase students' access to rigorous grade-level content, enabling them to informally explore concepts and to develop formalized mathematical thinking, as well as equipping students to apply mathematics to the world around them.

Sara Lack, Great Minds, Washington, District of Columbia
Samantha Falkner, Mondovi, Wisconsin

156 Analyze and Graph Families of 15 Functions, 6 Transformations: A Free Modular Course with 300+ Videos

10–12 Session

New Orleans Convention Center, 397

Students learn to graph “by hand” 15+ parent functions with vertical/horizontal shifts, stretches, shrinks, reflections, $f(-x)$, and combinations of these transformations. We will examine proper terminology, domain, range, and strategies for in-class or online instruction, a flipped classroom, or as a review. We have 500+ colorful animated graphs for prealgebra through calculus.

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

Karen Campe, New Canaan, Connecticut

157 March–May 2020: How We Scaled Calculus Teaching and Learning in a Pandemic

10–12 Session

New Orleans Convention Center, 291

The presenters will share what they learned as they planned for and hosted 33 AP Calculus Live content and review sessions in the spring of 2020, prepared for and filmed numerous AP Daily sessions in the fall, and rounded out the pandemic with 8 AP Daily Live Review lessons in 2021. There will be ample time for questions and answers.

Virginia Cornelius, Lafayette High School, Oxford, Mississippi

Twitter: @Virgecornelius

Mark Kiraly, Ryan High School, Denton, Texas



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159 Mathematics Teaching Practices: A Framework for Teachers Analyzing Mathematics Tasks



Coaches/Leaders/Tea Session

New Orleans Convention Center, New Orleans Theater B
Preservice teachers often struggle to determine the quality of math tasks. This session describes the creation of a task analysis framework utilizing the eight Mathematics Teaching Practices for methods courses and extensions to in-service teacher learning to promote access for each and every student in mathematics and to connect pedagogical concepts.

Valerie Long, Indiana University of Pennsylvania
Nicole Gearing, Orem, Utah
Kate Raymond, University of Oklahoma, Norman

160 Assessing (Real) Math Fluency



General Interest Session

New Orleans Convention Center, 296

Math assessments often focus on accuracy only, but assessing fluency must also attend to efficiency and flexibility—for example, being able to select an appropriate strategy. Join us to explore a collection of assessment tools and ideas that truly focus on fluency, from basic facts to multidigit whole numbers to fractions and decimals.

Jennifer Bay-Williams, University of Louisville, Pewee Valley, Kentucky
Twitter: @JBayWilliams
Sherri Martinie, Kansas State University, Manhattan

161 Let's Finally Understand Fractions as Numbers: Rethinking What We Know about Fractions



General Interest Session

New Orleans Convention Center, 295

Do you really understand fractions as numbers? In this session, participants will explore some reasons why fractions are so often misunderstood. We will then shift our focus to building our understanding of fractions as numbers and explore ideas on how we can support students to understand fractions as numbers.

Matt Hayden, Monona Grove School District, DeForest, Wisconsin
Twitter: @MgmathC

162 Women's Relationship with Math: Love Song or Break-Up Song



General Interest Session

New Orleans Convention Center, New Orleans Theater A
Relationships grow over time. This session will discuss how to improve girls' relationship with mathematics beginning with early math experiences and sustaining positive learning experiences over time. This session will describe how teachers can help girls to learn and love mathematics through teaching strategies, feedback, attitudes, and beliefs.

Dianne McCarthy, SUNY Buffalo State, East Amherst, New York

162.1 Leveraging CAS as a Tool For All Students to Explore Mathematics



10–12 Exhibitor Workshop

New Orleans Convention Center Room: 390

What if there was a technology tool that could make exploring mathematical properties, patterns, and relationships into inquiry activities? Join us as we explore examples that demonstrate using Computer Algebra Systems as a tool for discovery in the math classroom.

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Thank you to all of the volunteers who have helped make this conference a success!



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163 The Core of Our Geometry Instruction: Development of Geometric Reasoning and How to Assess It



3–5 Burst

New Orleans Convention Center, 393–394

Let’s think about the development of geometric reasoning in children. We’ll look at a framework to help us better understand the development of geometric reasoning. We’ll also look at some open-ended geometry tasks and how information derived from these tasks can be used in lesson planning to better individualize instruction.

Thomas Fox, University of Houston Clear Lake, Texas

164 Is a Tuna Melt Actually a Pizza? Fostering Debates and Justifications in the Math Classroom



6–8 Burst

New Orleans Convention Center, 395

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. Come hungry for learning, leave hungry for sandwiches!

Justin Aion, Environmental Charter School, Pittsburgh, Pennsylvania

Twitter: @JustinAion

Shelby Strong, Self, Gretna, Louisiana

165 What Fish Tanks, Compatible Groupings, Scheduling, and Coloring Have in Common



6–8 Burst

New Orleans Convention Center, 283–285

Did you know that determining student groups, displaying fish, arranging seating, and scheduling after-school activities are all based on the mathematics of coloring? In these times, coloring can be a great stress reducer and a useful mathematical tool. Let’s look at the mathematics of coloring: some theorems and relevant applications.

Mary McMahon, North Central College, Naperville, Illinois

Twitter: @MaryNCC

166 Redefining Relevance: Seeing Mathematics in the World around Us



8–10 Burst

New Orleans Convention Center, 293

Participants will be asked to consider a new definition of relevance as seeing and recognizing mathematics in the world around us and how this different approach can refocus mathematics lessons. This presentation will focus on the concept of symmetry and its appearances and uses in our world to demonstrate balance and beauty.

Sharon Okelley, Francis Marion University, Florence, South Carolina

167 Substitution and Elimination: More Interesting Than You Think!



8–10 Burst

New Orleans Convention Center, 288–290

Solving systems of linear equations can be challenging. In this session I’ll disrupt some common practices and conventions around the use of elimination and substitution to solve systems of linear equations. We’ll explore tasks that can promote greater flexibility for students as they use these strategies.

Zandra de Araujo, Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; University of Missouri, Columbia

Twitter: @zdearaujo

168 Things You Should Know That Your Students Learned about Math in Science Class



10–12 Burst

New Orleans Convention Center, 386–387

Half-life, pH, logistical growth, damped oscillation, and inverse square relationships—this is just a sampling of the many things that your math students learn in science class. Learn what your students know so that you can leverage their previous knowledge to make interdisciplinary connections to science in the math classroom.

Josh Berberian, The Shipley School, Bryn Mawr, Pennsylvania

169 Number and Operations through a Variety of Perspectives: Preparing Preservice Teachers



Coaches/Leaders/Tea Burst

New Orleans Convention Center, 383–385

This session will focus on a series of projects designed to deepen teacher candidates’ knowledge of Number and Operations on Whole Numbers, Fractions, and Decimals through a variety of perspectives, including standards analysis, discussion of algorithms and strategies, connections to curriculum and research, and modeling with manipulatives.

Janelle Lorenzen, Southeastern Louisiana University, Hammond

170 Mental Math + the Core + the Standard Algorithm



General Interest Burst

New Orleans Convention Center, 391–392

Many adults continue to make fun of the mathematics and the methods we use to teach our students. This session will show connections between our teaching methods, numerous mental math strategies we hope students (and adults) are using, and the ultimate connections with the standard algorithm or “the way we used to do math.”

Lanee Young, Fort Hays State University, Kansas



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171  **Helping Students Become Problem Solvers Not Problem Performers**
PreK–2 Session
 New Orleans Convention Center, 292
 Come explore ways to help your students become problem solvers. Students who are thinkers focus on the problem and mathematics to achieve a solution instead of just picking out numbers and trying to do something with them without understanding. In this session we will explore different types of problems that focus on understanding.
Brittany Goerig, hand2mind, Midlothian, Texas
 Twitter: @bgoerig






172  **Empowering Young Math Modeling Sleuths to Solve Problems**
3–5 Session
 New Orleans Convention Center, New Orleans Theater A
 This session will present an instructional strategy used to engage K–6 students with mathematical modeling to solve school and community problems while connecting to students’ lived experiences. We will share modeling tasks that engage students in problem formulation within their local contexts, empowering them to draw on their funds of knowledge.
Jennifer Suh, Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; George Mason University, Fairfax, Virginia
 Twitter: @completemath
Susan Call, Westlawn Elementary, Falls Church, Virginia
Brett Terrell, Westlawn Elementary, Falls Church, Virginia
Kristen Burke, Westlawn Elementary, Falls Church, Virginia

173  **Who’s Hiding in Your Math Class?**
3–5 Session
 New Orleans Convention Center, 396
 How would your students answer, “Can I hide or be ignored in math class?” Learn strategies to keep students engaged, participating meaningfully, out of hiding, and seen for the mathematicians they are and can become.
Shannon Kiebler, Empower Consulting, Littleton, Colorado
 Twitter: @shannonkiebler

174  **Informal Statistical Inference: Using Simulation to Build on Student’s Intuition about Probability**
8–10 Session
 New Orleans Convention Center, 397
 Collecting class data on yes/no questions can be easy and fun. We will present two activities for using simulation to conduct informal inferential reasoning on studies that involve a yes/no variable. The learning activities will be appropriate for direct use in middle school or high school classrooms and will align directly with the Common Core.
Nathan Tintle, Dordt University, Sioux Center, Iowa
 Twitter: @nathantintle

175  **Making Space: Analyzing Student Discourse Actions in Mathematics to Promote Access to More Voices**
8–10 Session
 New Orleans Convention Center, New Orleans Theater C
 Participants will discuss how discourse actions promote students’ identify and agency by creating space for student voices, marking students’ contributions, and assigning mathematical competence. Participants will use rubrics to identify discourse actions in classroom videos and consider how to elicit deeper student thinking and engagement.
Melissa Boston, Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; Duquesne University, Pittsburgh, Pennsylvania
 Twitter: @MBostonMath
Amber Candela, University of Missouri–St. Louis, Saint Louis

176  **Informed Investing: Using Math to Evaluate GameStop**
10–12 Session
 New Orleans Convention Center, 295
 The remarkable rise and fall of GameStop share prices introduced many students to the stock market. Learn how students can use math to discover how to estimate stock value on the basis of objective criteria and can decide for themselves whether “meme stocks” are a safe or risky investment.
Andrew Davidson, Financial Life Cycle Education Corp (FiCycle), New York, New York
 Twitter: @ficycleedu
Philip Dituri, Financial Life Cycle Education Corp (FiCycle), New York, New York
Jack Marley-Payne, Financial Life Cycle Education Corp (FiCycle), New York, New York

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177 Positioning ELs for Success



Coaches/Leaders/Tea Session
New Orleans Convention Center, 286–287

How would you feel learning math in Spanish? There is a myth that math is a universal language, and yet we are struggling to meet the needs of ELs. Three quarters of ELs are Spanish-speaking; this motivating session focuses on them. The author of a popular book for teachers will teach you how you may position ELs to be successful.

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

178 Breaking Down Readability Barriers in Mathematics



General Interest Session
New Orleans Convention Center, 291

A student’s relationship to math should not be dictated by their reading confidence. This session analyzes the barriers present in math texts for students with dyslexia, for multilingual learners, striving readers, and emerging readers. Educators will learn techniques to make text more readable and accessible while maintaining content rigor.

Christine Hopkinson, Great Minds, LLC, Washington, District of Columbia
Twitter: @ckhopkinson

179 Broadening the Purpose and Value of Mathematics through Curiosity and Storytelling



General Interest Session
New Orleans Convention Center, New Orleans Theater B

Why did our romance with mathematics end? How can we resurrect our love for mathematics that is grounded in our unique cultural experiences and identity with this subject? In this workshop, we will address these questions and the needed solutions by looking at the 5,000-year history of mathematics and nurturing a lifetime thirst for its narratives.

Sunil Singh, Amplify, Brooklyn, New York
Twitter: @Mathgarden

180 Jump-Start Your Lessons with High-Yield Routines



General Interest Session
New Orleans Convention Center, 296

In this session, teachers will learn powerful alternatives to begin their lessons through seven mathematics routines that support student development of the Common Core State Standards for Mathematical Practice. Participants will learn to implement starters that aren’t activity sheets, require no supplemental materials, and promote number sense at any grade level.

Angela Epperson, Bradley County Schools, Cleveland, Tennessee
Twitter: angelaeperson



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- Refreshen and Deepen Mathematics Content Knowledge for Teaching
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181 Line Dance: The Fundamentals of Using Number Lines



PreK–2 Workshop

New Orleans Convention Center, 383–385

Number lines are a lovely sense-making tool, from early elementary to secondary mathematics domains. Sounds simple? Often the building and understanding are a bit elusive to students and educators! Join us for hands-on learning to construct this important tool and learn about the important foundations you are laying for grades 3–6 content.

Elizabeth Peyser, Educator in Kansas, Wichita

183 Dare to Compare! Using Residual Reasoning as a Powerful Fraction Comparison Strategy



3–5 Workshop

New Orleans Convention Center, 294

Have students ever told you $\frac{5}{6}$ and $\frac{7}{8}$ are equal because they are both just one away from the whole? This workshop confronts students about the unreliability of looking at the gap between the numerator and denominator to compare fractions, while focusing on tasks that develop the powerful fraction comparison strategy called residual reasoning.

Joann Barnett, Missouri State University, Springfield

Kurt Killilion, Missouri State University, Springfield

Gay Ragan, Springfield, Missouri

Adam Harbaugh, Missouri State University, Springfield

184 Tasks That Trigger Thoughtful Talk



3–5 Workshop

New Orleans Convention Center, 386–387

Many of the attributes of polygons—side length, angle measure, symmetry, perimeter, and area—can be explored using paper folding, perimeter pieces, square tiles, and grid paper. We’ll work through a series of tasks that help students make sense of these attributes. Tasks are designed to have entry levels for all students.

Laurie Boswell, Big Ideas Math, Franconia, New Hampshire

Twitter: @laboswell

185 Making Sense of Rational Number Division through Modeling



6–8 Workshop

New Orleans Convention Center, 293

Frequently, students learn an algorithm “just because” that’s how it’s done. This session empowers teachers to have a useful, yet simple, area model for explaining rational number division. This model will readily resolve rational number division mysteries such as, “When dividing fractions, why is the quotient sometimes larger than the divisor?”

John Ashurst, Harlan Independent Schools (Retired), Baxter, Kentucky

Twitter: kiltedcyclist

Lindsay Gold, University of Dayton, Ohio

Michael Houston, Ellwood City, Pennsylvania

186 Teaching Math at a Distance: Reimagining Face-to-Face and Remote Instruction



6–8 Workshop

New Orleans Convention Center, 288–290

Harness the affordances of face-to-face instruction with remote learning in any setting. This workshop will engage you in a math routine and rich task with purposeful discussion in a setting with some participants face-to-face and others joining remotely. Learn how to harness the affordances of both models to bring out rich mathematics.

Theresa Wills, George Mason University, Fairfax, Virginia

Twitter: @theresawills

187 Game Show Mania! Simulations for the Classroom



8–10 Workshop

New Orleans Convention Center, 395

This session will feature three simulations of popular TV game show games. Participants will play Deal or No Deal, The Price is Right Dice Game, and Let’s Make A Deal Three Aces game using different simulation methods. Probability, statistics, expected value, and randomness will be the focus of the games.

Sharon Taylor, Georgia Southern University, Statesboro

Kathleen Mittag, The University of Texas at San Antonio, Retired, Bishop



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Friday Afternoon Workshops

1:00 p.m.–2:15 p.m.

188 Take a Wild Ride on Your Own Roller Coaster Function!



10–12 Workshop

New Orleans Convention Center, 283–285

Learn to engage students in understanding the results of combining functions by designing roller coasters. Have fun doing mathematics while experiencing pedagogy that supports productive discourse, provides natural opportunities for differentiation, and attains significant mathematical goals.

Barbara Kuehl, Mathematics Vision Project | MVP, Salt Lake City, Utah

Janet Sutorius, Nephi, Utah

189 Hidden Structures of Mathematics: Pineapples, Perseverance, and Purpose



Coaches/Leaders/Tea Workshop

New Orleans Convention Center, 393–394

The world of mathematics can be captured in a pineapple. Come explore authentic mathematical connections: Start with a pineapple; weave in patterns, nature, and science; and then discuss how students use math with a sense of joy and wonder to understand and critique their world. Leave with a renewed sense of purpose about why we teach mathematics.

Jaclyn Murawska, Skokie/Morton Grove School District 69, Illinois

Twitter: @murawskamath

Sean Nank, California State University San Marcos, Carlsbad

Friday Afternoon Sessions

2:30 p.m.–3:30 p.m.

190 Leveraging the Brilliance in Student Work to Expand Math Understanding for All



PreK–2 Session

New Orleans Convention Center, New Orleans Theater C

Looking at student work requires more than looking for right answers. When we start by looking for the brilliance in student work, we can identify and build on the funds of knowledge they bring to our classrooms. We'll explore ways to leverage each student's work to engage them in grade-level mathematics and cultivate their math identities.

Kristin Gray, Amplify, Lewes, Delaware

Twitter: @MathMinds

Marni Greenstein, 17868, Brooklyn, New York

191 Assessment Interviews: Moving beyond Timed Tests



3–5 Session

New Orleans Convention Center, 296

Most fluency assessments focus on accuracy of facts. This session will highlight how to use student interviews to assess the other components of fluency: flexibility and efficiency. Tools for creating and conducting these assessments as well as data-tracking tools to target specific need and provide prescriptive instruction will be shared.

Susan Loveless, Rutherford County Schools, Murfreesboro, Tennessee

Twitter: @susanloveless23

192 Math Solver Apps: A Teacher's Friend or Foe?



6–8 Session

New Orleans Convention Center, 396

The digital age has brought artificial intelligence–powered math solvers to our students. Is this a way of cheating on homework and tests or an important support tool for remote schooling? In this session we will explore how these math apps can help teachers examine how they assess and attend to teaching the full breadth of the standards.

William Nolan, NWEA, Middlegrove, New York

James Pratt, NWEA, Dallas, Georgia

193 Designing Desmos Activities to Experience the Joy and Beauty of Mathematics.



8–10 Session

New Orleans Convention Center, New Orleans Theater B

Desmos, as a tool for instruction, has the power to display the beauty of mathematics through a variety of animations, digital manipulatives, and connected ideas. In this session we'll explore how Desmos can make visual patterns come to life, connect mathematical representations, and show mathematics as a series of real-world actions.

Kurt Salisbury, Midway ISD, Waco, Texas

Twitter: @kurt_salisbury



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194 Connecting Industry to Mathematics Instruction



10–12 Session

New Orleans Convention Center, 291

Industry-inspired lessons will be demonstrated and explored by participants. STEM lessons include an industry Launch video with a Desmos activity, a student sheet posing industry tasks, and analysis questions that require student discussion. Presented materials are a result of a three-year NSF collaboration between high schools and a community college.

Jay Martin, Wake Technical Community College, Raleigh, North Carolina

Julia Smith, Wake Technical Community College, Raleigh, North Carolina

195 The Unacceptable Status Quo in High School Mathematics



10–12 Session

New Orleans Convention Center, 286–287

Today, it seems as if nearly everyone agrees that 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

196 Increase Underserved Students’ Mathematical Agency by Using Equity Commentators in Lesson Study



Coaches/Leaders/Tea Session

New Orleans Convention Center, 397

Adding equity commentators in the lesson study cycle elevates the commitment to equity, as commentators offer feedback throughout the cycle and share commentary including comments and critiques built on the evidence of what is noticed about focal students as they are working to make sense of mathematics while exercising their agency.

Susie Hakansson, Independent Mathematics Education Consultant, Venice, California

Twitter: @SusieHakansson

197 Discourse for Assessment—Moving the Conversation Forward



General Interest Session

New Orleans Convention Center, 292

How do we create an equitable learning environment that encourages and nurtures student-to-student discourse, and how can we use discussion to advance student thinking? We will discuss why discourse for assessment is an equity issue, how to create a discourse-rich class environment, and how to use the discourse to support all learners.

Carrie Thornton, Great Minds, Auburn, Washington

198 Let’s Debate Math: Increasing Discourse and Argumentation



General Interest Session

New Orleans Convention Center, New Orleans Theater A

Imagine debate, often a humanities staple, as an integral part of your math class. Come experience and learn ideas for expanding students’ understanding of math with debates that will empower and engage students of all levels. Let’s get our students constructing viable arguments and critiquing the reasoning of others!

Chris Luzniak, The Archer School for Girls, Los Angeles, California

Twitter: @cluzniak

199 One Organization’s Commitments to Equity and the Implications for All Students



General Interest Session

New Orleans Convention Center, 295

This session supports the recent position statement and commentaries from TODOS: Mathematics For ALL’s regarding prioritizing anti-racism in mathematics education. This work has influenced new state frameworks, policies, and virtual learning formats. Specific actions will be detailed for the purpose of goal setting and improved student success.

Linda Fulmore, Mathematics Education Consultant, Cave Creek, Arizona

Twitter: @lmfulmore



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200 Let's Be Clear: Precise Language for Addition and Subtraction



PreK–2 Workshop

New Orleans Convention Center, 293

Students learn addition and subtraction strategies to tackle a variety of computation situations. Couple the strategies with language, and students can be flexible, accurate, and efficient during their process. Let's be clear with the language to support fluency development with young mathematicians.

Rob Nickerson, ORIGO Education, Lakewood, Colorado
Melinda Schwartz, ORIGO Education, Earth City, Missouri

201 Refresh, Revisit, and Revise (RRR) Place Value (The 3 R's of Place Value)



PreK–2 Workshop

New Orleans Convention Center, 393–394

This workshop will show the progression of understanding place value in an elementary environment, as outlined in my research article published in the upcoming *Virginia Mathematics Teacher* journal.

Annwyn Long, Chesterfield County, Henrico, Virginia
James Wright, Chesterfield County Schools, Henrico, Virginia

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

3–5 Workshop

New Orleans Convention Center, 395

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 Ann Gold, University of Dayton
 Twitter: @lindsayanngold

John M Ashurst, Harlan Independent Schools (Retired)
Michael Houston, Riverside High School, Pennsylvania

203 If Seeing Is Believing, Then Doing Is Understanding



3–5 Workshop

New Orleans Convention Center, 386–387

This hands-on workshop uses the lens of fractions to highlight two of NCTM's Mathematics Teaching Practices from *Principles to Actions: Ensuring Mathematical Success for All* (2014): use and connect representations and build procedural fluency from conceptual understanding. Caution: This ain't your grandma's PD!

Brian Buckhalter, Buck Wild About Math, Oxford, Mississippi
 Twitter: @buckwildabtmath

205 Let Me Explain! Setting the Stage for Student-Led Classroom Discourse



6–8 Workshop

New Orleans Convention Center, 283–285

Prioritizing mathematical reasoning and evidence of students' thinking are cornerstones of effective classroom discourse. In this session, learn how to create and implement tasks that invite students to take the lead in talking, writing, and making conjectures about mathematics.

Brea Ratliff, Personal Card, Auburn, Alabama
 Twitter: @brea_ratliff

206 Challenge Accepted! Use Project Based Learning to Finally Explore Social Justice in Algebra Class



8–10 Workshop

New Orleans Convention Center, 288–290

Good projects combine 21st century skills and rich mathematics but can also explore ideas of social justice. Learn how to explore history, inequality, and current events while students make mathematical models, think critically, and develop mathematical practices. Bring your ideas and we'll start creating new projects that will serve your population.

Carl Oliver, City As School, Brooklyn, New York
 Twitter: @carlolwitter

207 Social Justice in a Virtual Environment: The Case for Reparations



10–12 Workshop

New Orleans Convention Center, 383–385

In this workshop, the presenters will share their implementation of a social justice lesson on reparations in virtual secondary mathematics classrooms. Participants will engage in the mathematics of reparations and examine student work samples. Participants will discuss the impact of the lesson on student perceptions of mathematics.

Kyndall Brown, Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; University of California Los Angeles
Naehee Kwun, UCI CalTeach, Long Beach, California



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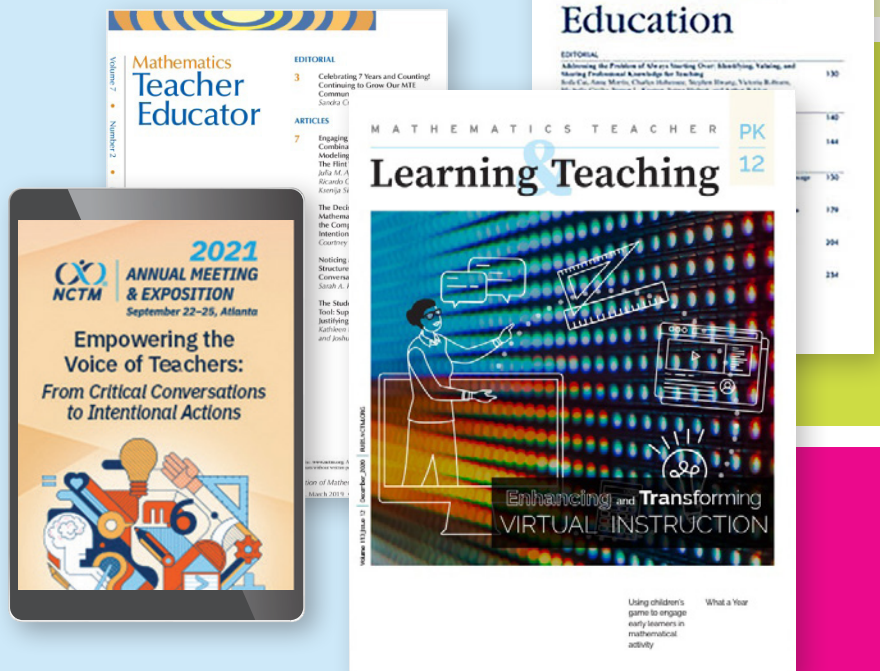
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Program Advertisers (in alphabetical order)

CPM Educational Program.....	18
Stenhouse Publishers	2

NCTM Advertising

Three-year Look Ahead for Annual Meetings	29
Professional Development	39
Classroom Resources.....	49
Membership	52
Publications	64

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

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

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The Louisiana Association of Teachers of Mathematics is dedicated to the promotion of excellence in the teaching and learning of mathematics in Louisiana's schools. To this end, LATM provides professional development and networking opportunities to educators and recognizes excellent educators of mathematics through its awards program. Further, LATM assists other organizations in promoting interest in mathematics in Louisiana, and collaborates with other organizations of teachers of mathematics.

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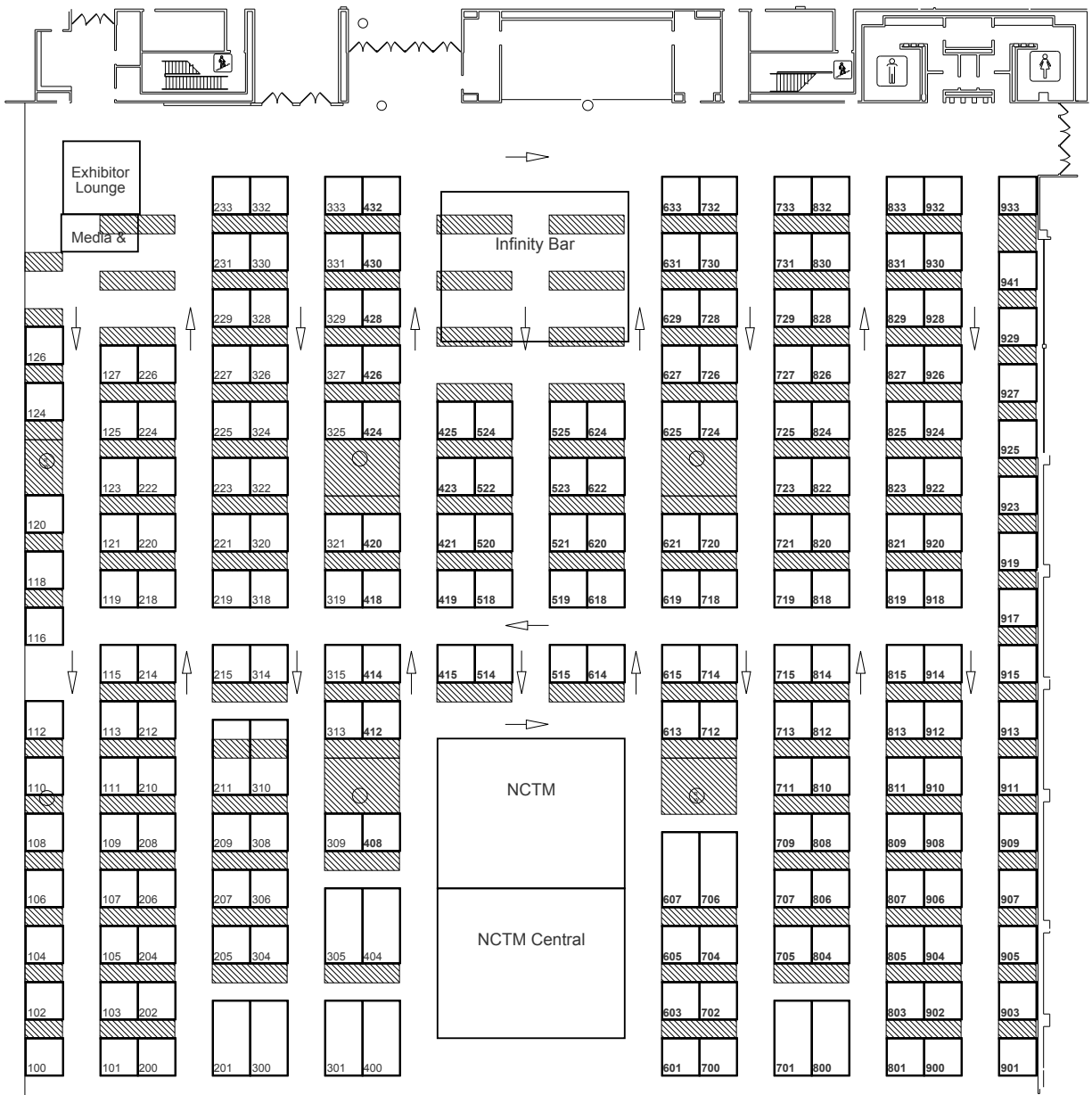
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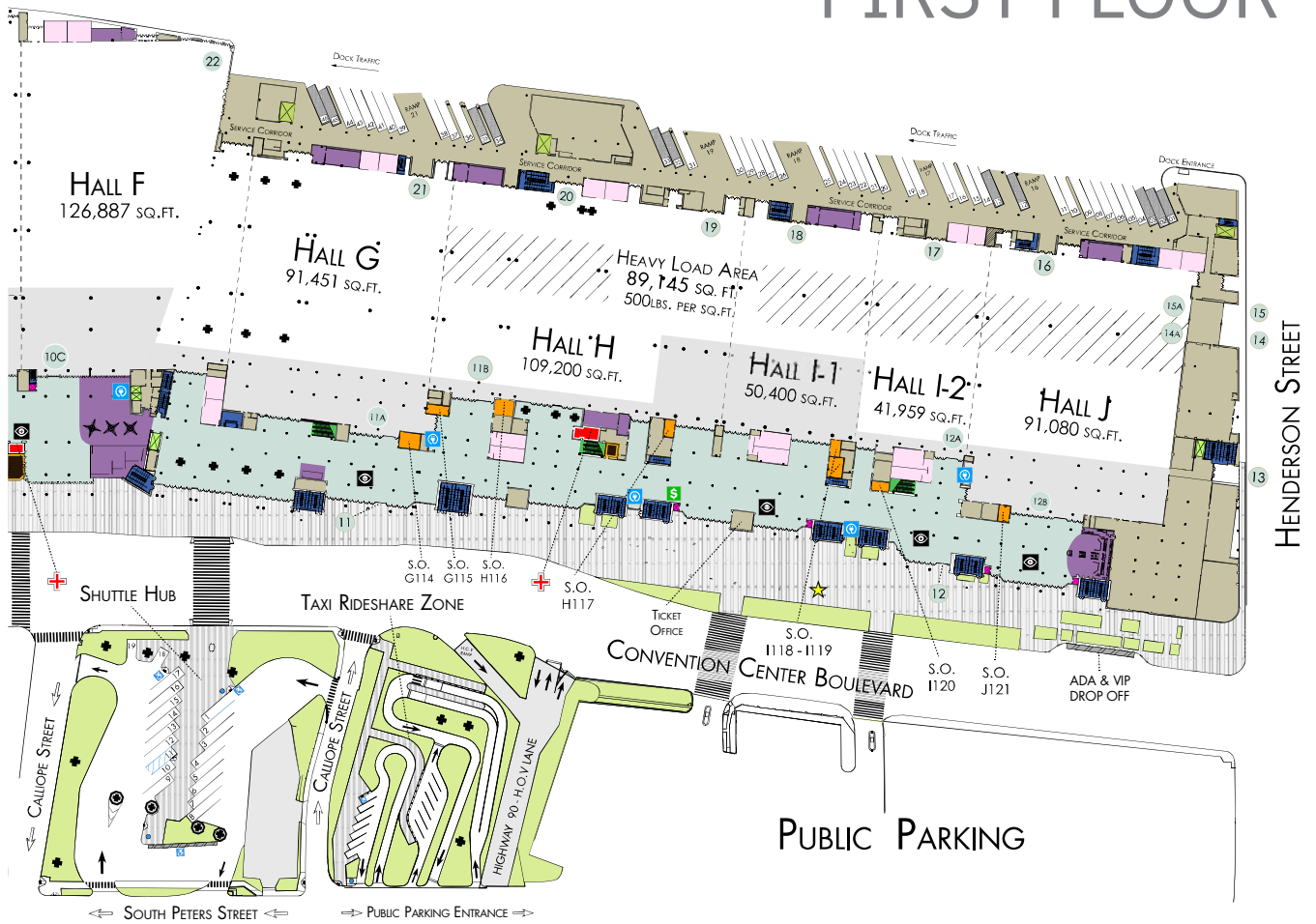
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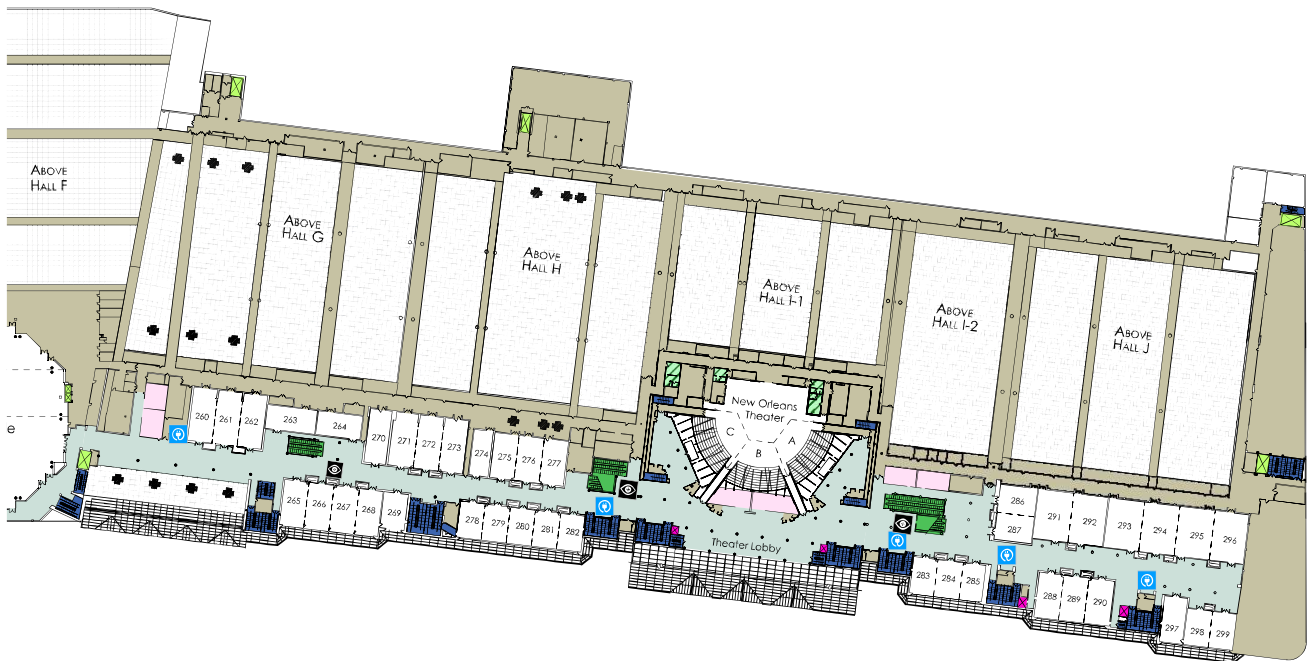
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Booth 301

Eerie, PA
(814) 651-0147

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Booth 201

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cpm.org

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Curriculum Associates

Booth 607

North Billerica, MA
(978) 313-1269

CurriculumAssociates.com

Curriculum Associates serves millions of students with a laser focus on educators' needs and the belief that thoughtful, continuous innovation leads to positive impact on classrooms and measurable growth for students.

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Booth 304

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greatminds.org

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Portsmouth, NH
(603) 431-7894

heinemann.com/math

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Hooda Math

Booth 603

Saint Louis Park, MN
(612) 437-9977

HoodaMath.com

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Kendall Hunt Publishing Company

Booth 700

Dubuque, IA
(563) 589-1075

k12.kendallhunt.com

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mathleadership.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.

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Booth 408

Earth City, MO
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Savvas Learning Company (formerly Pearson K12 Learning)

Booth 305
Paramus, NJ

savvas.com

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STEMscopes Math

Booth 310
Houston, TX
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stemscopes.com/math

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Portsmouth, ME
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stenhouse.com

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Booth 300
Salem, OR
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mathlearningcenter.org

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TODOS: Mathematics for ALL

Booth 121
Tempe, AZ
(480) 515-5265

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.

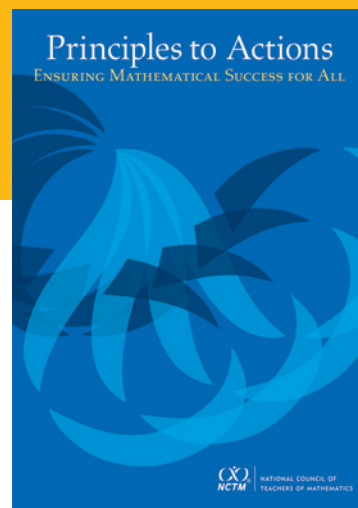
Speaker Index

- A**
Agron, Joseph 151
Aion, Justin 76, 164
Allan, Elizabeth 147
Amidon, Joel 13, 39
Ancrum, Jessica 93
Anderson, Rick 88
Andreasen, Janet 7
Anthony, Holly 62
Ashurst, John 185, 202.1
- B**
Baier, Rob 204
Bailey Ritter, Kenley 116
Balk, Ellie 129
Baltzley, Patricia 8
Barnes, David 40, 125, 147
Barnett, Joann 183
Bartholomew, Scott 147
Baumann, Shelly 24
Baumann, Tammy 33
Bay-Williams, Jennifer
..... 68, 160
Beatini, Thomas 119
Bellman, Allan 1 30
Berberian, Josh 168
Berry, III, Robert 22
Bezaire, Joel 52
Boston, Melissa
..... 2, 21, 113, 175
Boswell, Laurie 184
Boyd, Ashley 70
Brown, Curtis 10
Brown, Kyndall 207
Bruce, Nichole 140
Bryant, Cynthia 98
Buckhalter, Brian 203
Bullock, Audrey 154
Burke, Kristen 172
Burrill, Gail 137
- C**
Call, Susan 172
Campe, Karen 156
Candela, Amber 21, 175
Cannon, Marilyn 78
Cardone, Tina 105
Carlson, Lisa 140
- Cassel, Darlinda 138
Castaneda, Stephanie 111
Childs, Kristopher 95
Chow, Jay 46
Claiborne, Jaclyn 25
Clements, Douglas 59
Coe, Ted 61
Coffman, Lisa 69
Cook, Candies 39
Cooper, Sandra 116
Cope Bondurant, Liza 13
Cornelius, Virginia 157
Corum, Kimberly 72
Curran, Danielle 115
Cutler, Carrie 96
- D**
Dalton, Marylu 57
Danielson, Christopher 90
Darrough, Rebecca 154
Davidson, Andrew 176
Davis, Jill 138
Davis, Kevin 44
de Araujo, Zandra 167
Delano Moore, Sara 34
Desai, Siddhi 82, 114
Di Pasqua, Alexis 149
Dillon, Frederick 67
Dituri, Philip 110, 176
Donham, Melissa 116
Dubee, Megan 55
Dykema, Kevin 117
- E**
Ellis, Mark 97
Epperson, Angela 180
Erickson, Staci 31
Ewing, Jim 177
- F**
Falkner, Samantha 155
Fennell, Francis (Skip) 153
Flynn, Michael 84
Fossum, Nolan 94
Fox, Amanda 32
Fox, Courtney 74
Fox, Thomas 163
Frank, Kristin 72
- Fulmore, Linda 199
- G**
Galasso, Sarah 100
Gapinski, Robin 81
Gearing, Nicole 159
Goerig, Brittany 171
Gold, Lindsay 185, 202.1
Golden, John 54
Golden, Xavier 54
Gooding, Geraldine 147
Gray, Kristin 43, 190
Gray, Paul 85
Greathouse, Paula 62
Greenstein, Marni 43, 190
Griffin, Melinda 49
Guo, Kate 32
- H**
Hakansson, Susie 196
Harbaugh, Adam 17, 183
Harrison, Desiree
..... 2, 113, 152
Hayden, Matt 161
Hayes, Michael 151
Hedgepeth, Shauna 52
Heffernan, Cristina 105
Henderson, Kathy 46
Hernandez, Maria 148
Hobbs, Penelopia 56
Hoffman, Kent 108
Holliman, Natalie 112
Hopkinson, Christine 178
Hosket, Kayton 130
Houston, Michael
..... 185, 202.1
Howse, Tashana 128
Hubbard, Fenisha 60
- I**
Id-Deen, Lateefah 4
Imm, Kara 91
- J**
Joiner, Teresa 42
Jones, Lloyd 99
Justice, Nicole 56
- K**
Kapadia, Huzefa 135
Kebreab, Lybrya 63
Kelemanik, Grace 12, 146
Kenney, Tim 103
Kerrigan, John 86
Kersaint, Gladis 118
Kiebler, Shannon 173
Killion, Kurt 17, 183
Kiraly, Mark 157
Klein, Raymond 6
Knapp, Scott 131
Knoell, Donna 15
Kohler, Susan 65
Kotelawala, Usha 148
Krall, Geoff 124
Kuchta, Carol 23
Kuehl, Barbara 188
Kurtz, Brianna 82
Kwun, Naehee 207
- L**
Lack, Sara 155
Lancaster, Ron 37
Larson, Christine 142
Lawler, Brian 132
Lee, Karin 139
Leiterman, Sandra 5
Lenartowicz, Loryn 103
Lindfors, Tiffany 69
Long, Annwyn 201
Long, Valerie 159
Lorenzen, Janelle 169
Loveless, Susan 191
Lucenta, Amy 12, 146
Luzniak, Chris 198
Lynch, Jeremy 3
Lynch, Sararose 3
- M**
Mackie, Calvin 1
Mann, Robert 51
Margolis, Claudine 20, 151
Marks Krpan, Cathy 133
Markworth, Kimberly
..... 14, 145
Marley-Payne, Jack
..... 110, 176

Speaker Index

Marlowe, Thomas	73	Pearson, Melissa	11	Schwartz, Melinda	200	W	
Martin, Jay	194	Peete, Annetra	134	Sgroi, Richard	26	Wager, Anita	87
Martin, W Gary	48	Pefauere, Elizabeth	143	Shah, Raj	127	Weiss, Drorit	37
Martinie, Sherri	16, 160	Peyser, Elizabeth	181	Shepherd, Chad	136	Welch, Sharon	134
Marzocchi, Alison	149	Pierre, Rhonda	36	Siegel, Lauren	148	Wendel, Amy 1	43
Matthews, Lou	132	Pinter, Holly	18, 122	Singh, Sunil	179	White, Jennifer	66
McCann, Melissa	130	Pohle, Evelyn	149	Sopala, Dianna	102	Whitney, Sarah	33
McCarthy, Dianne	162	Pratt, James	192	Spikings, Desiree	60	Wilcher, Patrick	47
McCarty, Jacqueline	56			Spitzer, Sandy	72	Wiles, Peter	88
McCoy, Ann	78	R		Stanley, Tricia	129	Wilkerson, Trena	41
McMahon, Mary	165	Ragan, Gay	17, 183	Steele, Mike	123	Williams, Emily	151
McTamaney, Catherine	87	Ratliff, Brea	205	Strom, April	61	Williams, LaRita	93
Mills, Greta	27	Ray, Mark	92	Strong, Shelby	76, 164	Wills, Theresa	186
Milou, Eric	195	Raymond, Kate	159	Strutchens, Marilyn	35	Wise Smith, Labonnie	134
Mitchell, Suzanne	77	Reardon, Tom	38, 156	Suh, Jennifer	16, 172	Wissner-Gross, Zachary	25
Mittag, Kathleen	121, 187	Reed, Philip	147	Sutorius, Janet	188	Witherspoon, Taajah	120
Monroe, Dr. Ann	39	Reid, Anita	51	Swartz, Barbara	18, 122	Wood, Andrea	75
Moore, Connie	56	Rendon, Sharon	71	Swartz, Brad	18, 122	Wray, Jonathan	153
Moynihan, Faith	79	Reulbach, Julie	64			Wright, Chris	83
Murawska, Jaclyn	141, 189	Rigelman, Nicole	145	T		Wright, James	201
		Roepke, Tena	19	Taylor, LaTina	65		
N		Rosen, Jeffrey	45	Taylor, Sharon	121, 187	Y	
Nagarajan, Janaki	114	Royce, Christine	147	Tejero Hughes, Marie	50	Yeh, Cathery	132
Nank, Sean	141, 189	Rumaldo, Emily	149	Terrell, Brett	172	Young, Lanee	170
Nickerson, Rob	200			Thompson, Victoria	29		
Nolan, William	192	S		Thornton, Carrie	197	Z	
		Safi, Farinaz	114	Ticknor, Cindy	107	Zavala, Maria	132
O		Safi, Farshid	82	Tintle, Nathan	174	Zielinski, Susan	109
OKelley, Sharon	166	Salisbury, Kurt	193	Tobon, Geraldo	50		
Oliver, Carl	206	Salton, Gabrielle	96	Toncheff, Mona	28		
Ormandy, Tamara	194	SanGiovanni, John	68	Totaro, Susan	11		
		Santana De Tice, Paula	63				
P		Sarama, Julie	59	V			
Palmquist, Jacqueline	8	Scheafer, Shelly	14	Vennebush, Patrick	126		
Parker, Brett	83	Schmidt, Ashley	7	Vogel, Jackie	106		
Pearce, Kyle	61	Schooler, Lesley	9	Voza, Sue Ellen	8		

Principles to Actions Professional Learning Toolkit



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

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

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

Building on *Principles to Actions*

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

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

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

This set of grade-band books elaborates on the teaching and learning principles described in *Principles to Actions*. Each book provides examples and activities to help teachers develop their understanding of the eight effective

mathematics teaching practices and how they can be enacted in the classroom.

- **Enhancing Classroom Practice with Research behind “Principles to Actions”**

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



- **Access and Equity: Promoting High-Quality Mathematics in—**
 - Grades Pre-K–2
 - Grades 3–5
 - Grades 6–8
 - Grades 9–12
- **Principles to Actions Elaboration Series**
 - Access and Equity
 - Curriculum
 - Tools and Technology
 - Assessment
 - Professionalism

