NCTM Regional Conference & Exposition 2019
NASHVILLE | OCTOBER 2-4

Program Book

nctm.org/nashville2019

#NCTMNash19
Celebrate 100 Years
Looking Back and Moving Forward

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

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

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

TOPICS

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

Register Now!
Learn more at nctm.org/100 and follow us on 📡LinkedIn 📡Facebook 📡Instagram 📡Twitter 📡YouTube 📡#NCTM100
HOSTS
Tennessee Mathematics Teachers Association
Middle Tennessee Math Teachers

All Regional Conference presentations will be held at the Music City Center & Nashville Omni. See pages 71–74 for floor plans.

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

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

nctm.org/nashville2019

The publications and programs of the National Council of Teachers of Mathematics present a variety of viewpoints. The content, affiliations, and views expressed or implied in this publication, unless otherwise noted, should not be interpreted as official positions of the Council. References to particular commercial products by a speaker should not be construed as an NCTM endorsement of said product(s). NCTM reserves the right to change speakers, change facilities, or modify program content.

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

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

Printed in the U.S.A.
Welcome to the NCTM Regional Conference in Nashville! We hope you enjoy the diversity of presentations covering a variety of themes intended to focus on the results you need to achieve your professional goals. Whether you are a beginning teacher just starting on your mathematical teaching journey or a seasoned veteran of the classroom or somewhere in between, we hope you will enjoy our keynote speakers, Tim Kanold and Jessica Kanold-McIntyre. Tim and Jessica have a special connection as a dynamic duo father-daughter mathematics educator team. They will help you explore your mathematics story while sharing their journey in a light-hearted and humorous manner.

You will have the opportunity to engage in stimulating discussions and activities and learn from outstanding teachers and leaders in over 200 workshops, sessions, or quick bursts. The Program Committee worked diligently and spent long hours preparing a program designed around the following six themes:

- Assessment: Eliciting and Using Student Thinking
- Building on Students’ Strengths: Practices That Challenge, Engage, Empower, and Meet the Needs of Every Student
- Growing Professionalism and Developing Advocacy
- Beyond the Classroom Walls: Access, Equity, and Empowerment
- Building Mathematical Knowledge for Teaching
- Enhancing Mathematical Thinking Through Reading, Writing, Speaking, and Listening.

In between attending sessions, be sure to peruse the fascinating exhibits with the latest offerings to support best practice. And if you want to experience Music City without venturing too far, the Country Music Hall of Fame is adjacent to the Convention Center. If you are feeling adventuresome and want to venture away from downtown and the vibrant live music scene in search of mathematics in action, be sure to visit the full-scale replica of the Parthenon and investigate its connections to the Golden Ratio. You will be awe-inspired by the 42-foot statue of Athena residing inside the Parthenon.

A special thank you goes out to all of the officers and board members of the Tennessee Mathematics Teachers’ Association (TMTA) and the Middle Tennessee Math Teachers (MT)² and to the hundreds of volunteers who make this conference possible. We are grateful to the NCTM staff and board who have been invaluable in planning and supporting the conference. An extra special thank you goes to the Nashville Program Development Group Representative, Cathy Carroll. Her guidance and insight have been invaluable during the nearly two years of planning this conference.

We hope you enjoy your stay in the Nashville area. While you are here, be sure to enjoy the Music City’s historic charm, live music, hot chicken, and famous Southern hospitality!
The NCTM 2019 Regional Conference & Exposition officially begins on Wednesday with the Opening Session at 5:30 p.m. Presentations on Thursday and Friday begin at 8:00 a.m. and are scheduled concurrently throughout the day.

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

Please remember:

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

**New and Preservice Teachers Workshop**

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

**Thursday and Friday, Presentations 54 and 211**

9:45 a.m.–11:00 a.m.

Nashville Omni, Broadway Ballroom GH

**Overview & Orientation**

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

**Thursday and Friday, Presentations 2 and 159**

7:15 a.m.–7:45 a.m.

Music City Center, 104 AB

**Types of Presentations**

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

- **Sessions** (60 minutes) represent a common format where the speaker relates his or her ideas to an audience. Rooms are either theater style or classroom style and vary in size.
- **Workshops** (75 minutes) are rooms set with round tables for hands-on work.
- **Bursts** (30 minutes) are presentations that focus on a specific topic or idea. Rooms are set with round tables. The goal is information sharing, conveyed quickly and succinctly.
- **Exhibitor Workshops** (60 minutes) are opportunities for exhibitors to showcase their products and services away from the Exhibit Hall. Look for the symbol indicating exhibitor workshops in the program book.

**Grade Bands**

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

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

ASSESSMENT: ELICITING AND USING STUDENT THINKING

Effective teaching of mathematics uses evidence of student thinking to assess progress toward mathematical understanding and to adjust instruction continually in ways that support and extend learning. Sessions in this strand will include, but are not limited to, determining mathematical goals, developing purposeful and varied ways to elicit student thinking, making sense of student thinking, asking meaningful questions to gain deeper insight into students’ understandings, and using what we learn about students’ mathematical reasoning to guide our instruction.

BUILDING ON STUDENTS’ STRENGTHS: PRACTICES THAT CHALLENGE, ENGAGE, EMPOWER, AND MEET THE NEEDS OF EVERY STUDENT

Sessions in this strand focus on strengths-based teaching and learning practices for engaging and empowering each and every student in an inclusive classroom. Sessions attend to the design and implementation of instruction that affirms students’ identities as humans and as authors of mathematics, challenging students to solve rigorous and worthwhile mathematical tasks that are relevant to them, amplifying each and every student’s voice and mathematical ideas, supporting collaborative classroom communities, and/or leveraging mathematics as a sense-making tool for personal and social change. Sessions may specifically address Response to Intervention (RTI), Multi-Tiered Systems of Support (MTSS), inclusion, co-teaching, multilingual education, gifted programming and instruction, and other forms of differentiation and strengths-based support strategies.

GROWING PROFESSIONALISM AND DEVELOPING ADVOCACY

Whether participating in your first professional learning community (PLC) or refining teaching practices to create more inclusive classrooms, we all have something to share and something to learn from each other. How do you establish and maintain professionalism in your classroom, in your interactions with families and colleagues, in your social media presence, and in your community? This strand focuses on developing your professional voice as a teacher and advocate for students and fellow teachers, as you evolve throughout your educational career.

BEYOND THE CLASSROOM WALLS: ACCESS, EQUITY, AND EMPOWERMENT

The Access, Equity, and Empowerment strand will focus on policies, strategies, and practices that support or impede access to the highest quality of mathematics teaching and learning with fair and impartial opportunity. This strand will look within and beyond the classroom to interrogate systemic barriers and explore ways to intentionally disrupt and dismantle them. Sessions may address policy, advocacy, attitudes, practices such as teacher or student tracking/de-tracking, and belief systems to empower all teachers and students as knowers and doers of mathematics.

BUILDING MATHEMATICAL KNOWLEDGE FOR TEACHING

Building your mathematical knowledge for teaching involves both content and pedagogical knowledge. Sessions in this strand will take a participant through the decisions a teacher makes to teach a given topic. Sessions include, but are not limited to, using and connecting mathematical representations, building procedural fluency with a foundation on conceptual understanding, developing effective questioning strategies, using technology to visualize and understand mathematical ideas, enhancing teacher content knowledge, and finding ways to articulate a mathematical content or practice focus and/or a progression across grade levels.

ENHANCING MATHEMATICAL THINKING THROUGH READING, WRITING, SPEAKING, AND LISTENING

Students regularly communicate in math class, but how can teachers ensure that this communication is mathematically purposeful? Sessions across this strand will explore how to encourage students to engage in expressive and receptive discourse in ways that further their mathematical thinking as well as how teachers can plan for this important aspect of instruction. Participants will explore various ways to strengthen students’ abilities to prove, justify, explain, explore, argue, and reason through the utilization of various strategies, tools, and/or technology.

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

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

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

**What you’ll walk away with:**

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

**Tips for a Rewarding Regional Conference & Exposition**

- Access the conference app for program and speaker information, to connect with other attendees, and to share your feedback. Visit [nctm.org/confapp](http://nctm.org/confapp).
- Get available speaker handouts at [nctm.org/planNashville](http://nctm.org/planNashville).
- Keep the conversations going, connect with other attendees and speakers, access and share session resources, ask questions, and more in the MyNCTM online community at [my.nctm.org/Nashville2019](http://my.nctm.org/Nashville2019).
- If you’re experiencing the conference with your colleagues, attend different presentations and share your learnings with one another after the conference.
- Silence your cell phone during presentations.
- Be safe! Remove your name badge when you leave the conference facilities.

**Registration and Access to Presentations**

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

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

**For Your Child’s Safety**

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

**Information Booth**

The Information Booth will be in the Music City Center. Staff can answer your questions about Nashville 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 Music City Center Security.

**First-Aid Station**

There will be a first-aid station at the Music City Center during the conference. If you need medical services while in Nashville, 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/planNashville](http://nctm.org/planNashville). Handouts will be available one month after the conference.

**Exhibits**

Make time to visit the Exhibit Hall. The hours allow ample opportunity to explore, test, and purchase resources for your classroom. You’ll also be able to meet product specialists, get fresh ideas, and watch demonstrations on how products will help you in your classroom. We’ve provided dedicated time to visit the exhibits; no presentations will take place from 12:00 p.m. to 1:00 p.m. on Thursday and Friday. Check out the map of the Exhibit Hall on page 75 and the list of exhibits on pages 76–78.

**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 or see the Program Updates.
General Information

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

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

Visit nctm.org/confapp 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/planNashville to check it out.

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

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

Program Updates
Visit nctm.org/nashville2019 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 Tennessee 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 Tennessee 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 Tennessee are not valid for this Regional Conference.*

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

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

- Get free take-home activities, sample journals, and more at Member Services. Take the opportunity to update your membership information and learn about your benefits.
- Discover available funding and resources to support you in your career and professional development through the Mathematics Education Trust (MET).
- Check out Classroom Resources and learn about NCTM’s collection of lesson plans, problems, and more.
- The Networking Lounge is a prime location to meet up with colleagues between presentations! Whether you want to make connections with fellow conference goers, exchange teaching tips, or catch up with friends, you’ll find a comfortable spot in the Networking Lounge. Relax and Recharge—make use of charging stations while you reflect with colleagues.
- Learn about NCTM’s Professional Development offerings. Information will be available about NCTM’s new Professional Learning Services and upcoming Regional Conferences and Annual Meetings.
HIGHLIGHTS
Opening Session: Looking Back and Moving Forward: Writing Your Mathematics Teaching Story!, 1

GET SOCIAL
Stay informed and get connected with attendees by using #NCTMNash19 on social media.

Conference App
nctm.org/confapp

Twitter
@NCTM

Instagram
@NCTM.math

Facebook
facebook.com/TeachersofMathematics

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

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

FIRE CODES
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1

**Opening Session: Looking Back and Moving Forward: Writing Your Mathematics Teaching Story!**

**General Interest Session**

In this inspirational and interactive opening session, mathematics teachers Timothy D. Kanold and Jessica Kanold McIntyre engage in a unique and spirited father/daughter exchange. They reveal insights about significant and memorable moments in their personal and professional careers, and how those special moments shape the story of your professional life--one day, one month, one school season, one career at a time.

They bring a humorous focus to moments of building their own mathematical knowledge for teaching, and they reveal a more serious awareness of the social injustices caused by lack of student access and agency in K-12 mathematics. They will also share their story of growing professionalism through the power of collective teacher efficacy as mathematics teachers and leaders. They challenge you to find your personal and collective teacher voice as a way to solve the complex problems you face every day--this will validate, elevate, and reconnect you to your work as a teacher of mathematics. They will also help you to reflect on your past moments and use them to shape the eventual story your mathematics teaching life will tell. Come join us!

**Timothy Kanold**

Twitter: @tkanold

The Center for Teaching and Learning, Lodi, California

**Jessica Kanold-McIntyre**

Educational Consultant

Nashville Omni, Legends Ballroom
**HIGHLIGHTS**

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

**REGISTRATION HOURS**

7:00 a.m.–5:00 p.m.

**EXHIBIT & NCTM CENTRAL HOURS**

9:00 a.m.–5:00 p.m.

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2  Regional Conference Overview & Orientation
   General Interest Session
   Whether you’re new to NCTM or a seasoned veteran, there is something for you at the conference! Hosted by members of the Board of Directors, this session will show you how to maximize your overall conference experience. Learn all the new, innovative aspects this 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.
   Beth Kobett
   Twitter: @bkobett
   Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; Stevenson University, Maryland
   Music City Center, 104 AB

3  BUILD  Integrating Daily Math Routines in a Primary Classroom
   Pre-K–2 Session
   When used strategically, daily math routines have the potential to contribute to classrooms where students are engaged in rich mathematical communication. This session will explore how educators use daily routines to improve mathematics learning and teaching in K-2 classrooms.
   Judi Privitt
   Columbia Public Schools, Missouri
   Lindsey Ragsdale
   Columbia Public Schools, Missouri
   Music City Center, 209 A

4  BUILD  Beyond Worksheets: Developing Number Sense and Fluency through Classroom Routines
   3–5 Session
   My students don’t have any number sense! Do you find yourself saying this over and over? Let’s look at some routines that can be adapted for grades 3-5 to help students think more deeply about how numbers work and what operations mean, as they develop fluency with basic facts and understand rational numbers. And . . . how to get started tomorrow!
   Linda Gojak
   Twitter: @LindaGojak
   Past President, National Council of Teachers of Mathematics, Reston, Virginia; ORIGO Education, Kent, Ohio
   Music City Center, 101 AB
8:00 A.M.–9:00 A.M.

8  BUILD

Statistical Literacy Should Not Be Optional
8–10 Session
Recognizing the increasing need for statistical and quantitative thinking and reasoning in the world today, NCTM’s Catalyzing Change identifies the use of mathematics and statistics to make sense of the world as a central purpose in teaching mathematics. How can we make this vision a reality in the contexts in which we teach and why is it important?
Gail Burrill
Past President, National Council of Teachers of Mathematics, Reston, Virginia; Michigan State University
Music City Center, 207 AB m E

9  ENHAN

Implementing Reading and Writing Activities to Help Students Make Sense of Precalculus and Calculus
10–12 Session
The presenter will share reading, writing, and group activities designed to help precalculus and calculus students build conceptual understanding through collaboration and conversation. Graphic organizers, anticipation guides, categorization tables, active comprehension activities, and other reading/writing instructional strategies will be shared.
Tena Roepke
Ohio Northern University, Ada
Nashville Omni, Broadway Ballroom AB

10  BUILD

Using Technology to Rethink the Analysis of Polynomial Functions through Conjectures and Reasoning
10–12 Session
Why can’t my students apply the theorems associated with analyzing polynomials? Do my students really need to know these theorems? During this session, participants will examine these questions and investigate strategies that incorporate the use of technology intended to develop students’ conceptual understanding and visualization of polynomials.
Stephen Bismarck
Twitter: @stephenbismarck
University of South Carolina Upstate, Spartanburg
Music City Center, 205 BC

11  ASSESS

A Timed Race vs. Running for the Record
Coaches/Leaders/Teacher Educators Session
In this session, participants will “celebrate the process of thought, de-emphasize speed and value strategic reasoning” (Newton). Research shared will illustrate preservice perspectives of what can be learned about a child’s thinking from a timed test vs. a math running record. The samples provided will encourage participants to offer insights as well.
Monica Cavender
Quinnipiac University School of Education, Hamden, Connecticut
Music City Center, 207 CD

12  BUILD

Flexibility: More Than a Teacher Trait
General Interest Session
Flexibility is necessary for procedural fluency! We want students to look at problems like 308 - 299 or 3(y - 5) - 2(y - 5) = 0, and notice something about the values that lead to an efficient strategy choice. We will explore routines and questioning strategies to help your students become flexible thinkers, and thereby stronger mathematicians.
Jennifer Bay-Williams
Twitter: @JBayWilliams
University of Louisville, Kentucky
Music City Center, 202

13  BUILD

The Good, the Bad, and the Ugly: The Language of Math
General Interest Session
How has the Standard for Mathematical Practice of precision changed how teachers of math use language and vocabulary in their daily practice? This session will take a critical look at math vocabulary and phrases, both new and old, that are commonly used in classrooms today. Come ready to laugh, ponder, reflect, and renew!
Pamela Halpern
Salem State University, Massachusetts
Music City Center, 104 CDE

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

14 BOSS
The Mathlexia Odyssey: Exploring Math through Colorful Eyes
General Interest Session
An engaging and colorful presentation that explores math through the eyes of students with various learning styles. Those with learning disabilities often say “I suck at math” when in fact they actually have highly intuitive and strong mathematical abilities. Alternative approaches to math are essential and lead ultimately to math success for all!
Lori Kiteala
Twitter: @mathlexia
The Mathlexia Odyssey, Montreal, Quebec
Music City Center, 103 C

15 BEYOND
Who’s Afraid of the Big Bad Wolf? Understanding and Combating Math Anxiety
General Interest Session
Math anxiety is a pervasive cultural phenomenon that undermines student performance and reduces teaching self-efficacy among math teachers. This presentation will summarize the current state of the research on math anxiety, revealing important insights into its causes, and providing evidence-based strategies for mitigating its negative effects.
David Schroerlucke
Bellarmine University, Shepherdsville, Kentucky
Music City Center, 103 C

8:00 A.M.–9:15 A.M.

16 BUILD
A Clear Vision for Utilizing Number Lines
Pre-K–2 Workshop
Research shows a strong relationship between students’ understanding of number lines and math achievement. In this interactive session for K–5 educators, participants will explore the progression from number tracks to number lines and engage in games and activities to improve understanding of relative position, magnitude, and operations.
Debi DePaul
Twitter: debi_depaull
ORIGO Education, Gig Harbor, Washington
Music City Center, 103 C

15.1 EW
Bridges Intervention—Delivering Clear and Systematic Instruction
General Interest Exhibitor Workshop
Searching for an effective K–5 intervention resource with built-in assessments and frequent progress monitoring? Discover how Bridges Intervention uses the power of visual models to reach struggling students. Organized by content rather than grade, each session includes warm-ups, lessons, and practice pages focused on key standards.
The Math Learning Center
Salem, Oregon
Music City Center, 101 E

17 BOSS
Hungry for More? Exploring Social Issues with Mathematics
Pre-K–2 Workshop
Explore the possibilities for connecting math, literature, and social justice to develop ways to think about authentic interdisciplinary activities. You will interact with picture books to design lessons to engage students in conversations about topics such as hunger or poverty while integrating authentic mathematical tasks and content.
Anita Wager
Vanderbilt University, Nashville, Tennessee
Isaac Nichols-Paez
Vanderbilt University, Nashville, Tennessee
Music City Center, 201

18 BUILD
Using Content Progressions to Build Coherence across Grade Levels
3–5 Workshop
To help students build on prior experiences, it is important for all teachers within the school to have a common overall vision of mathematics learning. In this session, we will explore how teachers from across grade levels can use common strategies and structures in order to create a coherent set of learning experiences for students.
Julie James
Twitter: jjames12278
University of Mississippi - Center for Math and Science Education
Alice Steimle
University of Mississippi - Center for Math and Science Education
Music City Center, 201

Thursday

ASSSESS
Assessment: Eliciting and Using Student Thinking

BOSS
Building on Students’ Strengths

EW
Exhibitor Workshop

ADVOC
Growing Professionalism and Developing Advocacy

NCTM 2019 Regional Conference & Exposition
8:00 A.M.—9:15 A.M.

19 BOSS
Walk the Number Line for Research-Based Results! Let’s Go!
3–5 Workshop
The single most important visual for use in the elementary classroom is the number line. Learn how to use this tool for growth patterns, multiples, factors, rounding, digital root, and simplifying fractions. We will construct multiple models for alternative algorithms for regrouping, making change, and elapsed time.

Kim Sutton
Twitter: @Creative_Math
Creative Mathematics, Arcata, California

Linda Wallace
Creative Mathematics, Arcata, California

Music City Center, 102

20 BUILD
What’s Your Angle on Angles? Exploring a Progression in Geometry
3–5 Workshop
Do your students struggle to “see” angle relationships? Are protractors perplexing? This session will provide lessons and hands-on activities to illuminate angle measurement understanding, explore application of angle relationships in middle school, and connect this understanding to transformational geometry and high school trigonometry.

Elizabeth Peyser
Curriculum Associates, Wichita, Kansas

Music City Center, Broadway Ballroom JK

21 BOSS
Math Game Centers for Middle Years: Using Centers to Differentiate
6–8 Workshop
How do you make math fun, challenging, and anxiety free, while including all students at all ability levels? Math game centers open the door to math success. Learn how to help your students by providing math centers that are set up to accommodate their needs while giving you the opportunity to provide individual/small group instruction.

Stephanie Garcia
Twitter: @boxcarsmissouri
Box Cars and One Eyed Jacks, Edmonton, Alberta

Music City Center, 209 BC

22 ASSESS
Rich Tasks + Optimism + Perseverance = Growth Mindset in the Mathematics Classroom
6–8 Workshop
Do your students have a growth mindset? Participants will learn about the brain science that supports growth mindset along with taking part in fun and engaging rich tasks that will help them convert their classroom to one that is filled with growth mindsets. Take home activities that you can use next week!

Sandra Miller
Twitter: MrsMathMiller1
Penrridge School District, Perkasie, Pennsylvania

Nashville Omni, Cumberland 5/6

23 BUILD
Coding for Critical Thinking and Problem Solving
8–10 Workshop
Help your students build critical thinking and problem solving skills through basic programming using the TI-Nspire and TI-Innovator technology. Starting with 10 minutes of coding, you will experience activities that spark student interest in mathematics, engineering, and robotics. This session is for the novice programmer.

Charlene Atkins
University of Central Missouri, Warrensburg

Music City Center, 105

24 BUILD
Connected Thinking in Algebraic Functions through Transformations
8–10 Workshop
Does your algebraic curriculum lack a continuous flow of connected ideas? Would you like several new resources, with and without technology, to enhance student learning? Here, you will explore several transformation-based tasks and projects spanning multiple algebraic functions so your students may develop stronger and deeper function relationships.

Jayna Moffit
Lincoln Junior High School, Bentonville, Arkansas

Music City Center, 205 A
8:00 A.M.—9:15 A.M.

25 BUILD
Empowering Students to Build Connections between Multiple Representations
8–10 Workshop
What type of tasks support students in building connections between representations naturally? Come experience a sequence of tasks that support students as they move flexibly between representations of mathematical situations. We will explore linear, exponential, polynomial, inverse, and logarithmic functions.
Sharon Rendon
Twitter: @srendon2
CPM Educational Program, Summerset, South Dakota
Nashville Omni, Cumberland 1/2

26 BUILD
Apple of My l(ntegral)
10–12 Workshop
Technology allows new and innovative ways to explore calculus. This session will focus on a hands-on, technology-infused project used in AP Calculus, focused around volumes of solids of revolutions. Participants will collaborate to find volumes of selected fruit using calculus, and use free digital tools like Flipgrid for peer assessment.
Steve Fuguet
Twitter: @MrFuguet
Hatboro-Horsham High School, Pennsylvania
DJ Fromal
Hatboro-Horsham High School, Pennsylvania
Music City Center, 103 AB

27 BUILD
Understanding Inverse Functions through Data Modeling and Transformations with Technology
10–12 Workshop
This workshop will focus on how to develop understanding of inverse functions and operations in algebra through transformations of data and linear modeling in real-world applications. Focus functions will be linear, quadratic, and exponential, using inverse functions for each (e.g., square root, logarithmic) using technological tools strategically.
Jeremy Zelkowski
The University of Alabama, Northport
David Dai
Alma Bryant High School, Irvington, Alabama
Music City Center, 104 AB

9:30 A.M.—10:30 A.M.

28 BOSS
Be Both Author and Illustrator of Mathematical Understanding
Coaches/Leaders/Teacher Educators Workshop
We want every learner in our care to be BOTH the author and illustrator of their mathematical understanding. Explore how to deepen understanding, promote productive struggle, and increase flexibility by using and connecting mathematical representations. Providing multiple pathways to success invites diverse learners to contribute ideas to the conversation.
Jill Gough
Twitter: jgough
Trinity School, Atlanta, Georgia
Music City Center, 101 CD

29 BUILD
Examining the Progression of Addition and Subtraction: Moving Students Toward Fluency
Pre-K–2 Session
In this session, we will define what it means to be fluent with addition and subtraction, explore the three aspects of fluency (accuracy, flexibility, and efficiency), and examine the learning progression from pre-K to grade 2. We will learn instructional strategies to engage all students through concrete, representational, and abstract activities.
Monica Fridetzky
South Central CORE - TN Department of Education, Shelbyville, Tennessee
Music City Center, 207 AB

30 BUILD
Selecting and Implementing High-Level Mathematics Tasks in Early Elementary Grades
Pre-K–2 Session
Participants will solve elementary mathematics tasks with differing levels of rigor and share solutions strategies. We will then explore the Task Analysis Guide (Smith and Stein 1998) and classify the tasks according to the guide. Finally, participants will discuss effective strategies to keep the level of rigor high when implementing tasks.
Audrey Bullock
Austin Peay State University, Clarksville, Tennessee
Rebecca Darrough
Austin Peay State University, Clarksville, Tennessee
Music City Center, 207 CD
9:30 A.M.–10:30 A.M.

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

32 BUILD
Melodies to Master Core Math Concepts
6–8 Session
Math teachers can use earworms—songs that are forever stuck in your head—to promote retention of key math skills and concepts. Catchy jingles for integer operations, solving inequalities, measure of center, slope, and more will be shared. Participants will have the opportunity to develop original earworms for their classroom.
Donna Sanborn
Crawford Co R1, Bourbon, Missouri
Nashville Omni, Broadway Ballroom E

33 BOSS
Strategies Used to Promote Discourse in Mathematics Classrooms
6–8 Session
Do you struggle with student engagement in your lessons? Participants will learn about and practice many study team and teaching strategies, participate in doing math problems that model these strategies, and connect the strategies to the Standards for Mathematical Practice.
Gerry Long
Twitter: @GerryCLong
CPM Educational Program, Olive Branch, Mississippi
Nashville Omni, Broadway Ballroom AB

34 ENHAN
Investigations with Right Triangles to Deepen Students’ Conceptual Understanding
8–10 Session
Rich, open-middle tasks offer opportunities for students to explore concepts with depth. We explore a series of investigations with right triangles designed to improve students’ conceptual understanding of geometry and proof. Ideas for how technology can enhance these tasks are offered along with multiple solution paths and student work samples.
Holly Anthony
Tennessee Tech University, Cookeville
Stephanie Kolitsch
University of Tennessee at Martin
Jackie Vogel
Austin Peay State University, Martin, Tennessee
Music City Center, 106 C

35 ASSESS
Portfolios In Action: Transforming Assessment to Include Student Learning and Reflection
8–10 Session
"Do you value student’s growth as a mathematician?" Step into the journey of how we incorporated a portfolio, interview, and investigation into our final evaluation process for grade 9 students with an emphasis on mathematical processes and multiple representations. Learn from our challenges and strategies, and leave with ready-to-use resources.
Melissa Baker-Cox
Twitter: @mrs_bakerm
Limestone District School Board, Kingston, Ontario, Canada
Lauren Anderson
Limestone District School Board, Kingston, Ontario, Canada
Music City Center, 101 AB

36 BUILD
Tantalizing Tents: Modeling with Mathematics
10–12 Session
One 4 by 6 note card, one fold, one provoking question: Which tent provides the most room? The many possibilities for this tent are easy to physically create and examine, yet the one “best” tent is challenging to determine and justify. The result is mathematical modeling, analysis, and learning!
Robert Mann
Western Illinois University, Macomb
Music City Center, 104 CDE
9:30 A.M.—10:30 A.M.

37 **ASSESS**
Leading Learners to Level Up: Establishing and Using Goals to Focus Learning
Coaches/Leaders/Teacher Educators Session
Effective mathematics teaching begins with establishing goals to focus learning. We want students to persevere and to show their work and [insert content goal]. But what if they can’t yet? When success pathways are visible, learners are empowered to reach for the next level in their learning. How might teachers use leveled learning progressions and

Jill Gough
Twitter: jgough
Trinity School, Atlanta, Georgia

*Nashville Omni, Broadway Ballroom CD*

38 **BEYOND**
A Social Justice Approach to Mathematics Instruction: Time to Make a Change and Make a Difference!
General Interest Session
In addition to academic instruction, one of a classroom teacher’s most important roles is to help students develop the critical thinking, collaboration, and self-reflection skills necessary to foster a better society. Learn how to set the stage for social change, and provide a venue to promote and accelerate new ideas through a social justice approach!

Beatrice Moore-Luchin
Twitter: @BeaLuchin
Banneker Association, Houston, Texas

*Music City Center, 205 BC*

39 **BOSS**
Incorporate an Equity-Based Research Theme in High-Quality Lesson Study
General Interest Session
Infuse equity into the lesson study process to provide traditionally underserved students access to high-quality and rigorous mathematics and to shift teachers’ approaches to incorporating best practices for these students. This session will supply examples of how to incorporate and infuse equity into high-quality lesson study.

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

*Music City Center, 202*

40 **ASSESS**
It’s Ours to Reason Why . . . The Right Question Changes Everything
General Interest Session
Anyone who’s ever sat in a classroom knows that teachers ask lots of questions throughout the course of the day. In this session, we’ll look at how the questions we ask and tasks we assign to students can catalyze thinking, reasoning, and problem solving skills while maximizing opportunities for learning, doing, and understanding mathematics.

Cynthia Bryant
Twitter: @MoMathgal
Greater Ozarks Cooperating School Districts, Springfield, Missouri

*Music City Center, 209 A*

41 **ASSESS**
Improving Students’ Cognitive and Non-Cognitive Mathematics Experiences with Data Anaysis
Research Session
The study focuses on importance of collecting and analyzing data to improve elementary school students’ cognitive mathematics learning and non-cognitive experiences and teacher effectiveness. Teachers identify a problem in students’ performance, design instruction, collect and analyze data, and based on findings change their teaching practices.

Rupam Saran
Medgar Evers College, City University of New York, Great Neck

*Music City Center, 103 C*

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

CPM Education Program
Elk Grove, California

*Music City Center, 106 A*

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

**41.2 **
**BUILD**
**Leave the Math, Change the Language**
6–8 Exhibitor Workshop
Access is everything. Learn ways to invite every student to the table with language strategies that lower the barrier to access. Experience these strategies based on research from NCTM and the Council of the Great City Schools ELL framework. Take tools back to your classroom that provide equity and access for all learners.

Pearson
Hoboken, New Jersey

**Music City Center, 101 E**

9:45 A.M.–11:00 A.M.

**42 **
**BUILD**
**Customizing a Math Lesson for Language Development Needs**
Pre-K–2 Workshop
In this workshop, our focus will be on honing Eureka Math lessons to reduce the barriers for students with language development needs that cause unproductive struggles. Participants will experience ways to support these students as they learn mathematics, such as using manipulatives, fluency activities, and scaffolding whole group discussion.

Andi Misemer
Great Minds, Washington, District of Columbia

**Music City Center, 101 CD**

44 **BUILD**
**When My 2 + 3 Isn’t the Same as Your 2 + 3**
Pre-K–2 Workshop
“I Don’t Get What They Want Me To Do!” is a refrain we often hear from students about word problems. Many times, they don’t know which operation to choose when making sense of a problem. Learn to recognize features of different problem situations and practical strategies to support students as they make sense of the different categories.

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

Kimberly Morrow Leong
George Mason University, Fairfax, Virginia

Linda Gojak
Past President, National Council of Teachers of Mathematics, Reston, Virginia; ORIGO Education, Kent, Ohio

**Music City Center, 101 CD**

45 **BOSS**
**Deeper, Not Faster: Using Tasks to Provide Extension and Challenge for Gifted Students**
3–5 Workshop
Gifted students need quality instruction to grow mathematically. In this session, teachers will consider the selection and transformation of tasks to target the needs of advanced learners, creating learning experiences with depth and challenge while honoring focus, coherence, and rigor.

Joseph Roicki
Twitter: @roickij1
Great Minds, Redmond, Washington

**Music City Center, 205 A**

46 **BOSS**
**Math with Dignity: Customizing Instruction for Students with Significant Content Gaps**
3–5 Workshop
How do we create instruction for students who have significant content gaps that allows them to learn the skills they need while still having the dignified experience of successfully engaging with the same math as their peers? This workshop will demonstrate process that helps build a bridge from their last point of success to grade-level content.

Laura Marie Coleman
Twitter: @teach2abilities
Great Minds, Washington D.C.

**Music City Center, 102**

43 **ASSESS**
**Understanding Place Value: When 97 Is More Than 90 + 7**
Pre-K–2 Workshop
What are the big ideas students need to understand to have a deep and flexible knowledge of place value? How can teachers assess and support the development of such understanding? What does it look and sound like? We will examine student thinking via work samples, dialogue, and activities that promote a deeper understanding of place value in K-2.

Karen Economopoulos
Twitter: inv3_math
TERC, Cambridge, Massachusetts

Megan Murray
TERC, Cambridge, Massachusetts

**Music City Center, 102**
9:45 A.M.–11:00 A.M.

47 BOSS
Engaging All Students and Empowering Growth Mindset through High-Quality Measurement Tasks
6–8 Workshop
The purpose of this session is to provide strategies that will ensure all students can learn mathematics and at high levels. Participants will experience measurement inquiry tasks to inspire growth mindset among middle school learners. We will also discuss attributes of high-quality tasks and their potential impact on the development of mindset.
Martha Parrott
Northeastern State University, Broken Arrow, Oklahoma
Nashville Omni, Cumberland 3/4

48 BUILD
Think about It: Selecting and Posing Problems So Students Will Want to Solve Them
6–8 Workshop
What motivates students to want to solve a problem? How you pose a problem can have an impact. Participants will discuss the factors that affect motivation, learn how to turn ordinary exercises into extraordinary problems, solve great problems posed by others, and consider strategies for using any problem to its full potential.
Patrick Vennebush
Twitter: @pvennebush
Discovery Education, Falls Church, Virginia
Music City Center, 105

49 ASSESS
Creating Equitable Problem-Solving Instruction through Discourse
8–10 Workshop
Have you ever wondered why some students feel helpless when problem solving? Come learn how student-centered discourse can be leveraged to support productive struggle and persistence in problem solving. Experience equitable problem-solving instruction and leave with strategies and student-centered activities that support all learners.
Sam Rhodes
Twitter: @srhod
William & Mary, Williamsburg, Virginia
Allison Crisher
Virginia Beach City Public Schools
Music City Center, 201

50 ASSESS
Using Classroom Discourse as a Tool for Formative Assessment
8–10 Workshop
A set of research-based moves that support eliciting and assessing student thinking and the kinds of tasks that foster meaningful discourse will be considered through two cases of mathematics teaching. Ways in which discourse influences students’ opportunities to learn rich mathematics and how it ties to formative assessment will be considered.
Michelle Cirillo
Twitter: UDMichy
University of Delaware, Newark
Music City Center, 104 AB

51 BUILD
Climate Change: Math Activities Using Data from Al Gore’s Climate Project and the U.S. Climate Report
10–12 Workshop
Obtain the most current climate change data, causes, and consequences. Model this shocking data obtained from attending the 3-Day Climate Reality Training (see the PowerPoint slides). Students become aware of this important issue with applied mathematics. Obtain all materials: data, student worksheets, teacher notes, and detailed step-by-step blogs.
Tom Reardon
Twitter: @tomreardon3
Fitch High School / Youngstown State University, Poland, Ohio
Music City Center, 209 BC

52 BOSS
U.S. Mail: Merging Transformational Geometry, Algebra, and Probability through Modeling
10–12 Workshop
Transformational geometry, algebra, probability, and modeling all merge in the everyday context of canceling a stamp on an envelope. Participants will experience a multiperson model which will support an intuitive understanding of these abstract principles and have an activity ready for classroom use.
Tammy Jones
Twitter: @TLJCG
TLJ Consulting Group, Lebanon, Tennessee
Mary Martin
Middle Tennessee State University, Murfreesboro
Nashville Omni, Cumberland 1/2
Building Mathematical Thinkers

Bridges in Mathematics is a comprehensive PK–5 curriculum that equips teachers to fully implement the national standards in a manner that is rigorous, coherent, engaging, and accessible to all learners. Bridges blends direct instruction, structured investigation, and open exploration.

Stop by booth 208 to learn more, or join our sessions:

- Engage & Differentiate: Place Value Games for K–5   Oct. 3, 1–2:15 p.m in Room 102
- Arrays, Properties, and Practices   Oct. 3, 4–5 p.m in Room 104 CDE

mathlearningcenter.org/bridges
9:45 A.M.–11:00 A.M.

53 BEYOND
Toward Emancipatory Teaching: Using Letter Writing in Math Class
Coaches/Leaders/Teacher Educators Workshop
We will explore the potential for emancipatory teaching through the practice of letter writing in mathematics classrooms. We will discuss how students’ introduction and check-in letters have informed our own teaching and learning. In particular, we have found that letter writing allows us to build on students’ assets and strengths.
Victoria Curd
Twitter: @mathSever
Metropolitan Nashville Public Schools, Tennessee
Musie Yosef
Metropolitan Nashville Public Schools, Tennessee
Christopher Collins
Metropolitan Nashville Public Schools, Tennessee

Music City Center, 103 AB

54 New and Preservice Teachers Workshop
General Interest Workshop
Find answers to your questions on topics such as classroom management, parents, motivation, and keeping your sanity. Connect with other new teachers, learn from experienced professionals, and find resources to engage you and your students. You might even win a prize!
David Barnes
National Council of Teachers of Mathematics, Reston, Virginia

Nashville Omni, Broadway Ballroom GH

11:00 A.M.–12:00 P.M.

55 BOSS
Hanging Math Out to Dry: Using Primary Clotheslines to Build Number Sense
Pre-K–2 Session
Do you know that number line appears in the standards more than 26 times? This workshop is designed to explore how the clothesline (an open number line) creates the opportunity for all students to engage in discourse that promotes the development of number sense. Participants will investigate how this tool is utilized in K-grade 2.
Stacy Zagurski
West Covina USD, Upland, California
Kristen Acosta
West Covina USD, Upland, California

Music City Center, 101 AB

56 ENHAN
The Nuts and Bots of Geometry and Coding in the Lower Grades
Pre-K–2 Session
Experience K-2 geometrical content through sorting and coding tasks. These tasks contain both hands-on and technological components. Multiple SMPs are embedded in the tasks. This interactive session will provide teachers with activities that can immediately enhance the classroom.
Jeremy Winters
Middle Tennessee State University, Murfreesboro
Kristin Winters
Discovery School, Murfreesboro, Tennessee
Dovie Kimmins
Discovery School, Murfreesboro, Tennessee

Music City Center, 106 C

57 BUILD
Revamp Your Instruction Strategies That Support Understanding and Fluency with Multiplication!
3–5 Session
In this session, participants will evaluate their instruction and assessment strategies related to students’ understanding and fluency with multiplication. Participants will examine the order in which they teach multiplication facts, the instructional strategies, tasks, and activities they use and how they assess students’ understanding and fluency.
Jennifer Yantz
Austin Peay State University, Clarksville, Tennessee
Audrey Bullock
Austin Peay State University, Clarksville, Tennessee
Rebecca Darrough
Austin Peay State University, Clarksville, Tennessee

Music City Center, 205 BC

58 BEYOND
Teaching Social Justice Mathematics: Looking Beyond Task Selection
3–5 Session
Teaching mathematics with a social justice lens entails more than matching mathematical content to tasks. It honors the culture and identity of the students. Interrogation of teacher bias and beliefs is also necessary. In this session, a classroom teacher and a teacher educator will lead participants through this process.
Marian Dingle
Twitter: @DingleTeach
DeKalb County School System, Stone Mountain, Georgia
Naomi Jessup
Georgia State University, Atlanta

Nashville Omni, Broadway Ballroom AB
62 BEYOND
Creating a Math Classroom of #DreamChasers
10–12 Session
The 2014 Kentucky High School Teacher of the Year will share how she helps all students in her rural, low socioeconomic school chase their dreams with a growth mindset. The strategies will focus on establishing culture, engaging instruction, and leading the learning as teachers to empower all students to call themselves mathematicians.

Joanna Stevens
Twitter: @MrsStevensMath
Lincoln County High School, Lancaster, Kentucky

Music City Center, 209 A

63 BUILD
Developing Mathematical and Statistical Knowledge for Teaching—Let’s SEE it Happen!
10–12 Session
We will feature a research-supported way of understanding how mathematical and statistical knowledge for teaching (MKT/SKT) develops. We will complete activities that ask for teacher responses to student thinking during the act of teaching. Session participants will reflect on their personal MKT/SKT and consider specific ways to grow in this area.

Jeremy Strayer
Twitter: @jeremystrayer
Middle Tennessee State University, Murfreesboro

Alyson Lischka
Middle Tennessee State University, Murfreesboro

James Haynes
Middle Tennessee State University, Murfreesboro

Music City Center, 207 AB

64 BEYOND
End of High School Placement Exams: Fostering Middle and High School Collaborative Partnerships
Coaches/Leaders/Teacher Educators Session
This session shares the development of our middle and high school mathematics teacher partnerships. We will share how collaboration within our PLC has helped develop an articulated curriculum, assessment, and informed placements. We will discuss our common vision for “Portrait of a Mathematically Proficient Student” and the end of placement exams.

Darshan Jain
Twitter: @djain2718
Adlai E. Stevenson High School, Lincolnshire, Illinois

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

Music City Center, 104 CDE
11:00 A.M.—12:00 P.M.

65 **BEYOND**
Engaging the Disengaged Student
General Interest Session
This session will discuss some of the reasons students are disengaged in our math classes—identities of low achievement, low socioeconomic backgrounds, distracting home lives, and others. Practical strategies (with specific examples) of how to engage these students in mathematical learning will be shared. Group discussions will be invited.

Todd Abel
University of Central Arkansas, Conway
Adam Abel
Washington County (VA) Schools, Abingdon, Virginia
Ashley Lamar
Washington County (VA) Schools, Abingdon, Virginia

Music City Center, 103 C

66 **President’s Address:** Catalyzing Change: Initiating Critical Conversations in Mathematics Teaching and Learning
General Interest Session
The National Council of Teachers of Mathematics formed three writing teams at the early childhood/elementary, middle school, and high school levels with the intent to initiate the critical conversations needed to address issues in school mathematics. The Catalyzing Change series focuses on recommendations in school mathematics with the purpose of initiating critical conversations for improving mathematics teaching and learning in school mathematics. This talk is intended to initiate critical conversations based on the key recommendations from the Catalyzing Change series.

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

Nashville Omni, Broadway Ballroom F

67 **BOSS**
Rehumanizing Mathematics Learning through Culturally Responsive Mathematics Teaching
General Interest Session
Learn from the efforts of teachers in several districts to enact elements of culturally responsive math teaching as a way to increase student interest and success, while engaging students’ cultural, linguistic, and community knowledge. You will examine examples of math tasks, discuss instructional practices, and reflect on our work as teachers of math.

Mark Ellis
Twitter: EllisMathEd
California State University, Fullerton

Music City Center, 207 CD

11:30 A.M.—12:00 P.M.

67.1 **ExW**
Creating Mathematical Understanding through Hands-On Activities with EAI Education Manipulatives
3–5 Exhibitor Workshop
How can I help my students better understand math, rather than trying to memorize a series of steps or rules? Manipulatives help your students better understand concepts through hands-on learning. Come discover these powerful tools in developing conceptual understanding, including sample manipulatives to take back to your school and use next week.

EAI Education
Oakland, New Jersey

Music City Center, 101 E

68 **BUILD**
Doing Mathematics with Language Arts and Science!!! Oh My!!!
Pre-K–2 Burst
During this session, participants will experience two hands-on mathematical activities while integrating children's books and science.

Maria Diamantis
Southern Connecticut State University, New Haven

Nashville Omni, Cumberland 3/4

69 **BUILD**
Manipulatives That Won’t Break the Bank
Pre-K–2 Burst
We know that manipulatives help students grasp mathematical concepts—plus they are fun! Professional mathematics manipulatives can be expensive, especially if you are trying to equip an entire classroom. You can find effective and affordable manipulatives that will spark student learning and not break the bank in the process.

Deborah Cantrell
University of Tennessee Chattanooga

Music City Center, 209 BC
11:30 A.M.–12:00 P.M.

**70 BUILD**

**Fractions: From Misunderstanding to Deep Understanding**

_3–5 Burst_

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

Debi DePaul  
Twitter: debi_depaul  
ORIGO Education, Gig Harbor, Washington  

**Music City Center, 102**

**71 BEYOND**

**Integrating Mathematics and Language Arts: Writing Short Stories with Fractions**

_3–5 Burst_

Once students have been introduced to basic operations with fractions, these can be integrated into creative writing experiences. In this session, we will share a lesson in which students have the opportunity to strengthen their understanding of fraction operations while exercising their creativity by writing a short story that includes fractions.

Sister Cecilia Anne Wanner  
Middle Tennessee State University, Murfreesboro  
Sarah Bleiler-Baxter  
Middle Tennessee State University, Murfreesboro  

**Music City Center, 205 A**

**72 BUILD**

**Bridging the Gap Between Neuroscience and Mathematical Practices**

_6–8 Burst_

This session will explore, from a neuroscientific perspective, practices of mathematics instruction for students with math difficulty. Emphasis will be placed on the neurocognitive processes and emotional functioning that affect the learning of mathematics.

Dawn Pilotti  
Currey Ingram Academy, Brentwood, Tennessee  
Mary Ragsdale  
Currey Ingram Academy, Brentwood, Tennessee  

**Nashville Omni, Cumberland 5/6**

**73 ENHAN**

**Reasoning and Proof in Grades 6-8**

_6–8 Burst_

Participants in this session will learn how to engage students in grades 6-8 in reasoning and proof. Students should prove in all content and grade levels as recommended by NCTM and the Common Core State Standards. In this session, participants will explore the key-word format as a strategy for engaging primary and middle grade students in proof.

Tye Campbell  
The University of Alabama, Tuscaloosa  
Eugene T Glover Jr  
The University of Alabama, Tuscaloosa  

**Music City Center, 104 AB**

**74 BUILD**


_8–10 Burst_

Algebraic computation is a valued mathematical skill. In this presentation, I first introduce teaching quadratic equations. Then, using this as an example, I compare math curriculums in the U.S. and China, discussing how the U.S. lacks intensive algebraic practices and the setbacks this has caused. Finally, I suggest methods of improvement.

Yuxi Wen  
Vanderbilt University, Nashville, Tennessee  

**Nashville Omni, Broadway Ballroom GH**

**75 BOSS**

**Chem-E-Cars in the Classroom**

_8–10 Burst_

A chem-e-car is a water bottle with wheels, powered by a chemical reaction of baking soda and vinegar, connecting chemistry, engineering, and mathematics. We will provide videos, handouts, and lessons for several topics (e.g., graphing ordered pairs, modeling, trig functions). Come race a chem-e-car and learn about impact on student learning.

Lauren Clark  
Twitter: @DrJenevaClark  
University of Tennessee, Knoxville  
Tabatha Rainwater  
Austin East Magnet High School, Mascot, Tennessee  
Franziska Grill  
Austin East Magnet High School, Mascot, Tennessee  

**Music City Center, 105**
11:30 A.M.–12:00 P.M.

76 BUILD
Translations & Scale Changes on Data Sets: Effects on Descriptive Statistics
10–12 Burst
We’ll take a look at a classroom-ready exploration that asks students to make conjectures about what happens to basic, descriptive statistics under translations and scale changes. Technology connections will also be explored.
Thomas Fox
University of Houston Clear Lake, Texas
Music City Center, 201

77 ASSESS
Mighty Misconceptions: Identifying and Addressing Error Patterns to Deepen Student Understanding
Coaches/Leaders/Teacher Educators Burst
In this session, we will work together to analyze student work samples by identifying error patterns. With these specific patterns in mind, we will uncover specific strategies for addressing the underlying misconceptions through conceptual understanding, procedural fluency, and mathematical reasoning. Many resources will be shared.
Jennifer Meadows
Twitter: meadowsjr007
Tennessee Tech University, Cookeville
Leslie Suters
Tennessee Tech University, Cookeville
Music City Center, 103 AB

78 ENHAN
Facilitating Classroom Discourse with Desmos
General Interest Burst
Desmos Classroom Activities leverage technology to empower teachers and make student thinking visible. In this session, participants will use the new snapshot feature to digitally select, sequence, and craft connecting questions around student work to promote rich discussion. This session is led by a Desmos fellow and is for any experience level.
Robert Janes
Twitter: @MrJanesMath
East Hartford Public Schools, Connecticut
Nashville Omni, Broadway Ballroom JK

79 ENHAN
Literacy Strategies in the Mathematics Classroom
General Interest Burst
Literacy strategies DO have a place in the mathematics classroom! This session goes beyond utilizing picture books to aid in teaching math concepts. Learn how to apply literacy strategies to support students’ understanding and learning of mathematics vocabulary and concepts. Leave with ideas and strategies to implement tomorrow!
Jettie Payne
Christian County Public Schools, Hopkinsville, Kentucky
Nashville Omni, Cumberland 1/2

80 ASSESS
Using Alternative Assessments to Better Evaluate Students’ Current Understanding
Higher Education Burst
Alternative assessments used by the presenter in collegiate mathematics classes of all levels will be shared. Advantages and challenges will be discussed along with advice for implementing alternative assessments.
Brandon Banes
Lipscomb University, Nashville, Tennessee
Music City Center, 101 CD

1:00 P.M.–2:00 P.M.

81 ENHAN
Developing Mathematical Discourse through Hands-On Practice in Pre-K-2
Pre-K–2 Session
You’ve heard it said that “If they can’t talk about, they don’t understand it,” within the context of ELA instruction. How does that translate to math instruction, portfolios, and mathematical writing? Come and learn with us about how to implement hands-on, talking structures within your classroom to develop accurate mathematical discourse.
Jessica Willings
Twitter: @WillingsJess
Jefferson County Schools, Mascot, Tennessee
Courtney Naill
Jefferson County Schools, Mascot, Tennessee
Amanda Lay
Jefferson County Schools, Mascot, Tennessee
Music City Center, 205 BC

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

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1:00 P.M.–2:00 P.M.

**82 BUILD**
Practice Makes Permanent: Improving Instruction through Deliberate Practice
Pre-K–2 Session
The shift of focus means that teachers must have a deeper understanding of mathematical concepts to effectively instruct mathematics in the classroom. By understanding the progression of a mathematical concept, participants will engage in a deliberate practice routine to deliver the components of a math lesson.

*Jeremy Centeno*
Great Minds, Panama City Beach, Florida
*Nashville Omni, Broadway Ballroom AB*

**83 BEYOND**
Community-Based Mathematics Instruction: Adjusting Curriculum for Culturally Responsive Teaching
3–5 Session
Elementary mathematics instruction is ineffective if teaching practices adhere strictly to the curriculum-based textbook. Textbooks are written for the general classroom, as it is nearly impossible for student culture to be represented. This presentation will demonstrate how to adjust mathematics curriculum to fit cultural needs of students.

*Eugene T. Glover, Jr*
Twitter: @EugeneTGloverJr
The University of Alabama, Tuscaloosa
*Tye Campbell*
The University of Alabama, Tuscaloosa
*Music City Center, 207 AB*

**84 ENHAN**
Making Sense of Word Problems with the 3 Reads Routine
3–5 Session
The 3 reads is an instructional routine to support students in entering and thinking about a problem. It directly supports the Standards for Mathematical Practice of “making sense of problems and “persevering in solving them.” In this session, you will experience the routine and discuss examples of implementing it in the elementary classroom.

*Daniel Ilaria*
Twitter: @DrIlaria
Chester Springs, Pennsylvania
*Music City Center, 207 CD*

**85 ENHAN**
Statistics in the Middle
6–8 Session
We will analyze data by looking at box plots, dot plots, and least squares regressions lines. We will use the data to answer inference questions. Let’s talk statistics in middle school.

*Alice Carson*
Twitter: @aliceinmathland
Powell High School, Knoxville, Tennessee
*Nashville Omni, Broadway Ballroom F*

**86 BUILD**
Building Mathematical Knowledge for Teaching
Proof in Geometry
8–10 Session
A pedagogical framework and sample tasks for introducing proof in secondary geometry will be shared. This framework includes a targeted, research-based list of subgoals aimed at preparing students to productively engage with proof. Findings related to student outcomes in classrooms where lessons guided by this framework were taught will be shared.

*Michelle Cirillo*
Twitter: UDMichy
University of Delaware, Newark
*Music City Center, 209 A*

**87 ENHAN**
Utilizing Online Tools to Tell a Statistical Story
8–10 Session
Statistics is about storytelling—we’ll explore digital tools that help students build connections between data and the underlying, sometimes hidden, stories they tell and be brave in their written expression. Experience Desmos Activity Builder for Stats and PollEverywhere through a learner’s eyes, and ask “What’s Going On In This Graph?”

*Robert Lochel*
Twitter: @bobloch
Hatboro-Horsham High School, Pennsylvania
*Music City Center, 104 CDE*
1:00 P.M.–2:00 P.M.

**88 BUILD**
GeoGebra Does THAT? Doing Statistics and Data Analysis in GeoGebra
10–12 Session
GeoGebra—widely used in algebra and geometry classes—has a robust set of statistics tools. In this session, you will learn how GeoGebra can be used to develop quantitative literacy in statistics or AP Statistics through exploratory data analysis, creating dynamic data and regression displays, and conducting inference procedures and simulations.
Steve Phelps
Twitter: @giohio
Madeira High School/ Madeira City Schools, Cincinnati, Ohio
Music City Center, 202

**89 ADVOC**
Learning from Friends, Colleagues, and Strangers
10–12 Session
How do we help ourselves grow as educators? Especially after five, ten, or twenty years of practice? In this session, attendees will learn how to improve their instructional practice through observing other classroom teachers (and themselves) in real life and digitally. Learn how to build a community of trust for valuable feedback and support.
Megan Dubee
Twitter: @megandubee
Academy of the Holy Names, Tampa, Florida
Music City Center, 103 C

**90 BEYOND**
Contemporary Women Mathematicians: Their Contributions, Struggles, and Successes
General Interest Session
This presentation will feature short biographies of the lives and work of contemporary mathematicians, who just happen to be women. The stories of these women give mathematics a human face and show a wide variety of backgrounds, ethnicities, and career choices. The women are interesting people and ones with whom our students can identify.
Loretta Kelley
Kelley, Petterson, and Associates, San Francisco, California
Music City Center, 101 AB

**91 NCTM Author Panel Talks**
General Interest Session
Be part of the lively discussion with NCTM authors as the big ideas from their books are shared. Books included are: Everything You Need for Mathematics Coaching, K-12; The Mathematics Lesson Planning Handbook, 3-5; and Reimagining the Mathematics Classroom.
Mark Ellis
Twitter: @EllisMathEd
California State University, Fullerton
Beth Kobett
Twitter: @bkobett
Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; Stevenson University, Eldersburg, Maryland
Jenny Bay-Williams
University of Louisville, Kentucky
Music City Center, 106 C

**92 ASSESS**
Who’s Asking the Questions in Math Class? Using Students’ Curiosity to Understand Their Thinking
General Interest Session
Even though we want students to be curious about mathematics and how it applies in our world, most students and adults believe math class is a place where they’re given answers to questions they’ve never asked. Learn how to inspire students to ask their own questions and use their curiosity to gain insights into their thinking and understanding.
Tim Hudson
Twitter: @DocHudsonMath
DreamBox Learning, Bellevue, Washington
Music City Center, 101 AB

**93 ENHAN**
Math and English: Enemies or Friends
Higher Education Session
We will look at how research and writing can be used in math classes to the benefit of the students, and not just as an extra assignment. We will look at examples from different assignments in different types of math classes. We will also look at an offshoot of this idea where the student submits a video to a particular assignment.
Gary Hall
Lipscomb University, Nashville, Tennessee
Music City Center, Broadway Ballroom CD
1:00 P.M.—2:00 P.M.

93.1 **ENHAN**
Rate of Change: Algebra to Calculus
10–12 Exhibitor Workshop
Rate-of-change is a concept that students encounter several times through the course of their middle and high school math classes. How can we build comprehension of the concept instead of memorizing an equation? In this session, we will explore rate-of-change through several applied contexts to develop the concept for students.

**Texas Instruments**
Dallas, Texas

Music City Center, 106 A

1:00 P.M.—2:15 P.M.

94 **BUILD**
Developing Mathematical Ideas in the K-2 Curriculum with Bee Bots
Pre-K–2 Workshop
Come and meet Bee Bot—a friendly, easy-to-operate robot that engages students in learning math. We will present ideas for using Bee Bots to teach standards in the K-2 curriculum, with videos of them in action in the classroom. Free resources will be shared to bring this learning back to your classroom to excite your students.

**Jamie Price**
East Tennessee State University, Johnson City

**Ryan Nivens**
East Tennessee State University, Johnson City

Nashville Omni, Broadway Ballroom JK

95 **BUILD**
Meanings, Manipulatives, and Math Diagrams: Monitoring to Ensure the 3Ms Match
Pre-K–2 Workshop
Experience connections between various meanings of the four operations and manipulatives/math diagrams to model them. Contextual problems from K-3 will be the basis for guiding participants to see how monitoring student’s work is critical for these connections. Educators leave with a more internal eye on ensuring representations match meanings.

**Jeremy Winters**
Middle Tennessee State University, Murfreesboro

**Cindy Cliche**
Murfreesboro City Schools, Tennessee

**Dovie Kimmins**
Murfreesboro City Schools, Tennessee

Music City Center, 103 AB

96 **ENHAN**
When Literacy Meets Mathematics: Increasing Understanding through Reading, Writing, and Speaking
Pre-K–2 Workshop
Engaging students in purposeful mathematics communication requires being intentional about the literacy strategies used to bring it to life. Using the Mathematics Literacy Mat from Prince George’s County Public Schools (Maryland), participants will learn how to effectively integrate reading, writing, and speaking strategies into their mathematics classes.

**Karen Riley Jeffers**
Twitter: @Karen_RJeffers
Prince George’s County Public Schools, Upper Marlboro, Maryland

**Donicka Herod**
Prince George’s County Public Schools, Upper Marlboro, Maryland

**Nina Jacks**
Prince George’s County Public Schools, Upper Marlboro, Maryland

Music City Center, 101 AB

97 **BOSS**
Engage and Differentiate: Place Value Games for K-5
3–5 Workshop
Utilize hands-on activities to engage students and develop conceptual understanding around the Number Operations & Place Value learning progressions. Develop strategies to build a community of mathematical thinkers, promote discourse, incorporate visual models and reflect on the Standards for Mathematical Practice. Leave with ideas to use in your classroom tomorrow!

**Lori Bluemel**
Math Learning Center, Chandler, Arizona

**Jennifer Ranum**
Math Learning Center, Windsor, Colorado

Music City Center, 101 CD
99 ENHAN
Linking Language and Learning in Mathematics
6–8 Workshop
Given the language-rich expectations of the current standards, students need opportunities to practice communicating their own thinking and understanding each other’s way of thinking. They need opportunities to practice receptive and productive language functions. We will learn Mathematics Language Development routines that serve that purpose.
Harold Asturias
Lawrence Hall Of Science, Berkeley, California
Music City Center, 201

100 BUILD
Making Algebra Visual
6–8 Workshop
We will explore how we use manipulatives and models to assist our students in developing their algebraic thinking. We will focus on areas such as writing expressions, creating equations, and solving equations (including systems) through a conceptual and visual manner before focusing on algorithms and symbolic manipulation.
Jenni McCool
University of Wisconsin-La Crosse
Ashlee LeGear
University of Wisconsin–River Falls
Erick Hofacker
University of Wisconsin–River Falls
Music City Center, 205 A

101 BOSS
Making Middle School Mathematics Accessible to English Learners and Diverse Learners
6–8 Workshop
We examine strategies to support English learners and students with diverse learning needs in understanding mathematics and mathematical language, and in engaging in mathematical discourse. Participants will leave with strategies to implement in their own classrooms.
Sarah Warner
WestEd, Nashville, Tennessee
Nashville Omni, Broadway Ballroom GH

102 BUILD
Hands-On Elementary Symmetry: Rotate and Reflect in 3D
8–10 Workshop
Deepen your understanding of symmetry by expanding the concept to 3D. Explore reflection and rotation of simple and exotic solids using models, mirrors, and plastic rods. Translate your new insights into classroom practice and discourse. Elaborate on mathematical and practical consequences of the results.
Aniceta Skowron
Geometro, Ancaster, Ontario, Canada
Music City Center, 209 BC

103 BOSS
Making Algebra 3-D Real
8–10 Workshop
A main purpose of algebra is to develop functions that explain, model, and solve real-life situations. Participants will be involved in 3-D situations encouraging students to manipulate variables, record data, form graphs, develop functions, and solve problems with those functions. Situations include Fish Pond, Bungee Barbie, Walk, and Filler-Up.
David Ewing
University of Central Missouri, Warrensburg
Nashville Omni, Cumberland 3/4

104 BUILD
Exploring Conic Sections with Multiple Representations
10–12 Workshop
Participants will explore the conic sections through hands-on patty paper constructions and construction using technology. This workshop will review some of the best ways to model the relationships between the characteristics of the conic sections. Participants will leave with their own hands-on models.
Sheila Horstman
Clarksville Montgomery County School System, Tennessee
Music City Center, 105

Membership questions? We’ve got answers! Visit Member Services in NCTM Central.
Mathematical Thinking: From Assessment Items to Challenging Tasks
This compilation of problem-based activities encourages students to engage in productive struggle and deep thinking.
STOCK #14854

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

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

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

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

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

105 BUILD
Using Primary Sources from the History of Mathematics to Engage All Students
10–12 Workshop
Come join us as we read texts from the masters (e.g., Euler, Fermat, Pascal) and work together on interesting mathematical problems that they developed. See how mathematics is interrelated, especially with the rich connections between geometry and algebra. Discuss the use of narrative form as curricula and the humanistic nature of mathematics.
Mark Koester
MSU Denver, Colorado
Tayna Camargo
MSU Denver, Colorado
Nashville Omni, Cumberland 5/6

106 BOSS
Math for All: Universal Design for Learning in a Standards-Based Classroom
Coaches/Leaders/Teacher Educators Workshop
Comprehension of mathematics can be improved for all students by utilizing principles of Universal Design for Learning in a unified approach of curriculum planning and pedagogy. The presentation will show how support practices traditionally utilized for accommodations to specialized subpopulations can benefit the entire spectrum of learners.
Naomi Church
Twitter: @nchurch11
Florida Diagnostic and Learning Resources System, Tamarac
Music City Center, 104 AB

2:30 P.M.–3:30 P.M.

107 BUILD
Subitizing Serving as a Foundation for Fluency in K-Grade 2
Pre-K–2 Session
In this session, participants will learn how to use subitizing activities in their classrooms to support students’ development of fact fluency, essential work in K-grade 2. Participants will learn about the different types of subitizing and will explore a progression of strategies and activities that support the learning of addition and subtraction.
Jennifer Yantz
Austin Peay State University, Clarksville, Tennessee
Audrey Bullock
Austin Peay State University, Clarksville, Tennessee
Music City Center, 207 AB

108 BUILD
Using Tape Diagrams to Solve Word Problems
Pre-K–2 Session
This session will focus on using the model of a tape diagram to solve word problems. This model gives all students an entry point to solve a variety of word problem. The tape diagram supports all math operations which makes it a vital tool/model for students to have in their tool kits.
Andi Misemer
Great Minds, Prescott Valley, Arizona
Music City Center, 207 CD

109 ASSESS
Let’s Number Talk about It: Joining Children’s STEM Literature and Number Talks to Advance Numeracy
3–5 Session
How do you engage young students in numerical literacy learning that is both meaningful and challenging? Using children’s STEM literature is a dynamic way to pique student interest and promote critical thinking in number sense. Then, follow-up discussions with number talks allow students to test hypotheses and develop mathematical reasoning.
Nicholas King
University of Tennessee, Knoxville
Nick Kim
University of Tennessee, Knoxville
Music City Center, 103 C

110 ENHAN
Making Sense of Mathematics through Models, Discussion, and Discovery
3–5 Session
How do we help our students discover important concepts about numbers, properties, and operations? What questions do we pose? How do we guide math talk to inspire deep understanding? Explore simple investigations that encourage students to model ideas, verbalize patterns, debate insights, articulate rules, and make sense of number concepts.
Susan O’Connell
Twitter: @SueOConnellMath
Quality Teacher Development LLC, Millersville, Maryland
Music City Center, 104 CDE
2:30 P.M.–3:30 P.M.

111 **BUILD**

Is This Vending Machine FUNCTIONing Correctly?

6–8 Session

Understanding what a function is and isn’t is foundational to the concept of function. In this session you will engage with a GeoGebra applet that develops an initial understanding and definition of function. Participants will view and discuss eighth-grade students’ work with the applet. Bring a laptop or tablet to engage with the applet!

_Allison McCulloch_
Twitter: @awmcculloch
University of North Carolina at Charlotte

_Jennifer Lovett_
Middle Tennessee State University, Murfreesboro

_Lara Dick_
Middle Tennessee State University, Murfreesboro

Nashville Omni, Broadway Ballroom E

112 **BUILD**

Want to Develop Fluency with Functions? Algebrafy Patterns!

6–8 Session

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.

_Thomas Beatini_
Twitter: @BeatiniTom
Union City Board of Education, New Jersey

Music City Center, 202

113 **BEYOND**


8–10 Session

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

_Kristin Weller_
P. K. Yonge Developmental Research School at the University of Florida, Gainesville

_Taylor Bainter_
P. K. Yonge Developmental Research School at the University of Florida, Gainesville

Music City Center, 106 C

114 **BUILD**

Six Strategies for Developing Both Conceptual Understanding and Procedural Fluency in Algebra

8–10 Session

Too often students can “do” in the moment but later cannot recall which procedure to use. Developing robust concept images and analyzing the advantages and disadvantages of different ways of thinking about the mathematics can facilitate both flexible procedural knowledge and deep understanding of ideas such as linearity or solving an equation.

_Gail Burrill_
Past President, National Council of Teachers of Mathematics, Reston, Virginia; Michigan State University

Music City Center, 101 AB

115 **ASSES**

Create Assessments with Desmos!

10–12 Session

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

_Julie Reulbach_
Twitter: jreulbach
Cannon School, Mooresville, North Carolina

Nashville Omni, Broadway Ballroom F

116 **ADVOC**

Sharing Our Classrooms: Professional Learning through Reflective Peer Observation

Coaches/Leaders/Teacher Educators Session

Does peer observation play a part in your current teaching practice? What might mathematics teachers gain through observing one another? We describe a “Teaching Trios” model for professional learning where teams of three teachers engage in reflective observation of one another’s teaching, attending to NCTM’s eight Mathematics Teaching Practices.

_Sarah Bleiler-Baxter_
Twitter: @bleiler_sarah
Middle Tennessee State University, Murfreesboro

_Sister Cecilia Anne Wanner_
Middle Tennessee State University, Murfreesboro

Nashville Omni, Broadway Ballroom AB
2:30 P.M.–3:30 P.M.

117  
**Designing Innovation and Engineering Creativity with Grants for Mathematics Educators**  
*General Interest Session*  
What are the Mathematics Education Trust (MET) resources that can help you to be a leader in mathematics teaching and learning? Collaborate on improving your classroom, school, and state by using MET grants. We will look at which grants you can apply for and provide tips on how to write powerful proposals.  
Suzanne Mitchell  
Trustee, MET Board of Trustees  
*Music City Center, 209 A*

118  
**Revitalize the Role of Homework by Using Technology to Enhance Productive Struggle**  
*General Interest Session*  
There is struggle and then there is productive struggle. Homework without feedback and support can offer the wrong kind of struggle. Learn how to get on the road to better homework by adding an online tool (one that connects with Google Classroom) to your homework routine that can give just the right amount of feedback, for both teachers and students.  
Cristina Heffernan  
Twitter: @CristinaHeff  
Worcester Polytechnic Institute, Massachusetts  
*Nashville Omni, Broadway Ballroom CD*

119  
**Sciatics: An Interdisciplinary Approach to Developing Equitable and Engaging Math Practices**  
*General Interest Session*  
SciMatics is an interdisciplinary approach, one that is teacher-designed to increase student engagement in math through science and literacy. Every student teaches their peers standards-aligned SciMatics lessons. These and other shared practices establish equity, student voice and ownership, and support ELLs and SWDs while challenging gifted students as well.  
Jamilah Seifullah  
Twitter: @jam4less  
NYCDOE - Highland Park Community School, Brooklyn, New York  
Natasha Scott  
NYCDOE - Highland Park Community School, Brooklyn, New York  
Lindsay White  
NYCDOE - Highland Park Community School, Brooklyn, New York  
*Music City Center, 205 BC*

2:45 P.M.–4:00 P.M.

120  
**Improve Fluency with Math Talks and Number Strings**  
*Pre-K–2 Workshop*  
Timed tests don’t teach fluency, but what does? Learn to use number strings to improve student efficiency, accuracy, and flexibility and math talks to improve student math language and sharing of ideas. Teach additive strategies to help students gain confidence in math. Every student can be a math expert!  
Jesse Michmerhuizen  
Twitter: @jmichmer  
hand2mind, Vernon Hills, Illinois  
Brittany Goerig  
hand2mind, Vernon Hills, Illinois  
*Music City Center, 105*

121  
**The Joy of Counting**  
*Pre-K–2 Workshop*  
Number sense starts with counting. When counting is fun, a person will count more often and will find different ways to count. The speaker will discuss how games and activities can be used to encourage young children to count and to make connections for addition, subtraction, multiplication, and division.  
Shelley Fenton  
Volunteer State Community College, Gallatin, Tennessee  
*Nashville Omni, Cumberland 1/2*
2:45 P.M.—4:00 P.M.

122 **BOSS**

Providing Every Child an Opportunity to Speak: Discontinuing the Practice of Raising Hands

3–5 Workshop

Do you have students who always raise their hand? Do you have students who never raise their hand? Do you have students who are afraid to respond to posed questions? This session will provide participants with effective strategies to facilitate rich mathematical conversations, pose purposeful questions, and engage ALL student learners.

Kristopher Childs
Twitter: DrKChilds
Houghton Mifflin Harcourt, Lubbock, Texas

Music City Center, 103 AB

123 **ENHAN**

Salsa Garden: Using Measurement and Multiplication in a PBL Experience

3–5 Workshop

Are you looking for ways to create meaningful math experiences for all learners? Problem-Based Enhanced Language Learning takes the essential components of problem-based learning and infuses them with the intentional use of language. Collaboratively, students utilize mathematical language to research, brainstorm, discuss, and present findings.

Silvia Aparicio
Arizona State University, Phoenix

Music City Center, 104 AB

124 **ENHAN**

Empowering Your Students through Productive Mathematical Discourse

6–8 Workshop

In this session, we discuss how we use the 5 Practices for Orchestrating a Productive Math Discussion with teachers and students. We will first engage the audience in a rich mathematical task and role-play how to implement the 5 Practices. Teams will then be provided a rich math task and student work in order to participate in using the 5 Practices themselves.

Kathryn Ernie
University of Wisconsin—River Falls
Erick Hofacker
University of Wisconsin—River Falls

Music City Center, 101 CD

125 **BUILD**

Using Paper Folding to Visualize and Understand Mathematics

6–8 Workshop

An effective teacher helps students visualize and understand mathematical terms and concepts. An excellent method for doing so is paper folding. Through such activities, students can be challenged to explore, research, and write about mathematical topics. Participants in this session will learn paper-folding activities that can be used to explore polygons, area, volume, and other geometry concepts.

Carroll Wells
Lipscomb University University, Nashville, Tennessee

Music City Center, 102

126 **BUILD**

Mathematical Circuits: A Engaging Format for Teachers to Hone Their Content Knowledge

8–10 Workshop

How do you become a better math teacher? Do more math! Participants will learn about the circuit format, work several circuits, and begin the writing process. This format is great for teachers to hone their skills before they present a topic or before they pick tasks for their class. Teachers will leave the session energized and full of new ideas.

Virginia Cornelius
Twitter: @virgecornelius
Lafayette County Schools, Oxford, Mississippi

Music City Center, 205 A

127 **BOSS**

Using Student-Centered Routines to Increase Engagement

8–10 Workshop

Immerse yourself in the results of improvement science in the math class. In this workshop, you will see and experience what student centered learning looks, feels and sounds like in an algebra 1 classroom. The routines that you will explore and experience have been refined over the course of a school year based on student engagement and outcomes.

Kerri Rogers
The Metropolitan Career and Technical Center, Providence, Rhode Island
Debbie Kowalczyk
Wahconah Regional High School, Dalton, Massachusetts

Nashville Omni, Broadway Ballroom GH
2:45 P.M.—4:00 P.M.

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

Allan Bellman
Twitter: abellman17
University of Mississippi, Oxford

Kayton Hosket
University of Mississippi, Oxford

Music City Center, 201

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

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

Philip Dituri
FiCycle, New York, New York

Nashville Omni, Cumberland 3/4

130 BOSS
Using Trigonometry to Solve the World Water Crisis for Women and Children
10–12 Workshop
This is a full unit in trigonometry where students are introduced to the world water crisis and how it most affects women and children. Students use their knowledge of trigonometry to “solve” a water crisis in a town and bring clean sanitation to a remote island. Students develop problem-solving skills, numerical literacy, and global awareness.

Courtney Fox
Clermont Northeastern High School, Batavia, Ohio

Nashville Omni, Broadway Ballroom JK

4:00 P.M.—5:00 P.M.

131 BEYOND
Invisibly Yet Intentionally Redefining Math Intervention
Coaches/Leaders/Teacher Educators Workshop
In this interactive workshop, a team of a math interventionist/ coach, a grade 2 teacher, and a district curriculum coordinator will model how math intervention is transforming in their district. Videos and student work will provide evidence of growth in student and teacher agency as mathematicians.

Susan Hogan
Twitter: @hogansmath
Maranacook Area School, Readfield, Maine

Nancy Harriman
Maranacook Area School, Readfield, Maine

JoAnn Greves
Maranacook Area School, Readfield, Maine

Nashville Omni, Cumberland 5/6

132 BUILD
Planning for Teaching Mathematics to English Language Learners in the General Education Classroom
Coaches/Leaders/Teacher Educators Workshop
Participants will learn how to create differentiated lessons based on cognitive demand and contextual support that will increase the potential for ELLs to acquire academic literacy in math. This practice will also reduce the linguistic difficulties associated with mathematical discourse while managing to avoid the many pitfalls that can occur during instruction.

Darlyne De Haan
Bridgeton Public Schools, Galloway, New Jersey

Music City Center, 209 BC

133 ASSESS
Formative Assessments for Early Number Relationships
Pre-K–2 Session
In this session, participants will examine activities that use manipulatives to develop early number relationships, and they will determine how to assess students’ understanding through observation. Several observation tools will be discussed.

Jo Cady
University of Tennessee, Knoxville

Nashville Omni, Broadway Ballroom F
4:00 P.M.—5:00 P.M.

134 BUILD
Arrays, Properties & Practices
3–5 Session
The major clusters in the grades 3-5 standards depend on a conceptual understanding of, and procedural fluency with, multiplication and division situations. Using concrete, representational, and abstract models, with the properties of operations with area/arrays, you will be prepared to nurture students in the Standards for Mathematical Practices.

Pia Hansen
Math Learning Center, Cheyenne, Wyoming
Jennifer Christensen
Math Learning Center, Salem, Oregon

Music City Center, 104 CDE

135 BUILD
Making the Most of Meaningful Models
3–5 Session
Versatile models help teachers to articulate topics across elementary grades. Participants will discover practical activities using number lines, dot arrays, and area representations that can be used to teach major ideas involving basic facts, whole numbers, fractions, decimals, and computation strategies with deep conceptual understanding.

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

Music City Center, 209 A

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

Susan Chadaz
Box Elder School District, Brigham, Utah

Music City Center, 103 C

137 ENHAN
Procabulary: A Proactive Approach to Vocabulary in the Math Classroom
6–8 Session
Math assessments are about more than just the math. Our students’ ability to answer our questions or perform our tasks directly correlates to their ability to read our test questions and instructions. Come take a look at time-friendly (and fun!) ways to address both academic and domain-specific vocabulary in the math classroom.

Christie McElhinney
Twitter: @cj_mcelhinney
Ozark Public Schools, Missouri
Lisa Broadbent
Ozark Public Schools, Missouri

Music City Center, 202

138 BOSS
School-Wide Inquiry-Based Learning via Project-Based Learning: Solving the Problems of Your School
8–10 Session
Through a project-based learning approach, learn to design a school-wide inquiry-based learning unit that centers around an issue that students hope to solve in the school. Teachers will guide students according to individual class standards. Come see successful projects and various methods for students to gather data, design, and enact the study!

Nicholas King
University of Tennessee, Knoxville
Julie Steimer
University of Tennessee, Knoxville

Music City Center, 202

138 ASSESS
Inquiry Approaches, Exploration, and the Value of Student Errors in Math
10–12 Session
Inquiry approaches to math can produce student growth beyond content learning, including improved engagement, communication, and persistence. In this session, we will discuss ways to set up an environment that supports exploration, how to find and develop activities, and how student errors become useful in advancing student understanding.

Gregory Macklem
University of Notre Dame, South Bend, Indiana

Music City Center, 106 C
140 BUILD
The Look of Logs
10–12 Session
How can we help students understand what logarithmic functions are and how they fit into the structure of mathematics in terms of inverses and applications? By starting with a challenging task, explore how students create a conceptual understanding of logarithms that can lead to stronger procedural fluency.

Fred Dillon
Twitter: fdizzle1955
Institute For Learning, Strongsville, Ohio

Music City Center, 101 AB

141 BEYOND
Summer of Algebra: A City’s Attempt at Math Equity for Students Entering High School
Coaches/Leaders/Teacher Educators Session
Too many students do not have access to high-quality algebra instruction and curricula in eighth grade, especially in urban districts. Learn how teachers and district specialists in Chicago addressed this issue by starting and expanding an algebra course for incoming ninth-grade students who want to access high-level (AP) classes before graduation.

Martha Mulligan
Twitter: @marthamulligan
Chicago Public Schools, Illinois
Chris Nho
Chicago Public Schools, Illinois

Music City Center, 205 BC

142 ASSESS
Assessment Interviews: Moving beyond Timed Tests
General Interest Session
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
Twitter: @susanloveless23
Rutherford County Schools, Murfreesboro, Tennessee

Music City Center, 207 CD

143 ADVOC
Liar’s Bingo with the Math Teachers’ Circle of Middle Tennessee
General Interest Session
The Math Teachers’ Circle of Middle Tennessee is a community of K-16 math educators who come together to engage in mathematical play. Come see what we are all about; engage with us in a low-floor, high-ceiling task, Liar’s Bingo, that explores patterns and reasoning. We will discuss why this task is a favorite for elementary to Ph.D.-level mathematicians.

Shannon Reider
Twitter: @ShannonReider
Metropolitan Nashville Public Schools, Tennessee
Teresa Dunleavy
Vanderbilt University, Nashville, Tennessee
Elizabeth Metts
Vanderbilt University, Nashville, Tennessee

Nashville Omni, Broadway Ballroom E

144 ASSESS
Online Environment to Support Formative Assessment, Instructional Planning, and Collaboration
General Interest Session
The NSF-funded EnCoMPASS project supports teachers as they collaboratively explore and analyze student work and use that work to inform instruction and generate effective feedback. We will explore our online environment scaffolds these activities and share examples teachers’ use of it.

Jason Silverman
Drexel University, Philadelphia, Pennsylvania
Valerie Klein
Drexel University, Philadelphia, Pennsylvania

Nashville Omni, Broadway Ballroom CD

145 BOSS
Using Discourse Actions to Build on Students’ Strengths: “Link” Students’ Ideas and “Press” for More
General Interest Session
Participants will explore how the discourse actions of linking and press can be used to build on students’ contributions during discussions, using tools to analyze the use of linking and press in narrative and video lessons. Participants will then consider how the use of discourse actions elevates students’ voices during mathematical discussions.

Melissa Boston
Duquesne University, Pittsburgh, Pennsylvania
Amber Candela
University of Missouri—St. Louis
Juli Dixon
University of Missouri—St. Louis

Music City Center, 207 AB
4:30 P.M.–5:00 P.M.

146 **BUILD**
**Majestic Measurement: A Family-Focused STEM Learning Event for Young Children**

Pre-K–2 Burst
Preservice teachers and families with young children benefit from a morning of STEM learning focused on measurement. Join in for ideas for your own STEM events!

Jane Baker
Tennessee Tech University, Cookeville
Jennifer Meadows
Tennessee Tech University, Cookeville

Music City Center, 201

147 **ENHAN**
**Developing the Five Strands of Mathematical Proficiency Using Four Quadrants**

3–5 Burst
This session focuses on the use of a multirepresentational graphic organizer as a tool in the development of the five strands of mathematical proficiency. An overview of its implementation and the analysis of student work samples highlight how using this organizer aligns with NCTM Process Standards and the CCSS Standards for Mathematical Practice.

Monica Merritt
Mount Saint Mary College, Newburgh, New York

Music City Center, 101 CD

148 **ASSESS**
**Inspection-Worthy Mistakes: Which? And Why?**

3–5 Burst
“Mistakes are expected, inspected, and respected!” But, are all mistakes inspection-worthy? In this session, we examine leveraging mistakes in the classroom to promote mathematical discourse and reasoning. We will discuss what makes a mistake inspection-worthy and consider three types of errors that generally represent inspection-worthy mistakes.

Lucy Watson
Middle Tennessee State University, Nashville
Elizabeth Barlow
Knox County School District, Knoxville, Tennessee
James Willingham
Knox County School District, Knoxville, Tennessee

Nashville Omni, Broadway Ballroom JK

149 **BUILD**
**Keeping the “M” in STEM: Engaging Elementary Students in Meaningful Mathematics**

3–5 Burst
Come find ideas to teach mathematics through project-based STEM activities, rather than simply using math as the tool to explore science and engineering. Teachers from a three-week STEM camp for rising third through fifth graders share their experiences and activities utilized to focus on teaching the mathematics through STEM inquiry.

Megan Burton
Department of Curriculum of Teaching, Auburn University, Alabama

Nashville Omni, Cumberland 5/6

150 **BOSS**
**Infusing Projects into the Middle School Math Curriculum**

6–8 Burst
This session explores projects that have already been implemented in grade 6-8 classrooms. Participants will experience the planning process of creating projects, discuss the benefits of project-based learning, and learn how to implement similar and new projects in to their own curricula.

Michael Hart
Lincoln Public Schools, Nebraska
Mark Holland
Lincoln Public Schools, Nebraska
Mike Masin
Lincoln Public Schools, Nebraska

Music City Center, 209 BC

151 **BUILD**
**“The 35 Game”: Build a Need for Inequalities through Play**

8–10 Burst
Participate in a competitive and engaging dice game with a hidden agenda—we are discussing inequalities! Experience the game as a learner, learn teacher prompts which develop a need for inequalities, and build a bridge to formal analysis of compound inequalities.

Robert Lochel
Twitter: @bobloch
Hatboro-Horsham High School, Pennsylvania

Nashville Omni, Cumberland 1/2
Motivating the Division of Fractions Algorithm: How Variation Pedagogy Can Help!

**Coaches/Leaders/Teacher Educators Burst**

This presentation illustrates how the ideas of variation pedagogy and learning trajectory can be used to design a series of tasks to help students develop conceptual understanding regarding a mathematical topic. A set of problems is designed using these ideas to illustrate how the division of fractions algorithm could be motivated.

**Rongjin Huang**  
Middle Tennessee State University, Murfreesboro  
**Dovie Kimmins**  
Middle Tennessee State University, Murfreesboro  
**Music City Center, 103 AB**

Culturally Relevant Teaching: Encouraging and Engaging Student Thinking

**General Interest Burst**

Culturally relevant teaching can be utilized to encourage and engage students in mathematical thinking. Come explore how you can create meaningful tasks by emphasizing unique aspects of your students’ communities and cultures, acknowledging historical perspectives, illustrating practical applications, and thereby empowering your students.

**Lucas Elliott**  
University of Louisville, Kentucky  
**Music City Center, 104 AB**

Teacher Reflection Protocol

**General Interest Burst**

In this session, we will introduce a research-based teacher reflection protocol for use in PLCs or department meetings that facilitates pre-planning, peer review, and action planning reflection phases. This session will address the ways the protocol can be optimized for math teachers, as it can be used with any level or content area.

**Emily Russett**  
Metro Nashville Public Schools, Tennessee  
**Jaydie Fay**  
Metro Nashville Public Schools, Tennessee  
**Nashville Omni, Cumberland 3/4**

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**Emily Russett**  
Metro Nashville Public Schools, Tennessee  
**Jaydie Fay**  
Metro Nashville Public Schools, Tennessee  
**Nashville Omni, Cumberland 3/4**
Supporting Teacher Candidates on Task 4 of the Elementary edTPA

Higher Education Burst

This presentation will provide teacher educators with background information for task 4 of the elementary edTPA and suggest support for teacher candidates prior to their completion of the task. An emphasis will be placed on requisite knowledge and skills for completion of the task and how they can be explicitly addressed in a methods course.

Lisa Pallett
Notre Dame of Maryland University, Baltimore

Angela Snyder
Notre Dame of Maryland University, Baltimore

Music City Center, 105

### Infinity Bar Thursday Schedule

<table>
<thead>
<tr>
<th>Time</th>
<th>I</th>
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<th>IV</th>
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<tbody>
<tr>
<td>9:30 a.m.–10:30 a.m.</td>
<td>Beth Kobett</td>
<td>Barbara Kuehl</td>
<td>Kristopher Childs</td>
<td>Lateefah Id-Deen</td>
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<tr>
<td>11:00 a.m.–12:00 p.m.</td>
<td>Jenny Bay-Williams</td>
<td>Anita Wager</td>
<td>Teresa Dunleavy</td>
<td>Mona Tonchef</td>
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<tr>
<td>12:30 p.m.–1:30 p.m.</td>
<td>Grace Kelemanik</td>
<td>Trena Wilkerson</td>
<td>Dashan Jain</td>
<td>Cynthia Bryant</td>
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<tr>
<td>2:00 p.m.–3:00 p.m.</td>
<td>Jeremy Strayer</td>
<td>Travis Lemon</td>
<td>Linda Gojak</td>
<td>Susie Hakansson</td>
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MTSU’s College of Basic and Applied Sciences, in partnership with the College of Education, offers the Doctor of Philosophy (Ph.D.) in Mathematics and Science Education, an interdisciplinary program with concentrations in:

- Biological Education
- Mathematics Education
- Chemical Education
- Interdisciplinary Science Education

mtsu.edu/mse
REGISTRATION HOURS
7:00 a.m.–2:00 p.m.

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

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

159 Regional Conference Overview & Orientation
General Interest Session
Whether you’re new to NCTM or a seasoned veteran, there is something for you at the conference! Hosted by members of the Board of Directors, this session will show you how to maximize your overall conference experience. Learn all the new, innovative aspects this 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.
Beth Kobett
Twitter: @bkobett
Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; Stevenson University, Maryland
Music City Center, 104 AB

163 BOSS Set Your Sight on Success with Small-Group Lessons: Making the Most of Guided Math
3–5 Session
Small-group lessons can be more than just whole-class lessons with fewer students. How can you make the most of this instructional format? Learn how to create differentiated lessons that specifically target the learning needs of students with a lesson plan structure that addresses gaps in background knowledge as well as additional challenge.
Laney Sammons
Twitter: @LaneySammons
Laney Sammons Consulting LLC, Theford Center, Vermont
Nashville Omni, Broadway Ballroom AB

161 BUILD Planning with Learning Progressions in Mind
Pre-K–2 Session
Many times, educators begin teaching a math lesson with very little knowledge of what came before and where students are headed. To overcome this, educators need tools to guide their own learning in order to foster math connections, build on student’s prior knowledge and foster conceptual understanding. Let’s explore K-2 learning progressions.
Danielle Sullivan
Curriculum Associates, St. Petersburg, Florida
Music City Center, 103 C

164 ASSESS If You Could Read Their Minds! Try These Problems to Make Inroads into Doing Just That
6–8 Session
Energize your classroom by encouraging your students to take risks in problem solving. REAL problems are not the same as the practice exercises they are so used to doing. By observing the dialogue that takes place while “arguing” about whose way is a “better” solution, you will easily assess their understanding of math concepts and how they think.
Nicholas Restivo
Twitter: @TweetMOEMS
MOEMS, Bellmore, New York
Nashville Omni, Broadway Ballroom F

8:00 A.M.–9:00 A.M.

162 BUILD Stop Teaching Strategies, Start Teaching Sense
Pre-K–2 Session
Too often students have been taught multiple strategies but then never use them or get them all confused. This session will investigate how we can help children develop strategies, instead of teaching them, in a manner that makes sense and lays a solid foundation which can be transferred to addition and subtraction of all numbers.
Christina Tondevold
Twitter: @BuildMathMinds
Mathematically Minded, Orofino, Idaho
AnnElise Record
Concord, New Hampshire
Music City Center, 202

166 BOSS Introducing Students to Geometric Proofs through Project-Based Learning
8–10 Session
This presentation will focus on sharing how we introduce our gifted middle school students to geometric proofs through project-based learning. We specifically focus on developing students’ abilities to write paragraph proofs, as we believe this increases the opportunity to construct interdisciplinary skills and improve students’ technical writing.
Alana Tholen
Twitter: atholen2533
University of Iowa, Iowa City
Music City Center, 106 C
8:00 A.M.–9:00 A.M.

167 **BEYOND**

*Our Algebra 1 Gradebooks Hold the Key to Equity & Access: How Assessment Systems Support De-Tracking*

8–10 Session
Grading policies are overlooked as a leading cause of inequity because the ways they disadvantage students are unintentional and hard to detect. Learn principles for creating assessment systems that improve achievement and differentiation, and hear how schools used this system to de-track algebra 1 so that all students could reach high goals.

*Tim Hudson*
Twitter: @DocHudsonMath
DreamBox Learning, Bellevue, Washington

Music City Center, 101 AB

168 **BUILD**

*Speed Trap: An Application of the Other Trig Functions*

10–12 Session
The “other” trig functions are usually “discovered” by means of applying trigonometric identities. In this session, I will show how to connect all six trig functions to their geometric definitions, model circular motion on Desmos, and provide a fertile context for secant, cosecant, tangent, and cotangent that students can use to form deep understanding.

*Vincent Panetta*
Clarke County School District, Athens, Georgia

Music City Center, 207 CD

169 **ENHAN**

*We’re All Language Learners: Advancing Academic Language Levels through the Learning Cycle*

10–12 Session
Learn to support the use of academic language by understanding language levels and how they advance through a learning cycle. Experience how academic vocabulary is built, formalized, and reinforced through a sequence of mathematical tasks that engage students mathematically and capitalize on their previous experiences.

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

Music City Center, 207 AB

170 **ADVOC**

*Taking Action with the Teaching Practices*

Coaches/Leaders/Teacher Educators Session
Want to take action with the effective Mathematics Teaching Practices and improve mathematics instruction for an entire district? Come hear about one district’s journey in providing specialized training for building level math teacher leaders and how it improved mathematics instruction and student learning for all.

*Mary Fugate*
Twitter: mrsf4math
Bradley County Schools, Cleveland, Tennessee

*Angela Epperson*
Bradley County Schools, Cleveland, Tennessee

*Sarah Gann*
Bradley County Schools, Cleveland, Tennessee

Music City Center, 205 BC

171 **BEYOND**

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

General Interest Session
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.

*W. Gary Martin*
Twitter: @wgarym
Auburn University, Alabama

Music City Center, 104 CDE

172 **BUILD**

*Planning for Productive Struggle: A Struggle Worth Pursuing*

General Interest Session
We as teachers of math also struggle at times when planning for productive struggle. How do we face those challenges? How can we develop supportive environments for planning for productive struggle? We will engage in activities and discussions related to planning for productive struggle, supporting students, and facing challenges. It is worth it!

*Trena Wilkerson*
Twitter: @TrenaWilkerson
President-Elect, National Council of Teachers of Mathematics, Reston, Virginia; Baylor University, Waco, Texas

Nashville Omni, Broadway Ballroom E
173 **BOSS**
Small Group, Big Gains: Leading Effective Small Group Instruction
General Interest Session
Strategies used for reading intervention are often applied to mathematics with unintended consequences. Make sense of strategies to facilitate small groups effectively in mathematics to ensure more equitable practices. Create a shared image of teacher and student behaviors through authentic videos of pulled small-group instruction in mathematics.

**Juli Dixon**  
Twitter: @thestrokeofluck  
University of Central Florida, Orlando

**Lisa Brooks**  
University of Central Florida, Orlando

_Nashville Omni, Broadway Ballroom CD_

174 **ENHA**
Up for Debate! Empowering Students through Argumentation in Math Class
General Interest Session
Imagine: Debate, often a staple of the humanities classroom, as an integral part of your math class! Come learn and experience ideas for creating a healthy math-debating and discussion-centered classroom that will empower and engage students of all levels. Let’s get our students constructing viable arguments and standing up to debate!

**Chris Luzniak**  
Twitter: @cluzniak  
The Archer School, Los Angeles, California

_Music City Center, 105_

175 **BUIL**
Word Problems? No Problem!
Pre-K–2 Workshop
The importance of using underlying structures, rather than key words or story-related actions to solve word problems, has found expression in CCSS. Using visual models and graphic organizers, we will experience ways to create success for our students in working with change problems, group problems, and compare problems in K-grade 2.

**Paula Muehler**  
Twitter: SumItUp1  
Math Learning Center, Salem, Oregon

_Nashville Omni, Cumberland 3/4_

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

**Becky Holden**  
Twitter: @bholding86  
Trinity School, Atlanta, Georgia

_Music City Center, 105_

176 **BUIL**
Digging Deep to Better Understand Multiplication and Division
3–5 Workshop
When students only have a basic understanding of multiplication and division, fluency as well as application to real world contexts will suffer. In this presentation, participants will explore methods, models, tasks, and games that can be used to deepen student understanding of multiplication and division.

**Kayla Rymer**  
Grundy County Schools, Altamont, Tennessee

_Music City Center, 205 A_

177 **BUIL**
Multiplication Isn’t Always Commutative: Exploring the Problems with Problem Solving
3–5 Workshop
Let us convince you! The commutative property can actually get in the way of solving word problems. Explore more meanings of multiplication and division while making sense of equal groups, area/array, and comparisons as separate problem types. Leave with strategies for better sense making, and put the commutative property in its place!

**Kimberly Morrow Leong**  
Twitter: kmorrowleong  
George Mason University, Fairfax, Virginia

**Sara Delano Moore**  
ORIGO Education, Kent, Ohio

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

_Music City Center, 209 BC_

8:00 A.M.—9:00 A.M.

Friday
8:00 A.M.–9:15 A.M.

178 **ENHAN**

**Writing Their Way to Understanding**

3–5 Workshop

Writing is a powerful tool for processing mathematical thinking. We will explore quality questioning through fraction math tasks and how to use prompts to get students to write about their mathematical thinking. Using writing as formative assessment will be addressed.

Amy Youngblood
Twitter: @EduOptimus1
EduOptimus, Nixa, Missouri

Nashville Omni, Cumberland 1/2

179 **ENHAN**

**Developing Number Sense and Reasoning One Day at a Time in Grades 3–8**

6–8 Workshop

Developing reasoning and number sense is essential to our students’ long-term success. But, we can develop these daily. This session spotlights brief, rich, and engaging activities that develop mental mathematics and reasoning. This session will provide a collection of practical, ready-to-implement routines that can be modified for grades 3–8.

John SanGiovanni
Twitter: @JohnSanGiovanni
Howard County Public School System, Westminster, Maryland

Nashville Omni, Broadway Ballroom JK

180 **BOSS**

**Empowering Students through Equitable Mathematics Pedagogy**

6–8 Workshop

In this session, we will focus on strategies that have been shown to help each and every student reason and make sense of mathematics. We will examine vignettes, video clips, and student responses to problems situated in a variety of contexts. We will also solve related problems. At least ten equitable teaching strategies will be discussed.

Marilyn Strutchens
Auburn University, Alabama

Music City Center, 103 AB

181 **ENHAN**

**Reading and Writing to Uncover Students’ Mathematical Thinking and Understanding**

6–8 Workshop

Communication through written text in math is critical to building mathematical understanding. How do we incorporate reading and writing strategies into math in a meaningful way? We will look at multiple opportunities to utilize literacy to develop a deeper mathematical understanding, give all students a voice, and engage in math practices.

Sarah Galasso
Twitter: @SarahGMath
Carnegie Learning, Anaheim, California

Nashville Omni, Cumberland 5/6

181.1 **ASSESS**

**The Building Blocks of Proportional Reasoning: More Than Just a Rote Algorithm**

6–8 Workshop

Students may be able to write and solve proportions without reasoning proportionally. We will illuminate essential understandings related to the big idea of proportional reasoning by examining the thinking of students. Participants will engage in activities appropriate for middle school students designed to access and develop these understandings.

Dovie Kimmins
Middle Tennessee State University, Murfreesboro

Jeremy Winters
Middle Tennessee State University, Murfreesboro

Music City Center, 101 CD

182 **BUILD**

**Compare and Discuss to Deepen Algebra Learning**

8–10 Workshop

Compare and Discuss is an instructional method for building students’ procedural flexibility with a foundation on conceptual understanding. This workshop will engage participants with evidence-based guidelines for effectively supporting this instructional method, including questioning strategies, and provide examples from an algebra I curriculum.

Bethany Rittle-Johnson
Vanderbilt University, Nashville, Tennessee

Music City Center, 102
Friday

**8:00 A.M.–9:15 A.M.**

183 BUILD

**Creative Activities, Strategies, and Technology to Better Prepare Your Students for the ACT and SAT**

10–12 Workshop

Get interactive activities that align directly to the types of questions that are on the ACT/SAT. Obtain proven test-taking strategies that encourage multiple solution paths. Use a graphing calculator effectively to teach deeper conceptual understanding. Students learn and retain the math better, not just score better on these high-stakes exams!

**Tom Reardon**

Twitter: @tomreardon3

Fitch High School / Youngstown State University, Poland, Ohio

_Nashville Omni, Broadway Ballroom GH_

184 ENHAN

**Finite Differences, Polynomial Modeling, and Graphing Calculators**

10–12 Workshop

In this hands-on workshop, participants will utilize the Method of Finite Differences to model data sets that fit linear, quadratic, cubic, and quartic polynomials. We will additionally show that given a finite number of terms of an integer sequence does not define a unique n-th term. The TI-84 and TI-89 handhelds will play a role in the discovery.

**Jay Schiffman**

Rowan University, Glassboro, New Jersey

_Music City Center, 201_

185 ADVOC

**Transforming Professional Learning Communities to Support Student-Centered, Problem-Based Learning**

Coaches/Leaders/Teacher Educators Workshop

Math coaches and teacher leaders will (1) evaluate their existing teacher teams; (2) deepen an understanding of student-centered, problem-based learning; (3) explore 12 collaboration vehicles for PLCs that move instructional practice forward; and (4) plan which vehicles are the best fit for their teacher teams and how to incorporate them tomorrow.

**Sharon Rendon**

Twitter: @srendon2

CPM Educational Program, Summerset, South Dakota

**Thomas Stricklin**

Salem-Keizer Public Schools, Oregon

_Music City Center, 104 AB_

**9:30 A.M.–10:30 A.M.**

186 BOSS

**Let the Students Do the Thinking! How to Empower Students to Own Their Own Learning of Mathematics**

Pre-K–2 Session

Learn manageable practices and strategies to empower young students to think, talk, and take ownership of their mathematics learning using strategies that actively and authentically engage students in problem solving.

**Kelley Fountain**

Twitter: @KelleyKFountain

Curriculum Associates, Draper, Utah

_Music City Center, 207 AB_

187 BOSS

**Using Algebra Triangles to Develop Number Sense and Problem-Solving Skills**

Pre-K–2 Session

Algebra triangles are a great way to help K–2 students develop problem-solving skills while seeing the relationships in addition number sentences (Kuhns 2006). This workshop will allow participants to engage in algebra triangles and discuss their use in K–2 classrooms.

**Holly Anthony**

Tennessee Tech University, Cookeville

_Nashville Omni, Broadway Ballroom E_

188 BUILD

**Differentiating Mathematics for Economically Disadvantaged Students: Strategies and Activities**

3–5 Session

Because a solid understanding of operation sense is essential for developing reasoning and computational skills, economically disadvantaged students often struggle with conceptual learning. This session will focus on how to differentiate mathematics instruction for teaching basic operations explicitly to elementary school students who are at-risk.

**Jennifer Bond**

Ferguson Florissant School District, Saint Louis, Missouri

**Joseph Sencibaugh**

Webster University, Saint Louis, Missouri

_Music City Center, 101 AB_
189 BOSS
Hanging Math Out to Dry: Using Upper Elementary Clotheslines to Build Number Sense
3–5 Session
Do you know that number line appears in the standards more than 26 times? This workshop is designed to explore how the clothesline (an open number line) creates the opportunity for all students to engage in discourse that promotes the development of number sense. Participants will investigate how this tool is utilized in grades 3-5.

Kristen Acosta
Twitter: @aprilf4175
Merlinda Elementary, West Covina USD, California
Stacy Zagurski
West Covina Unified School District, California

Music City Center, 106 C

190 BOSS
Out-of-the-Box Ideas for Teaching Mathematics
6–8 Session
Thomas Edison said, “Opportunity is missed by most people because it is dressed in overalls and looks like work.” Active engagement to promote STEAM in the classroom is fundamental in this presentation. So, here is your chance to make your math class look less like work and more like fun through games, artwork, and real-world connections.

Tammie Patterson
Twitter: @dalsaver
The University of Tennessee at Martin
Kimberly Williams
The University of Tennessee at Martin
Karen DiBella
The University of Tennessee at Martin

Nashville Omni, Broadway Ballroom CD

191 BEYOND
Signin’ and Signin’ Teaches the Way Kids Learn!
6–8 Session
Learn a student-centered and engaging methodology and curriculum ensuring mastery of rigorous standards that motivates and provide access and equity for ALL students, regardless of background, with respect to measurable success outcomes. Leave with PowerPoint lessons on area, circumference, and volume that provide modeling, manipulatives, and song lyrics.

Siegried Stillman
Fallbrook Union Elementary School District, San Diego County, California

Music City Center, 207 CD

192 BUILD
Making Sense of Mathematical Modeling: Standards, Scenarios, and Assessment
8–10 Session
Many teachers find it challenging to facilitate authentic mathematical modeling in K-12 classrooms. We examine competing definitions and conceptions of modeling; review standards and stages of the modeling cycle; examine and rate modeling scenarios; engage in a modeling activity; and investigate a rubric for the assessment of mathematical modeling.

Jennifer Luebeck
Montana State University, Bozeman
Matthew Roscoe
University of Montana, Missoula
Lisa Scott
University of Montana, Missoula

Music City Center, 209 A

193 ENHAN
What Was She Thinking? Why Did He Get That Answer? Learn Strategies to Enhance Communication
8–10 Session
When we hear the frustration in “I just don’t understand any of it!” what can we do? Come and learn effective strategies for encouraging students to articulate their confusions about mathematical concepts and for differentiating developmentally appropriate challenges. Help your students build confidence and learn to communicate mathematically.

Connie Schrock
Twitter: @cfryschrock
Emporia State University / NCSM President, Kansas

Nashville Omni, Broadway Ballroom F

194 ASSESS
Taking Action: Eliciting and Using Students’ Thinking in Grades 9-12 Mathematics Classrooms
10–12 Session
This session utilizes activities from Taking Action: Implementing Effective Mathematics Teaching Practices in Grades 9-12 to engage participants in exploring the effective teaching practice of “elicit and use evidence of students’ thinking.” Participants will discuss how to apply ideas from the session to their own classroom.

Melissa Boston
Duquesne University, Pittsburgh, Pennsylvania
Fred Dillon
Institute For Learning, Strongsville, Ohio

Music City Center, 104 CDE
Mathematical Modeling—Let’s Get Messy!
Coaches/Leaders/Teacher Educators Session
Further your understanding of the research behind and the meaning of mathematical modeling. Examining research found in the GAIMME report, you will walk away with more insight of what truly constitutes mathematical modeling. And, of course, you will get to experience several highly engaging modeling lessons to use immediately in your classroom!
Robert Thatcher
Pearson Inc., Hoboken, New Jersey
Nashville Omni, Broadway Ballroom AB

Branching Out: Building Stakeholder Connections to Support Professional Growth
General Interest Session
This session describes the processes we used to establish and continue to support connections with stakeholders that have led to beneficial partnerships. We will share experiences of university faculty and K-12 teachers who collaborate in mutually beneficial endeavors to improve the teaching and learning of mathematics for all students.
Jessica Ivy
Bellarmine University, Louisville, Kentucky
Dana Franz
Mississippi State University, Starkville
Music City Center, 202

Lower the Floor, Raise the Ceiling: Teaching Problem Solving to ALL Students
General Interest Session
Teaching students to reason and problem-solve is the cornerstone of quality math instruction. This session will highlight several engaging strategies such as Three Reads and the Three-Act Math Task and more that will provide multiple entry points for all students to engage in the math and ignite a passion for problem solving in your classroom!
Susan Loveless
Twitter: @susanloveless23
Rutherford County Schools, Murfreesboro, Tennessee
Music City Center, 103 C
9:30 A.M.—10:30 A.M.

198.3 **CW**

Routines Don’t Have to Be Routine in K–2
Exhibitor Workshop
Explore a variety of daily routines and teaching strategies focusing on the “not-so-simple” skills of counting and building number sense. Together we will work through concepts that are essential to foundational mathematics understanding. This workshop will leverage the research and theories behind counting, cardinality, and building number sense.

Pearson
Hoboken, New Jersey

Music City Center, 101 E

9:45 A.M.—11:00 A.M.

199 **BUILD**

Adding More to Subtraction: Supporting a Variety of Addition and Subtraction Problem Structures
Pre-K–2 Workshop
Students often overgeneralize subtraction as “take away” and struggle with comparison and part-part-whole problems. This session will engage participants in activities to develop a conceptual understanding of the variety of addition and subtraction problem types using representations, including tens frames, bar models, and number bonds.

Lisa Pallett
Notre Dame of Maryland University, Baltimore

Nashville Omni, Cumberland 5/6

200 **BOSS**

Beyond Literature Connections: Storytelling in Math
Pre-K–2 Workshop
There is a plethora of children’s books that address all areas of the curriculum with engaging stories and whimsical illustrations, along with accompanying lesson plans. Math in literature has exploded! How about literature in math? What if our students approached math in a way similar to literature? What if they became the authors?

Teresita Cuesta
Sidwell Friends School, Gaithersburg, Maryland

Nashville Omni, Broadway Ballroom JK

201 **ENHAN**

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

Hilary Kreisberg
Twitter: Dr_Kreisberg
Lesley University, Cambridge, Massachusetts

Music City Center, 104 AB

202 **BUILD**

Which Model Should I Use? Choosing and Using a Variety of Representations
3–5 Workshop
We work to use and connect multiple representations in teaching. At some levels, physical models are straightforward, while symbolic representations are dominant elsewhere. This session shows how to match the representations with the math and how to connect representations. We will use counters, bar models, and number lines as key representations.

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

Nashville Omni, Cumberland 3/4

203 **BOSS**

Low-Cost Ways to Engage and Motivate Math Students
6–8 Workshop
Participants will have the hands-on opportunity to use manipulatives that start at the concrete level but also encourage deeper understanding of a variety of middle grades math concepts. There will be a demonstration of how to deepen the rigor. There will also be a demonstration of how to construct various games and activities from basic supplies.

Linda Shannon
Clarksville Montgomery County School System, Northeast HS, Tennessee

Penny Gregory
Clarksville Montgomery County School System, Northeast HS, Tennessee

Nashville Omni, Cumberland 1/2
9:45 A.M.–11:00 A.M.

204 BOSS

STEM-ulating Activities for People and the Planet

6–8 Workshop

Connect students’ growing math and critical thinking skills to the trends shaping the world around them from changing global demographics to carbon emissions to resource management. Engage in simulations, mathematical modeling, measurement, and data analysis using current events and real-world data.

Deborah McAllister
University of Tennessee at Chattanooga
Lisa Wilkes
Girls Preparatory School, Chattanooga, Tennessee

Music City Center, 209 BC

205 ASSESS

Building a Flexible Standards-Based Classroom within a Traditional School Setting

8–10 Workshop

Moving to a standards-based grading system in a school that uses a traditional model can be difficult. In this session, we will examine our personal philosophies of assessment, explore ways to craft a standards-based system while working within even the most restrictive curriculum, and role-play ways to make a smooth transition for all involved.

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

Music City Center, 105

206 ENHAN

Making Mathematics Meaningful through Modeling Problems

8–10 Workshop

Mathematical modeling involves students having choice and making assumptions about a real-life situation in order to present recommendations and a solution. We will engage the audience in working on different modeling-based problems while relating their work back to the various stages of the modeling cycle.

Erick Hofacker
Twitter: @DrHofacker
University of Wisconsin–River Falls
Ashlee LeGear
University of Wisconsin–River Falls

Music City Center, 101 CD

207 ENHAN

AP Calculus: Ditch That Lecture

10–12 Workshop

See what an active calculus curriculum looks like in action. Experience firsthand an activity-driven, inquiry-based approach where we pose problems or situations, consider possibilities, and then ask students to investigate and explore. Gain access to over 200 activities and 500 exercises that will prepare your students to conquer the AP exam.

Jim Pardun
Twitter: @JimPa23
Community High School District 128, Vernon Hills, Illinois
Steven Korney
Community High School District 128, Vernon Hills, Illinois

Music City Center, 201

208 BUILD

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

10–12 Workshop

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

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

Music City Center, 103 AB

209 BUILD

What Does It Mean to Be Quadratic?

10–12 Workshop

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

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

Music City Center, 102
A math intervention program for K–5

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

mathlearningcenter.org/intervention
210  BEYOND  
**Productive vs. Destructive Struggle in Mathematics Classrooms**  
Coaches/Leaders/Teacher Educators Workshop  
The session starts with an overview of productive struggle incorporating research on the shame-pride axis and equitable mathematics teaching. Ideas will be introduced on how teachers can reposition struggle, minimize shame, and facilitate students identifying themselves as doers of mathematics; ending with a brainstorming session on five strategies.  
Candies Cook  
Twitter: @candigerl80  
Oxford School District, Mississippi  
Dr. Joel Amidon  
The University of Mississippi  
Dr. Ann Monroe  
The University of Mississippi  

**Music City Center, 205 A**

211  **New and Preservice Teachers Workshop**  
**General Interest Workshop**  
Find answers to your questions on topics such as classroom management, parents, motivation, and keeping your sanity. Connect with other new teachers, learn from experienced professionals, and find resources to engage you and your students. You might even win a prize!  
Chonda Long  
National Council of Teachers of Mathematics, Reston, Virginia  

**Music City Center, 207 CD**

212  **BUILD**  
**Subitizing: Supporting Fluency with Addition!**  
Pre-K–2 Burst  
This session will examine how subitizing can be used to support students’ learning of addition. We will explore how it can provide students’ valuable experiences with composing and decomposing numbers and how it may help move students from counting strategies to more sophisticated strategies for addition.  
Jennifer Yantz  
Austin Peay State University, Clarksville, Tennessee  
Rebecca Darrough  
Austin Peay State University, Clarksville, Tennessee  
Audrey Bullock  
Austin Peay State University, Clarksville, Tennessee  

**Music City Center, 201**

213  **ASSESS**  
**Using Student Thinking and Connections to Facilitate Powerful Mathematics Discussions**  
Pre-K–2 Session  
Come experience powerful teaching and learning practices for engaging and empowering every student in mathematics. Leave with practical strategies that encourage students to share their mathematical ideas in a collaborative environment. And yes, younger students can do this—we’ll look at classroom videos to see these strategies in action!  
Danielle Curran  
Twitter: danigirl1216  
Curriculum Associates, Reading, Massachusetts  

**Music City Center, 201**

214  **ENHAN**  
**“Read to Me” Strategies Linking Literature and Multiplication**  
3–5 Session  
Participants will be introduced to eight to ten quality children’s literature books that will bring math to life through building vocabulary and promoting language development. The presenter will share story-based activities to reinforce multiplication skills including multiplication facts, problem solving, and multiplication number patterns.  
Deborah Ondov  
Minnesota State University, Mankato  

**Music City Center, 205 A**

215  **BOSS**  
**Teaching Turnarounds: Discover and Leverage Your Students’ Strengths through Instructional Design**  
3–5 Session  
Participants will engage in two compelling teaching turnaround strategies that can reframe and open up students’ mathematical learning opportunities. Learn to identify and leverage students’ strengths to develop powerful and strategic learning moments that recognize and bolster students’ strengths to build mathematical success.  
Beth Kobett  
Twitter: @bkobett  
Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; Stevenson University, Maryland  

**Music City Center, 204**
11:00 A.M.—12:00 P.M.

216  **ASSESS**  
*Active Learning Utilizing the Fab Five: Talking, Listening, Writing, Reading, and Reflecting*  
6–8 Session  
This presentation will consist of student specific real-life problem solving. Visualization through tech tools, case studies, turn and talk, and post it parade are just a few ways you can take your classroom from boring to brilliant. This session is a must for teachers who want to engage their classroom and help their students master mathematics.  
*Tammie Patterson*  
Twitter: @dalsaver  
The University of Tennessee at Martin  
*Texas Culver*  
The University of Tennessee at Martin  
*Music City Center, 106 C*

217  **BOSS**  
*MatheMusic: The Relationship*  
6–8 Session  
It is well known that music was one of the main interests of Pythagoras, who is attributed with the discovery of many of the numerical ratios, while Euclid wrote at least one genuine work in music. We will explore the correlations of music/mathematics and how we as educators can utilize these strategies for engagement and teaching.  
*Sereca Robinson Henderson*  
Musicology International, Inc., STEAM4KIDZ Institute, Shreveport, Louisiana  
*Music City Center, 101 AB*

218  **BUILD**  
*Game Show Mania! Simulations for the Classroom*  
8–10 Session  
This session will feature three simulations of popular TV games show games. Participants will play Deal or No Deal, The Price is Right Dice Game, and Let’s Make a Deal Card Game using different simulation methods. Probability, statistics, expected value, and randomness will be the focus of the games that participants can use in their classrooms.  
*Sharon Taylor*  
Georgia Southern University, Statesboro  
*Kathleen Mittag*  
The University of Texas at San Antonio, (Retired), Bishop  
*Music City Center, 104 CDE*

219  **BOSS**  
*Interesting Ideas, Activities, and Manipulatives to Engage Students for Success in Geometry*  
8–10 Session  
Have fun and challenge yourself to use a variety of strategies, tools, and resources to investigate new ideas, solve problems, and share mathematical ideas that can be used throughout the study of geometry. Participants will use household items with engaging problems to explore, develop, and apply geometric concepts and review geometry vocabulary.  
*Erin Schneider*  
Twitter: @MsSchneider018  
Atherton High School, Jefferson County Public Schools, Louisville, Kentucky  
*Music City Center, 103 C*

220  **ENHAN**  
*Mathematics Pen Pals: Developing Students’ Perseverance through Letter Writing*  
10–12 Session  
Do your students have opportunities to persevere in problem solving and justify their thinking? We will share how we work to build students’ perseverance in problem solving through extended tasks (letter writing). Examples and lessons learned will also be shared along with the benefits of using writing activities over an extended period of time.  
*Alyson Lischka*  
Middle Tennessee State University, Murfreesboro  
*Kyle Prince*  
Rutherford County Schools, Murfreesboro, Tennessee  
*Samanuel Reed*  
Rutherford County Schools, Murfreesboro, Tennessee  
*Nashville Omni, Broadway Ballroom E*

221  **ADVOC**  
*Mentoring: A Symbiotic Experience*  
10–12 Session  
In a mentor/mentee relationship, there are opportunities for each to grow professionally in content and pedagogy. We share a framework and strategies for supporting this symbiotic growth. Our discussion includes reflections on our goal of fostering student voice and broadening our collaborative work to affect other mentor/mentee relationships.  
*Nicholas Koberstein*  
Twitter: @nkoberstein  
The North Carolina School of Science and Mathematics, Durham  
*Music City Center, 104 CDE*
11:00 A.M.–12:00 P.M.

222 BOSS
When Students Speak: How to Empower and Engage Students (and Still Meet Our Goals!)
Coaches/Leaders/Teacher Educators Session
Come learn the essential components that utilize student thinking in class discussions that affirm mathematics learners’ identities. Student voice provides rich data, allows for engagement, and empowers learners. This session highlights how to use student thinking and the multiliteracy systems of support framework to meet the needs of every student.
Joleigh Honey
Twitter: @joleighhoney
Utah State Board of Education, Sandy

Music City Center, 205 BC

224 ENHAN
Class Discussions: Go from “Leading” to “Facilitating”
General Interest Session
In some class discussions, we ask questions and a few students might respond. Many students aren’t involved. Instead, we can facilitate discussions to encourage agency, include all voices, push thinking forward, and develop a culture of meaningful learning conversations. We will use several strategies, including technology, like Desmos.
Annie Forest
Twitter: @mrsforest
Berwyn South District 100, Illinois

Music City Center, 209 A

225 BUILD
Exploring Mathematical Concepts with Dynamically Linked Multiple Representations Using Spreadsheets
General Interest Session
How can we build multiple representations into teaching and learning activities? This can be a challenging task, but technology provides the means to do this effectively and efficiently. Join us in for an engaging interactive session to experience how a wide range of math topics can be dynamically represented and linked using spreadsheets.
Peter Mili
Falmouth, Massachusetts
Art Bardige
Whatifmath, Cambridge, Massachusetts

Music City Center, 207 AB

226 BOSS
Math Tasks + Manipulatives = Success
General Interest Session
Rich mathematical tasks that engage students in solving and discussing are a vital part of a mathematics classroom. Manipulatives can be utilized as a tool to help students with such tasks by providing entry points for each and every student. Come explore some rich tasks utilizing a variety of manipulatives.
Kevin Dykema
Twitter: @kdykema
Mattawan Consolidated Schools, Michigan

Music City Center, 202

11:30 A.M.–12:00 P.M.

227 ASSESS
Cutting Corners: Assessing Area and Perimeter Concepts and Procedures
3–5 Burst
This engaging task is a quick, easy, and yet very productive way to assess student understanding of perimeter and area while also checking for procedural fluency. The rectangle-based activity provides opportunities for all students to be successful while the extensions allow for intriguing challenges, discussions, and conclusions.
Robert Mann
Western Illinois University, Macomb

Nashville Omni, Cumberland 3/4

228 ASSESS
Making Interviews “Work” in Math Workshop
3–5 Burst
Diagnostic interviews are one of the most effective formative assessment strategies, yet can be difficult to manage in a regular classroom setting! We have been investigating possibilities to make interviews “work” efficiently, while being effective in learning about student thinking. Join us to learn about our favorite strategies and tools.
Molly Hall
Student, Louisville, Kentucky
Jennifer Bay-Williams
University of Louisville, Kentucky

Music City Center, 105
229 **ASSESS**

**Examining Mistakes to Shift Student Thinking**

6–8 Burst

Examining mistakes is a key element in developing students’ mathematical understanding. In this session, we present four research-based criteria for evaluating and using mistakes in class discussions to support all students’ learning. Additionally, we show how we used these criteria as a class during a problem-solving lesson on ratio reasoning.

*James Willingham*
James Madison University, Harrisonburg, Virginia

*Elizabeth Barlow*
Knox County School District, Knoxville, Tennessee

*Lucy Watson*
Knox County School District, Knoxville, Tennessee

**Music City Center, 205 A**

230 **ASSESS**

**Planning for Purposeful Formative Assessment: Simple and Effective Strategies**

6–8 Burst

There are so many valuable ways to use formative assessment to elicit student thinking that it can feel overwhelming at times. This session will focus on how to purposefully plan for formative assessment at three points of the lesson—opener, student work time, closure—and how to quickly analyze results and impact instruction immediately.

*Pauline Zdonek*
Twitter: @PaulineZd
Jane Addams Middle School, Bolingbrook, Illinois

**Nashville Omni, Broadway Ballroom GH**

231 **BOSS**

**10 Free Online Resources That Engage and Assess Mathematics**

6–10 Burst

Take your math instruction to a higher level with 10 free online resources that will help your students explore and discover mathematics. Participants will learn about resources to utilize in their classroom that engage students and assess student understanding.

*Emily McDonald*
Twitter: @EMcDonaldEDU
Red Bank High School, Hamilton County Schools, Chattanooga, Tennessee

*Shirley McDonald*
Ringgold Middle School, Catoosa County Schools, Georgia

**Nashville Omni, Cumberland 5/6**

232 **BUILD**

**Visualizing Completing the Square**

10–12 Burst

In efforts to help my students in Completing the Square and its meaning, I conducted an action research project to analyze the effects of visuals on their understanding. In this session, we will look at ways Completing the Square can be visualized to offer multiple opportunities for students to access the conceptual understanding.

*Emily Russett*
Metro Nashville Public Schools, Tennessee

**Music City Center, 102**

233 **BUILD**

**Creating Mathematical Confidence in K-5 Educators**

Coaches/Leaders/Teacher Educators Burst

Often times one of the most challenging aspects of being a district or building math coach is growing teacher confidence in the area of mathematics that then transfers to student learning. This session will focus on creating opportunities for teachers to gain math confidence in their grade-level standards, teaching practices, and delivery.

*Nicole Szajkowski*
Twitter: @NSzajkowski
Bismarck Public Schools, North Dakota

**Music City Center, 101 CD**

233.1 **ASSESS**

**Calculators & Assessments: A Love-Hate Relationship**

General Interest Burst

It is hard to imagine a time when today’s students will not have a calculating machine at hand. We want to educate students on fundamental math number sense and computational concepts, but we also want to prepare them to engage with math in a realistic way. When is it appropriate to use a calculator in an assessment?

*Andrew Jones*
Indiana Department of Education, Indianapolis

*Justin Mocas*
Indiana Department of Education, Indianapolis

**Nashville Omni, Cumberland 1/2**
11:30 A.M.–12:00 P.M.

234 BEYOND
Experiencing the Joy: An Indicator of Equitable Mathematics
General Interest Burst
Supporting students’ agency and identity is fundamental to fostering equitable mathematics communities. Number talks have been found to be a useful routine for providing with access and opportunities to all students. In an exploratory study, we found that experiences of joy during number talks coincide with equitable and humanizing mathematics.

Isaac Nichols-Paez
Twitter: @NicholsPaez
Vanderbilt University, Nashville, Tennessee
Anita Wager
Vanderbilt University, Nashville, Tennessee

Music City Center, 104 AB

235 BEYOND
Stoking the Fire: Putting Your Reason for Teaching Mathematics to Work
General Interest Burst
Behind every math teacher is a calling to invest in the lives of others. But sometimes that calling gets lost in the daily hustle and bustle of teaching. During this session participants will recall, refine, and connect their call to teaching to practical daily actions that will recharge and improve their teaching to foster doers of mathematics.

Joel Amidon
Twitter: @amidonplanet
University of Mississippi

Music City Center, 209 BC

236 BUILD
Developing Quantitative Literacy for Teaching
Higher Education Burst
How do mathematics educators prepare preservice teachers to answer the common student question, “When I am going to use this in the real world?” Using ideas from the quantitative literacy and reasoning movement in university-level mathematics, we present connections between secondary mathematics to postsecondary contexts.

Ryan Fox
Twitter: @drfoxatbu
Belmont University, Nashville, Tennessee
Rebeka Rosales
Belmont University, Nashville, Tennessee
Curtis Waligurski
Belmont University, Nashville, Tennessee

Music City Center, 103 AB

237 BEYOND
High School Mathematics Teachers’ Experiences Transitioning to Integrated Mathematics
Research Burst
This interpretive research study sought to understand 21 rural teachers’ experiences transitioning to integrated mathematics (IM) courses. Twenty-one high-school teachers were interviewed to elicit teachers’ beliefs, perceptions, and attitudes by asking them to describe their experiences, challenges, and successes transitioning to the IM sequence.

Holly Anthony
Tennessee Tech University, Cookeville
Miguel Perez
Tennessee Tech University, Cookeville
Carey Wilson
Tennessee Tech University, Cookeville

Nashville Omni, Broadway Ballroom JK

CPM EDUCATIONAL PROGRAM
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MORE MATH FOR MORE PEOPLE
241 **BEYOND**

**Supporting Students’ Sense of Belonging While Doing Mathematics**

3–5 Session

In learning environments, teachers and peers play a role in each student’s sense of belonging when students feel personally accepted, included, and supported. This session will discuss mindsets and instructional practices for teachers to consider ways to develop a sense of belonging for elementary students while simultaneously engaging in math.

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

**Music City Center, 202**

242 **ENHAN**

**Empowering Student Voice in Developing Mathematical Arguments through Collective Argumentation**

6–8 Session

Constructing viable arguments remains a mathematical practice but a challenge in K-12 math classrooms. You will learn how to enhance students’ arguments by emphasizing their voice in small-group discourse using collaboration in collective argumentation. Students gain authority in their work by modeling an authentic mathematical learning community.

Nicholas King
University of Tennessee, Knoxville
Tye Campbell
The University of Alabama, Northport

**Music City Center, 101 AB**

243 **BUILD**

**From Gatekeeper to Gateway: Meeting Students Where They Are to Improve Success in Algebra**

8–10 Session

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. The participants will relive my journey through the findings and learnings from three grades 7-12 classrooms.

Taajah Witherspoon
Twitter: tspoon1000
University of Alabama at Birmingham

**Nashville Omni, Broadway Ballroom AB**

238 **ENHAN**

**Developing Early Operation Understanding by Linking Literature to Problem-Solving Situations**

Pre-K–2 Session

Who ever imagined the use of children’s books could help kids understand that addition is more than adding on and subtraction has meanings beyond taking away? Let’s look at these problem types and develop a deeper understanding of addition and subtraction through the use of wonderful picture books. Have your library card ready!

Linda Gojak
Twitter: @LindaGojak
Past President, National Council of Teachers of Mathematics, Reston, Virginia; Mathematics Consultant, Willowick, Ohio

**Music City Center, 104 CDE**

239 **BOSS**

**Promoting Persistent Problem Solving: Strategies for Fostering Productive Struggle in Young Learners**

Pre-K–2 Session

How can we remove the reflex of some students to say “I don’t know” when they encounter new mathematical concepts? What are tools that can give them confidence to accept challenge? Using classroom video footage, participants will learn strategies for empowering young learners to see “stuck points” as an opportunity for celebration and learning.

Paul Roen
Curriculum Associates, Memphis, Tennessee

**Music City Center, 209 A**

240 **BOSS**

**RTI Math—Reach, Teach, Inspire**

3–5 Session

Help close the gaps in student learning of mathematics! This session will support teachers in using mathematical progressions, teacher practices, and growth mindset in an effort to increase student achievement and growth through practical applications.

Maureen Henderson
Twitter: @iAinAction
Springfield Middle School Innovation Academy, Tennessee
Tricia Craig
Robertson County Schools, Springfield, Tennessee

**Music City Center, 103 C**
1:00 P.M.–2:00 P.M.

244 **BOSS**

**Using Net Worth to Understand Linear Equations**

8–10 Session

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

Philip Dituri
Fordham University, New York, New York

Nashville Omni, Broadway Ballroom E

245 **BUILD**

**Horizons and Vanishing Points: Artistic Perspective through Parametrization**

10–12 Session

When Renaissance painters developed the technique of perspective, their contemporaries in mathematics suddenly gained a fresh perspective on geometry. In this session, you’ll see how pre-calculus students can use parametrization to find vanishing points and horizons! This multidisciplinary curriculum unit bridges history, art, and mathematics.

Paul Gafni
University of Washington, Seattle

Music City Center, 205 BC

246 **ADVOC**


10–12 Session

Reflect on the eight Effective Mathematics Teaching Practices and the 8 Standards for Mathematical Practice to consider how they relate and how teachers and students can engage in it all. A curriculum framework that supports the work of teachers in all of these meaningful practices will be shared and considered. The materials shared are all free open educational resources (OER).

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

Nashville Omni, Broadway Ballroom CD

247 **BUILD**

**Equal Groups and Area: Multiplication and Division through the Years**

General Interest Session

Students first learn about whole number multiplication and division through an equal groups model and an area model. How can we build on that foundational knowledge as we introduce students to multiplication and division of fractions, decimals, and binomials? Come and see tasks that examine multiplication and division across grade levels.

Kay Wohlhuter
Twitter: KAWooleater
University of Minnesota Duluth

Nashville Omni, Broadway Ballroom F

248 **ASSESS**

**Healthy and Effective Mathematics Conferences**

General Interest Session

Join us as we discuss the components of effective mathematics conferences and how they can support healthy mathematical mindsets and reduce anxiety. We will unpack each of the four components of conferring and match them with strategic questions that elicit student thinking and drive learning beyond answers.

Gina Picha
Twitter: @ginapicha
School, Austin, Texas

Music City Center, 207 AB

249 **BEYOND**

**Native American-Based Mathematics Materials for the Classroom**

General Interest Session

This session presents mathematics materials based in the culture and mathematics of Native American peoples for integration into K-12 or undergraduate courses. These materials—both paper and electronic—are classroom ready, and have been developed and piloted in consultation with Tribes throughout the West.

Charles Funkhouser
California State University Fullerton
Miles Pfahl
Dunseith Indian Day School, North Dakota

Music City Center, 106 C

Make the most of your membership by downloading NCTM Central, the new NCTM app! Learn more at nctm.org/confapp.
1:00 P.M.–2:00 P.M.

250 **BUILD**

**Development of Students’ Rate of Change and Derivative with Covariational Reasoning using GeoGebra**

High Education Session

The main goal of the presentation is to show how to develop students’ rate of change and derivative concept by developing students’ covariational reasoning. In this presentation, the participant will engage in constructing a task that facilitates the development of students’ rate of change and derivative with covariational reasoning using GeoGebra.

Amdeberhan Tessema
Twitter: Amde
Middle Tennessee State University, Murfreesboro

**Music City Center, 207 CD**

1:00 P.M.–2:15 P.M.

251 **ENHAN**

**5 Practices + 8 Effective Mathematics Teaching Practices = A Winning Combination!**

Pre-K–2 Workshop

To support the mathematics learning of all students, effective teachers establish an environment where students regularly engage in productive mathematics discourse. Attend this workshop to learn strategies to facilitate productive discourse and promote problem solving, reasoning, and critical thinking skills in a student-centered classroom.

Latrenda Knighten
Twitter: Latrendak
East Baton Rouge Parish School System, Louisiana

**Music City Center, 201**

252 **BOSS**

**Centers for Success: Overcoming Classroom Management Issues**

Pre-K–2 Workshop

Demonstration, debriefing, and discussion on how to employ various classroom management strategies for the purpose of effectively instigating, implementing, and improving small-group, differentiated math instruction.

Haleigh Alexander
University of Tennessee at Martin
Joyce Swan
University of Tennessee at Martin

**Nashville Omni, Broadway Ballroom GH**

253 **BUILD**

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

Pre-K–2 Workshop

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

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

**Music City Center, 205 A**

254 **BOSS**

**Build It, Fold It, Draw It: Develop Understanding of the Attributes of Polygons**

3–5 Workshop

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

Laurie Boswell
Twitter: @laboswell
Big Ideas Math, Franconia, New Hampshire

**Music City Center, 105**

255 **ASSESS**

**What Were You Thinking? Using Math Think Alouds to Model & Deepen Student Thinking**

3–5 Workshop

We need to model good thinking. We use think alouds in language arts, why not in math class? Through hands-on activities, you will learn practical ways to create effective think alouds which will empower your students to have access to different kinds of self-talk and become aware of the thinking that takes place before the solution is chosen!

Cathy Marks Krpan
Twitter: @CathyMarksKrpan
University of Toronto, Ontario, Canada

**Nashville Omni, Cumberland 5/6**
1:00 P.M.–2:15 P.M.

256  **ENHAN**
**Coding Fun in Math Class**
6–8 Workshop
Come learn all the possibilities of how apply coding to your math class learning experiences. Participants will be able to explore the hands-on learning through Scratch, Spheros, and Drones.

Dee Leible  
Twitter: @DeeLeible  
St Paul Lutheran School, Jackson, Missouri

Music City Center, 102

257  **BOSS**
**Contest Problems Will Energize and Enliven Middle School Lessons on Area**
6–8 Workshop
An effective tool to teach area to all students in middle school can be found in math contests. Investigate and reinforce area concepts by solving non-routine problems which allow for multiple solutions. The teaching of problem solving will be modeled as you contribute solutions.

Dennis Mulhearn  
Valley Stream Central HS District (Retired), Merrick, New York

Music City Center, 104 AB

258  **BEYOND**
**Making Math Accessible for ELL Students**
6–8 Workshop
ELL students need special supports within the math classroom. In this interactive workshop, you will learn techniques to implement within your classroom; three-read strategy, vocabulary acquisition strategies, and collaborative activities that promote student engagement and mathematical proficiency.

Marlene Collins  
Twitter: @CanDoCollins  
North Palos School District, Chicago, Illinois  
Linda Lichter-Sumita  
Chicago Public Schools, Illinois

Music City Center, 209 BC

259  **ASSESS**
**Maintaining the Focus When Giving Students Voice**
8–10 Workshop
What it means to elicit and use students’ mathematical thinking in instruction depends on the teacher’s perception of the role students and the teacher play in the classroom. The session will demonstrate the connection between the teacher’s daily learning goals and the selection of student work to achieve the purpose of the lesson.

Janet Sutorius  
Mathematics Vision Project, Nephi, Utah

Nashville Omni, Cumberland 1/2

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

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

261  **ENHAN**
**How Am I Using Teacher Discourse Moves in My Instruction? A Tool for Self-Reflection on Discourse**
10–12 Workshop
Participants will be presented with a self-reflection tool focused on using teacher discourse moves (TDMs) in an intentional and productive way. There will be an opportunity to analyze teacher use of TDMs using the tool. Participants will reflect on how the tool can be used when watching their own teaching to enhance discourse in their practice.

Cara Goldberg  
Lexington Public Schools, Massachusetts

Nashville Omni, Broadway Ballroom JK
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at your DOORSTEP

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- Administrators
- Math teacher educators
- Preservice teachers
- Math specialists

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

nctm.org/regionals
ASSESS

Students Can Make Sense of Calculus with Desmos
10–12 Workshop
When students are learning calculus, they should be doing the sense making, the making connections with complex ideas. Learn how Desmos, a free, online graphing app can help. We will do activities that require students to use the graphing app and activities that teachers build using the Desmos Activity Builder. Bring a laptop so you can play!

Martha Mulligan
Twitter: @marthamulligan
Chicago Public Schools, Illinois

ADVOC

7 Habits of Highly Effective Teachers
Coaches/Leaders/Teacher Educators Workshop
No matter how well we know mathematics, we will never master the classroom before mastering both ourselves and our relationships with students. During this interactive workshop, we adapt Stephen Covey’s world-renowned habits for professional effectiveness directly to our roles as teachers and to student-teacher relationships in the classroom.

Ellen Smyth
Twitter: @ellensmyth
Austin Peay State University, Clarksville, Tennessee
Tabitha Michael
Cheatham County School System, Sycamore High School, Pleasant View, Tennessee

BOSS

Teaching Problem Solving Using Cognitively Guided Math Instruction and Graphic Organizers ELLs
3–5 Session
CGI embeds self-regulated strategies in structured routines by enabling ELL students to monitor, evaluate, and reflect. Participants will learn how to incorporate cognitive strategy instruction for improving the learning and performance of math problem-solving and reasoning skills by facilitating information processing through visual representations.

Joseph Sencibaugh
Webster University, Saint Louis, Missouri
Michelle Sencibaugh
Valley Park School District, Missouri
Jennifer Bond
Valley Park School District, Missouri

EXPW

Building on Students’ Strengths
Workshop

ADVOC
Growing Professionalism and Developing Advocacy

BOSS
Building on Students’ Strengths
Workshop

ADVOC

Growing Professionalism and Developing Advocacy

ENHAN

What Are We Missing with Story Problems?
Pre-K–2 Session
“Missing Pages” are booklets that support the young learner in looking beyond the numbers in a problem to understanding the context of the situation. Children engage as the author using words and drawings to support reasoning. Making sense of story problems allows students opportunities to develop understanding of addition and subtraction.

Cindy Cliche
Twitter: @CindyCliche1
Murfreesboro City Schools, Tennessee
Jeremy Winters
Middle Tennessee State University, Murfreesboro

ENHAN

Let’s “Number” Talk!
3–5 Session
Promoting mathematically productive talk is essential for students to develop conceptual understanding. In this session, participants will learn the how and why behind the successful implementation of Number Talks. Leave with an understanding of how the mathematical disposition of your students can be transformed through Number Talks.

Susan Loveless
Twitter: @susanloveless23
Rutherford County Schools, Murfreesboro, Tennessee
2:30 P.M.–3:30 P.M.

268 BUILD
Direct Instruction: The When and How for Conceptual Math Learning
6–8 Session
We recognize best practice is conceptual learning, so how do we effectively incorporate surface learning in this progression? Direct Instruction is more than simply modeling or telling; it is making connections to concepts. We will collaborate to understand how to that integrate all levels of learning in lessons, solidifying students’ learning.

Bonnie Bolado
Twitter: @bonniebolado
North Carolina Center for the Advancement of Teaching, Cullowhee

Music City Center, 207 AB

269 BOSS
Rich Tasks That Connect to a Student’s Real World
6–8 Session
Explore rich tasks designed to engage students in fostering their interest, developing persistence, and encouraging creativity and connected to a student’s real world. In this session, you will receive a packet of several rich tasks and will learn from our experience working with middle school students over the past 10 years.

Hoyun Cho
Capital University, Columbus, Ohio
Gary Lawrence
Mustard Seed School, Hoboken, New Jersey

Nashville Omni, Broadway Ballroom E

270 BUILD
Multiple Representations and Perseverance, a Tool for When the Going Gets Tough
8–10 Session
Getting students to create a variety of representations and connect the key features of the representations is a strategy that teachers can develop in students to give them a pathway when they are stumped and don’t know how to proceed. The focus will be on how different representations can help student persevere and make sense of the mathematics.

Janet Sutorius
Mathematics Vision Project, Nephi, Utah

Music City Center, 209 A

271 BUILD
Cold, Warmer, HOT: A Dynamic Digital Lesson Strategy for Precalculus and Calculus
10–12 Session
Graphs programmed with adaptive “Cold, Warmer, HOT” hints allow students to play hide-and-seek in precalculus and calculus. These dynamic interactive graphs, created with Desmos, purposefully guide students as they visualize mathematical ideas, explore concepts, and make conjectures. Stop by to experience them yourself—you’re getting warmer!

Dave Cesa
Twitter: @davecesa
Charlotte Latin School, North Carolina

Music City Center, 207 CD

272 ASSESS
Moving beyond the Homework Review: Ways to Leverage “Mistakes” as Tools for Learning
10–12 Session
Participants will learn about lesson structures that allow for sharing of student thinking and explore using differing conceptions as a way to generate mathematical discussions that further learning. We will enact three different lesson structures that support using student conceptions as levers for learning and discuss the affordances of each.

Alyson Lischka
Middle Tennessee State University, Murfreesboro
Natasha Gerstenschlager
Western Kentucky University, Bowling Green
Jeremy Strayer
Middle Tennessee State University, Murfreesboro

Nashville Omni, Broadway Ballroom AB

273 ADVOC
Leading a Mathematics Team Focused on Learning and Equity
Coaches/Leaders/Teacher Educators Session
How does a team of teachers work together to improve the learning of every student? How does the team learn from one another to grow effective practices? This session will explore protocols that team leaders can use to establish equity and help teams make sense of standards, design common assessments, and analyze data and respond.

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

Nashville Omni, Broadway Ballroom CD
2:30 P.M.–3:30 P.M.

**274 ENHAN**

A Pause Is Worth 1000 Words

General Interest Session

“Wait time” after you ask a question is just the beginning. Talk less: You and your students will say and learn more. The secret to even more productive discussions? Rich tasks + purposeful questions + 7 different types of strategic pauses. Learn new ways to pause: Students’ confidence, contributions, and creativity will grow as a result.

**Ralph Pantozzi**
Twitter: @mathillustrated
Kent Place School, Summit, New Jersey
Sidney Nataro
Kent Place School, Summit, New Jersey

*Music City Center, 103 C*

2:45 P.M.–4:00 P.M.

**277 BUILD**

Early Geometry Concepts: Making Connections to the Real World

Pre-K–2 Workshop

Children develop their knowledge of the world around them through experiences in four aspects: movement in space; location and direction; 3D objects; and 2D shapes. In this playful session, we will take a journey through the developmental pathway necessary to build these essential concepts and how you can make them come to life in your classroom.

**Sandy Szako**
ORIGO Education, Magnolia, Texas
Rob Nickerson
ORIGO Education, Lakewood, Colorado

*Music City Center, 102*

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2:45 P.M.–4:00 P.M.

**277 BUILD**

Early Geometry Concepts: Making Connections to the Real World

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**Sandy Szako**
ORIGO Education, Magnolia, Texas
Rob Nickerson
ORIGO Education, Lakewood, Colorado

*Music City Center, 102*

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2:45 P.M.–4:00 P.M.

**278 ADVOC**

Partnering Together to Develop Effective Mathematics Teaching Practices

Pre-K–2 Workshop

Learn how a mathematics specialist, local school districts, and a university professor partnered together to create opportunities for teachers to observe the effective Mathematics Teaching Practices in action by an expert teacher. Come ready to join the discussion about instructional practices, video of the observation, and teacher perception data!

**Sarah Roller**
The University of Alabama in Huntsville
Carrie Plank
University of Alabama in Huntsville/Alabama Math Science Technology Initiative (AMSTI)

*Music City Center, 205 BC*

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2:45 P.M.–4:00 P.M.

**279 BOSS**

Fractions: When Students Understand Only Part of the Whole

3–5 Workshop

Students often develop notions about fractions that are only partially correct. Many of these partially correct ideas stem from what students hear during excellent instruction. This session will focus on phrases students use with fractions that sound correct but are actual warning signals of misconceptions and partial understandings.

**Joann Barnett**
Twitter: @Joannbarnett
Missouri State University, Springfield
Kurt Killion
Missouri State University, Springfield

*Music City Center, 201*
280 **BUILD**

**Improve Fluency with Math Talks and Number Strings**

3–5 Workshop
Timed tests don’t teach fluency, but what does? Learn to use number strings to improve student efficiency, accuracy, and flexibility and math talks to improve student math language and sharing of ideas. Teach additive and multiplicative strategies to help students gain confidence in math. Every student can be a math expert!

**Jesse Michmerhuizen**
Twitter: @jmichmer
hand2mind, Vernon Hills, Illinois

**Brittany Goering**
hand2mind, Vernon Hills, Illinois

Music City Center, 205 A

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281 **ENHAN**

**Supporting Students in Learning to Critique Others’ Arguments: Learning from Others’ Teaching**

3–5 Workshop
Participants will participate in a brief professional development focused on supporting students in constructing and critiquing mathematical arguments. The professional development uses classroom observation. A wraparound structure, including prebriefing and debriefing, enables teachers to engage in the work of teaching.

**Meghan Shaughnessy**
University of Michigan, Ann Arbor

**Darrius Robinson**
University of Michigan, Ann Arbor

Music City Center, 101 CD

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282 **BUILD**

**Making Middle School Math Come Alive**

6–8 Workshop
Come be apart of an engaging, team environment. Your team will be actively engaged to complete tasks that include: constructing a team graph, exploring integer games, and analyzing patterns to find linear equations. Your team will explore using manipulatives and participate in team strategies to keep your team engaged and working towards the goal.

**Ashley Boyd**
Twitter: @ashley4609
Olive Branch, Mississippi

Music City Center, 105

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283 **ASSESS**

**Teaching in the Moment: Making Decisions That Elicit and Use Student Thinking**

6–8 Workshop
Developing student understanding by eliciting and using student thinking requires us to build capacities to hear a wide range of ideas, and make in-the-moment decisions to select and sequence the ideas based on student understanding. Learn how teachers can make purposeful and intentional decisions with the support of instructional routines.

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

**Grace Kelemanik**
Fostering Math Practices, Natick, Massachusetts

Music City Center, 101 CD

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284 **BOSS**

**Using Learning Stations in Middle Grades Math to Challenge, Engage, and Meet the Needs of Students**

6–8 Workshop
Participants will engage in hands-on activities involving problem solving, statistics, probability, algebraic thinking, and more. We will begin with a whole-group problem-solving activity. Then, groups of participants will work through several learning stations set up in the room. Lastly, the whole group will debrief. Handouts will be provided.

**Deborah Crocker**
Appalachian State University, Boone, North Carolina

**Betty Long**
Appalachian State University, Boone, North Carolina

Music City Center, 105

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285 **ENHAN**

**Lots of “Me”s Make an Us: Math Activities That Leverage the Classroom Community**

8–10 Workshop
We, researchers and a teacher, have been developing and implementing activities that leverage the classroom community as an essential asset to our teaching and to students’ learning. In this workshop, we will present some of these activities, and the technologies they rely upon. Students from the classes will present to give their insights.

**Isaac Nichols-Paez**
Twitter: @NicholsPaez
Vanderbilt University, Nashville, Tennessee

**Corey Brady**
Vanderbilt University, Nashville, Tennessee

**Charles Williams**
Vanderbilt University, Nashville, Tennessee

Music City Center, Broadway Ballroom JK
2:45 P.M.–4:00 P.M.

286 **ENHAN**
Seeing Mathematics More Clearly through a Literacy Lens
8–10 Workshop
Find out how to challenge students to thinking mathematically as they read, write, speak, and listen. Strategies will include graphic organizers, high-interest real-world problems, and discussion prompts to challenge student thinking! Participants will leave this session today with literacy tools that can be implemented in the classroom tomorrow!

Kimberly Williams
The University of Tennessee at Martin
Karen DiBella
The University of Tennessee at Martin
Tammie Patterson
The University of Tennessee at Martin

Nashville Omni, Cumberland 3/4

287 **BOSS**
Creating Collaborative Classrooms: Engaging Students in Meaningful Learning of Mathematics
10–12 Workshop
Learn strategies to promote mathematical discourse in your math classes by experiencing the excitement of engaging in worthwhile mathematical tasks with others. Teachers will learn how to adjust their lessons to maximize student engagement and math discourse in middle and high school math classes.

Lisa Jasumback
CPM Educational Program, Salt Lake City, Utah

Nashville Omni, Cumberland 1/2

288 **BUILD**
Taking Trig to Task
10–12 Workshop
The transition from the static perspective of right triangle trig ratios to the dynamic perspective of circular trig functions, and from measuring angles in degrees to measuring angles in radians, can generate roadblocks and misconceptions. In this session, we will examine a sequence of tasks that reveal, rather than obscure, trigonometric ideas.

Scott Hendrickson
Brigham Young University, Provo, Utah

Music City Center, 104 AB

289 **ASSESS**
Developing Standards and Targets to Support Flexible Standards-Based Grading Implementation
Coaches/Leaders/Teacher Educators Workshop
What does a “B” or 87.6% convey? How can feedback be provided more effectively to support students’ continued persistence in learning and adoption of a growth mindset in learning mathematics? This how-to workshop shares our journey in developing standards-based grading (SBG) practices communicate students’ true proficiencies in learning with proper feedback and grade.

Darshan Jain
Twitter: @djain2718
Adlai E. Stevenson High School, Lincolnshire, Illinois

Music City Center, 209 BC

**Infinity Bar Friday Schedule**

<table>
<thead>
<tr>
<th>Time</th>
<th>Workshop 1</th>
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<tr>
<td>9:30 a.m.–10:30 a.m.</td>
<td>Patrick Vennebush</td>
<td>Latrenda Knighten</td>
<td>Harold Asturias</td>
<td>Laurie Boswell</td>
</tr>
<tr>
<td>11:00 a.m.–12:00 p.m.</td>
<td>Gail Burrill</td>
<td>Juli Dixon</td>
<td>Michelle Cirillo</td>
<td>Marilyn Struchens</td>
</tr>
<tr>
<td>12:30 p.m.–1:30 p.m.</td>
<td>Jessica Ivy</td>
<td>Fred Dillon</td>
<td>John SanGiovanni</td>
<td>Connie Schrock</td>
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</tbody>
</table>
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A list of Partner Affiliates in the conference region and the Affiliates-at-Large appears on page 69. To join one of these organizations, email the Affiliate contact for membership information. NCTM has Affiliates throughout the United States and Canada.

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

**About the Host Organizations**

The **Tennessee Mathematics Teachers Association (TMTA)** is a statewide association of teaching professionals with a shared interest in mathematics education. The mission of the Tennessee Mathematics Teachers’ Association is to encourage the study of and improve the teaching of mathematics in all the schools and colleges of Tennessee. TMTA has six regional mathematics teacher associations and three specialized mathematics teacher associations affiliated with it. To learn more, please visit our website: tmta.wildapricot.org.

**Middle Tennessee Math Teachers (MTMT)** is the local professional association devoted to providing a community of support and development for teachers in Middle Tennessee. MTMT is an affiliate of the Tennessee Mathematics Teachers Association and an affiliate of the National Council of Teachers of Mathematics. For more information or to become a member, please visit https://mt-squared.wildapricot.org.

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**Formulate Fantastic Features**

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

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

*Word count: 3500–5000

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

*Word count: 3000–3500

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

*Word count: 1000–1500

Access https://mc04.manuscriptcentral.com/mltltpk12 to submit manuscripts. Limit your article or submission to the total word count listed above, including references and figures (where applicable). You are encouraged to include such digital components as a video clip, audio file, Livescribe™ file, SMART Board™ file, or other form of multimedia to enhance the submission.
**Affiliate Information**

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**TODOS: Mathematics for ALL**  
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**Women and Mathematics Education**  
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NCTM wishes to thank our 2019 Nashville Regional Conference Committees for their generous support and dedication planning this Regional Conference.

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their organizations.

In leveling the playing field for mathematics, particularly for African-American students, Latina/o students, and females, by providing resources to support teachers and educators in classroom management, assessment, and differentiation.

mathematics education leaders to lead and support others throughout the year. Our next annual conference is in Chicago, March 30–April 1, 2020, and it will feature innovative and inspiring speakers covering emerging trends in math education. We publish and sell books that support our mission including the two new featured books: NCSM Essential Actions: Instructional Leadership in Mathematics Education (2019); and NCSM Essential Actions: Coaching in Mathematics Education. Visit our booth to learn more and visit www.mathedleadership.org for information.

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

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

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

The University of Notre Dame Center for STEM Education is seeking passionate STEM teachers to apply for a unique professional development opportunity. The Trustey Family STEM Teaching Fellows is a competitive program that seeks school-based teams of three to five STEM teachers from the middle grades (grades 5–8) who desire to change STEM education in their schools and communities. Stop by our booth to learn more about becoming a Trustey Fellow!
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*Note: PD time earned should be the time actually spent in sessions and/or workshops.*

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**TOTAL Professional Development Hours Accrued:**

*I certify that the above-named educator accrued the indicated number of professional development hours.*

Ken Krehbiel  
Executive Director, NCTM  
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