

WHAT YOUR COLLEAGUES ARE SAYING . . .

Building Family–School Partnerships in Secondary Math is a must-have for all secondary math educators! Engaging secondary students’ families in math education has been a challenge for educators for years. Using entertaining vignettes and multi-faceted home learning activities with real-world contexts, Bland and Rials provide practical, research-aligned strategies to help educators actively engage families in supporting students’ growth in mathematics.

Latrenda Knighten

2024–2026 President, National Council of Teachers of Mathematics
Baton Rouge, LA

Teacher leaders are educators who set a vision for improving instruction for their students and work collaboratively with colleagues to strengthen teaching practices across their schools. *Building Family–School Partnerships in Secondary Math* offers accessible and practical frameworks to support this work. It guides teachers in leading efforts that honor the knowledge, experiences, and contributions of students, families, and the broader school community. I highly recommend this book as a study resource for educators who are ready to support meaningful and lasting change in their schools.

Ayanna D. Perry

Director, Outreach and Dissemination,
Knowles Teacher Initiative
Bowie, MD

Shakiyya Bland and Julitha Rials debunk the myth that advanced mathematics belong only in the classroom and to a select few, offering guidance to help educators partner with families to support all teens’ math learning. Educators will come away knowing how to explain classroom instructional practices to families, encourage family math exploration at home and in the community, and advocate for informed decision-making around math pathways.

Holly Kreider

Director, NAFSCE Center for Family Math
Sunnyvale CA

With its focus on families with secondary school children, this book fills an important gap in the field of family engagement in mathematics. Bland and Rials’ deep understanding of adolescence and their knowledge of mathematics education result in powerful prompts and activities, carefully designed to support educators in their work with families.

Marta Civil

Professor and Roy F. Graesser Chair, Department of Mathematics,
The University of Arizona
Tucson, AZ

Building Family–School Partnerships in Secondary Math is a must-read for anyone passionate about student success. Their dedication to building genuine family–school partnerships in math shines through every page. They truly hit the mark by showing how connecting with families strengthens learning, equity, and collaboration for every scholar.

Brittany Harrell

Secondary Mathematics Teacher
Lawrence, KS

This book is a useful roadmap to foster open dialogue with students and families to create an inclusive environment and promote culturally responsive teaching. It is full of engaging ideas that can be easily implemented in your secondary math classroom.

Leslie A. Mohlman

Secondary Math Teacher, Alpine School District
Lehi, UT

Building Family-School Partnerships in Secondary Math emphasizes that family engagement is not a surface-level activity, but a core component of effective mathematics instruction. It addresses the often-overlooked link between home and school during adolescence, especially in a content area in which many parents may not feel equipped to fully support their child.

Kenneth Davis

Mathematics Coach, Normandy School Collaborative
Fairview Heights, IL

Rooted in real classroom experience, this book provides practical tools for teachers to move past traditional efforts at parent involvement to foster genuine family-school partnerships in support of secondary math. Bland and Rials show how connecting math to students' real, everyday life can transform engagement and better support every learner. It's accessible, insightful, and highly relevant for today's educators.

Katey Arrington

Director of Systemic Transformation
The Charles A. Dana Center and Past President
NCSM: Leadership in Mathematics Education
Austin, TX

This book is a must-read for all secondary math teachers and leaders! Bland and Rials come with a strengths-based lens of students, families, and educators, and provide practical ideas for educators to immediately implement with all families. Educators reading this will be prepared to create truly culturally relevant classrooms, provide families strategies to complement instruction, and include them in important decisions for students across their secondary years.

Angela Torres

Mathematics Specialist, Student Achievement Partners
San Diego, CA

Using research and practical strategies—from mathematical language routines to embracing Ubuntu—*Building Family-School Partnerships in Secondary Math* offers a transformative approach to actively engage families and caregivers as partners during their child's secondary mathematics journey.

Denise M. Walston

Chief of Curriculum, Council of the Great City Schools
Chesapeake, VA

Bland and Rials provide a much-needed resource that secondary mathematics educators can use to help parents truly become a part of their students' secondary mathematics journey. The "Try This", vignettes, and tips are ready for teachers to plot a pathway to build partnerships with parents.

John Staley

Past President, NCSM
Past Chair, U.S. National Commission on Mathematics Instruction
Coordinator, Baltimore County Public Schools
Randallstown, MD

Building Family–School Partnerships in Secondary Math

Building Family–School Partnerships in Secondary Math

A Guide for Teachers Grades 6–12

Shakiyya Bland

Julitha Rials

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Mathematics

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PREFACE

ORIGINS OF THIS BOOK

This book grew out of countless conversations—after school, school conferences and events, in hallways, and in community spaces—about one recurring question: How can we build on the skills and knowledge that families and educators bring, so we can work together to make math learning engaging and relevant for students—from their first school years all the way through high school?

Over our collective years of teaching K–12 mathematics, business, and special education, we witnessed firsthand the barriers and breakthroughs that happen when families and caregivers are authentically engaged in the math journey. Our inspiration comes from our students and from conversations with families who shared stories of learning at dining tables, participating at community STEM events, while gardening, and through problem solving in everyday life. The seeds for this work are sown in these partnerships and in the conviction that genuine family math engagement is possible at every grade level (PreK–12) and in every community.

WHAT THIS BOOK IS ABOUT

Building Family–School Partnerships in Secondary Math celebrates the transformative impact of authentic, inclusive family participation in math learning for Grades 6–12. Grounded in The Standards for Mathematical Practice, Math Language Routines, and Funds of Knowledge, it offers strategies that connect students’ lived experiences to powerful instructional practices. The book provides practical guidance for building strong partnerships among educators, students, and families—elevating diverse mathematical experiences and everyday moments of math learning, in school and in life.

Our inspiration comes from moments engaging with families at community STEM events hosted by the LRM Foundation, meeting with families after school, and from the wisdom within communities whose strengths are too often overlooked in traditional “family engagement” approaches. Math doesn’t live only in textbooks—it flourishes in hair braiding, cooking, playing games, managing budgets, constructing and designing sets for theatrical productions, and solving problems that matter in daily life. This book is an invitation to recognize, honor, and build on these real-world connections.

ABOUT LANGUAGE

- The terms “young people,” “learners,” and “scholars” honor the humanity and lived experiences of students beyond the school systems.
- The terms “caregivers,” “parents,” and “families” signify all who nurture young people—mothers, fathers, other family members, foster parents, and more.
- The terms “Chican@” and “Latin@” honor gender-neutral language, moving beyond the traditional “o” and “a” forms to embrace greater inclusivity.

Situating Our Work

This book is part of a larger movement toward relational and culturally responsive teaching. In an era shaped by growing awareness of educational equity and family engagement, it situates family math involvement within community-driven models.

Leveraging the theoretical and practical aspects of Funds of Knowledge, this resource reimagines “family engagement” in mathematics—not as homework assistance or isolated activities but as a continuous, daily collaboration.

Rationale: Why This Book?

We offer this text to help close the gap we all feel in our work with respect to school–family engagement. It’s built around practical, classroom-tested strategies that truly honor the strengths and knowledge educators, students, and their families bring with them.

We move beyond the usual call for “parent involvement” by showing what genuine partnerships look like. When families and educators connect meaningfully, mathematical thinking grows deeper, and problem solving is rooted in more contextual experiences.

Why This Work Matters Now

Right now, educators are navigating fast-paced curriculum demands, shifting policies, and changing expectations. Many are required to follow strict pacing guides, leaving little space to innovate. And yet, we know that lasting learning often comes from meaningful connections—connections that happen within community, not in isolation.

We wrote this book to offer practical support to fellow educators seeking to cobuild family math engagement at the secondary level—without adding unrealistic demands for teachers and caregivers.

Our approach blends research-backed frameworks with stories from our classrooms and communities:

- Foundations – Defining authentic family math engagement and exploring common challenges and opportunities.
- Strategies – Practical tools, vignettes, templates, and examples for building strong connections between home and school math.
- Sustaining the Work – How to make engagement part of your teaching culture and grow it over time.

Every chapter includes TIPS, Key Takeaways, Reflective Questions, and activities—so you can connect ideas to your practice in real time.

What We Hope You'll Gain

When you finish this book, we hope you'll feel:

- Confident in partnering with families and caregivers as collaborators in math learning.
- Equipped with strategies you can try right away—plus the understanding to adapt them to your unique context.
- Inspired to see math as a shared journey where students' identities, skills, and confidence grow with the support of their whole community.

More than anything, we hope you embrace opportunities to engage in this work through learning communities within and beyond schools.

Who This Book Is For—and How to Use It

We wrote this for:

- Math educators (Grades 6–12)
- Instructional coaches and math leaders

Some readers may dive into it cover to cover; others may open to the chapter that speaks to the challenge they're facing this week. It's equally useful for individual reflection or for team-based professional learning.

Tools You'll Find Inside

- Authentic vignettes that show what engagement looks like in action.
- Templates for at-home math activities, family events, and communication.
- Reflective prompts to help you pause, process, and plan your next steps.
- Practical takeaways in every chapter to keep you moving forward.

Teaching, especially in secondary mathematics, is an odyssey that can be messy, challenging, and deeply rewarding. Along the way, there are endless opportunities to innovate and make meaningful connections. The path becomes richer and more impactful when we partner together with young people and their families.

We are grateful you've chosen to take this journey with us through the pages of this book. Connect with us to share how you engage with this resource.

ACKNOWLEDGMENTS

Shakiyya’s Special Acknowledgments:

First and foremost, I thank God for this opportunity—without His favor, none of this would be possible. I am deeply grateful for my family, the collective of educators, students, and families who inspired this publication. Thank you to the many culturally responsive professionals whose love, support, and generosity continually call me to action.

Thank you to the LRM Foundation board: K. Nicole Rials, Rita Rials, and Lea Bruce for praying for us, encouraging us, and pushing us forward. Thank you, Dr. Julitha Rials (also on the LRM Foundation board) for joining me in this incredible journey to share our stories and research in ways that increase authentic family engagement in mathematics education. May God continue to honor our faith and labor every step of the way.

Thank you, Debbie Hardin—your encouragement has been a steady and indispensable source of strength. Your belief in the vision and in us has been instrumental to our progress, and I cannot thank you enough.

To every person who has poured into this work—whether through time, wisdom, or kindness—please know that you are part of this book’s heartbeat.

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Dr. Shakiyya Bland, thank you so much for believing in me. Your steady encouragement kept me going when things got tough. Without your patience and support, I honestly don’t think I could’ve made it through this project.

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Finally, to everyone who has lifted me with encouraging words, prayers, and support, whether quietly behind the scenes or out loud. I'm truly grateful for your inspiration, belief, and kindness.

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Shakiyya Bland, EdD, is the founder of the community-based not-for-profit Center for Universal STEM and Humanities and the LRM Foundation's director of education. She is also the director of educational partnerships at a national math equity policy institute and a director on the board of TODOS: Mathematics for ALL. As a 2020–22 Albert Einstein Distinguished Educator Fellow, Dr. Bland contributed her expertise to the U.S. Congress and the Executive Office of the U.S. Department of the Interior. With extensive experience as a PreK–12 mathematics educator and district

mathematics curriculum instructional coach, she received the honors of 2015 Secondary Educator of the Year, 2019 Champion of Equity, and 2025 Call to Action Impact Award in recognition of dedication to instilling hope, creating change, and advancing equity. She is the author of numerous culturally responsive mathematics lessons, strategies, and research. Her innovative curriculum unit, which explores geometric modeling to address food apartheid and promote food security, was featured in *High School Mathematics Lessons to Explore, Understand, and Respond to Social Injustice* (Berry et al., 2020). She has also partnered with national organizations to develop impactful instructional and family engagement resources. Dr. Bland holds a bachelor of science in education, a master of arts in education specializing in curriculum instruction and mathematics, and a doctorate in education leadership. She remains dedicated to engaging communities in learning that integrates mathematics with culture, experience, and history.



Dr. Julitha Rials's path to the classroom began in corporate America, where she spent over 15 years in management after earning a bachelor's degree in personnel administration and an MBA. Although she found success in the business world, she felt a deeper calling to make a difference in education. Dr. Rials spent 22 years in education, with a strong focus on mathematics and supporting students with special needs. She has a passion for creating inclusive learning environments where all students can

thrive. She holds a master's in special education and a doctorate in school leadership, and she is a certified equity facilitator, using her voice and experience to advocate for inclusive, student-centered education. In 2020, she was recognized as the Lawrence Public Schools Secondary Kansas Teacher of the Year, a recognition that reflects her dedication and impact in the classroom. Beyond teaching, Dr. Rials serves as the finance director for the LRM Foundation, where she helps lead initiatives that support the community. She also works closely with the foundation's educational director to bring hands-on STEM activities to students across Douglas County, Kansas.

Whether she is in a classroom, a boardroom, or at a community event, Dr. Rials brings heart, leadership, and a deep belief that all students deserve to feel seen, supported, and inspired.

CHAPTER 1

.....

THE IMPORTANCE OF FAMILY ENGAGEMENT IN SECONDARY MATH EDUCATION

“Families lay the foundation for future educational success. They make a difference to a child’s attitude, motivation to learn, and academic achievement through showing their positive attitude towards mathematics and being engaged in mathematics and numeracy at home.”

—Bragg et al. (2020)

In this chapter, we’ll explore:

- The foundations of family math engagement
- Building a collaborative relationship between educators and families
- High expectations for all students
- Practical strategies for secondary math educators to foster family engagement
- A vision for a supportive and inclusive approach to family engagement

THE FOUNDATIONS

Family engagement is an essential aspect of student success in secondary mathematics education. Although students spend much of their time in the classroom, the environment at home plays a crucial role in reinforcing learning. Research shows that students with engaged families are more likely to succeed academically, and this is particularly true in mathematics (Barger et al., 2019; Sheldon & Epstein, 2010), a subject where many students and families face barriers to understanding and engagement.

This chapter sets the foundation for building meaningful partnerships between educators and families to enhance student outcomes in mathematics. As we move forward, we'll address the research behind family engagement, the benefits of creating collaborative relationships between teachers and caregivers, and practical strategies for overcoming barriers to engagement.

WHAT FAMILY ENGAGEMENT IN MATH LOOKS LIKE



► Early in my (Shakiyya) teaching career I taught third-grade students, all of whom were dependents of the military, on a naval base in Japan. I witnessed a remarkable synergy between educators, families, and cultural diversity that transformed the learning environment. Several caregivers of the children attending the school volunteered as teaching assistants, becoming invaluable partners in the educational process. Some led literature circles, fostering rich discussions and critical thinking among students, while others worked behind the scenes, meticulously preparing materials for inquiry-based learning centers. Their presence was not just supportive; it was transformative, creating a bridge between home and school that enriched the learning experience for every child.

The school culture was further strengthened by the structure and discipline of military leadership. It was policy for every child to have a parental figure attend parent–teacher conferences—a practice that ensured consistent communication and reinforced the shared responsibility of nurturing student success. This expectation was about more than attendance; it symbolized a commitment to building a community where families and educators worked hand in hand. What made this experience even more profound was the blending of military culture with the rich cultural backgrounds of the children, families, and educators. Together, we cocreated a symphony of multicultural ways of being—an environment where diverse perspectives were not only respected but also celebrated. This collective effort promoted authentic family engagement that extended far beyond surface-level involvement.

Families became active participants in their children's education, contributing their unique strengths to support academic growth. This experience left an indelible mark on me and became foundational to my belief in the power of family engagement in education—particularly in mathematics. I saw firsthand how meaningful collaboration with families could transform not only student outcomes but also the culture of learning itself. It taught me that when families are genuinely engaged, they bring invaluable insights, energy, and support that can elevate education to extraordinary heights.



KEY TAKEAWAYS

- Although this vignette is drawn from an elementary experience, its core focus is on cultivating schools as welcoming places where families feel they belong. Such narratives highlight the critical role caregivers play as coeducators who actively contribute to students' academic journeys.



SOURCE: istock.com/David Sacks

Try This: To start the semester, educators connect with students' caregivers through calls or emails, introducing themselves and opening channels for communication. Beyond invitations to Open House events and regular newsletters, schools develop purposeful volunteer opportunities tailored for secondary families.

Example: Caregivers may engage by helping with math clubs or tutoring sessions, which broadens family participation across various grades and subjects while building on established relationships and assets.

Family engagement in mathematics is about cultivating a culture where math becomes as natural part of family life as sharing meals or weekend outings. Any time is an optimal time to engage with data, for example. While scrolling through social media, you may notice personalized ads designed to match your online shopping habits. These data structures and algorithms have purpose and profitability. Consider initiating a conversation with students about data using the following questions: “What methods were used to collect data? For what purpose? How will data be used to make decisions and by whom? What do you notice? What do you wonder?” This is the essence of true family engagement: a living, breathing mathematics that extends beyond the classroom walls.

FAMILY MATH ENGAGEMENT ACTIVITY AND PROMPTS (PRE-ALGEBRA/ALGEBRA)

Activity Framework: Strategic Tool Selection
for Measuring Area & Volume

Objective:

Students and families collaboratively explore how the choice of measurement tools affects the accuracy and convenience of calculating area or volume for objects or spaces at home.

Preparation:

- Materials Needed
 - Tape measure
 - Ruler

- Smartphone measurement apps
- Online geometry calculators
- Paper and pencil
- Recording sheets (printed or digital)
- Calculator (optional)
- Estimated Time
Allocate 20–30 minutes to complete measurements and calculations.

Introduction:

- Strategic tool selection in real-world measurement tasks is important. Different tools can impact the precision, convenience, and usability of measurements.

Activity Instructions:

1. Select an Object or Space:
Families choose a room or household object to measure.
2. Tool Selection:
Review available measurement tools and decide which to use.
3. Measurement and Calculation:
 - a. Measure the dimensions of the chosen object/space using each tool.
 - b. Record all measurements.
 - c. Calculate the area (for flat surfaces) or volume (for 3D objects) using the appropriate mathematical formulas.
4. Compare Results:
Analyze and compare the results from each tool for accuracy and ease of use.

Family Discussion Prompts:

- Which tool gave the most precise measurement? Why do you think that is?
- Which tool was the most convenient or easy to use?
- Did any tool give a result that was noticeably different from the others? What might explain the difference?
- How might your choice of tool change if you were measuring a much larger or smaller object?
- If you had to measure an irregularly shaped object, which tool(s) would you use and why?
- How do professionals (like builders or designers) decide which tools to use for different measurement tasks?

Reflection:

- Reflect on what you learned about tool selection and measurement accuracy.
- Encourage students to set a goal for improving their measurement skills or trying a new tool in a future project.

Plan:

- What is one new tool or technique you would like to try for measuring in the future?
 - How can you apply what you learned about precision and tool selection to other real-world math problems?
-

Research on How Family Engagement Impacts Students

A growing body of research underscores the significant role of family involvement in mathematics education. For example, a study conducted by the Global Strategy Group (GSG) for the Gates Foundation (2022) revealed that 96% of parents believe making math education more engaging and relevant significantly boosts their child’s likelihood of success. Parents shared several relevant examples, such as applying mathematics in computer science, using statistics in programming, and engaging in quantitative reasoning. They also emphasized the importance of deeper critical-thinking skills and creative problem solving.

As educators, we believe our number-one priority for caregiver engagement is about helping students see the mathematics in their daily lives. It’s about transforming the question “When will I ever use this?” into excited exclamations of “I can use this right now!”

In our middle and secondary math classrooms, we embraced this philosophy wholeheartedly. We didn’t just solve for x ; we used algebraic concepts to design and build catapults, exploring parabolic functions through the arc of a launched projectile. We collaborated with local artists to create mathematical art, turning abstract concepts into tangible, beautiful creations. We delved into city planning, using geometry to reimagine our community spaces. These experiences didn’t just teach math; they ignited curiosity and fostered a deep, lasting connection to learning.

Teachers can share the following ideas with families looking for valuable opportunities to engage with mathematics.

1. Involve students in home and community improvement projects, asking questions like, “How can we measure this?” or “What’s the best way to calculate the area?” This mirrors the classroom’s approach to city planning using geometry.

2. Explore mathematical art together (e.g., fractals and mandalas), creating patterns or designs that incorporate geometric shapes or algebraic concepts. This echoes the collaboration with local artists.
3. Encourage exploration of math-related books or documentaries, discussing the perseverance of mathematicians and scientists (e.g., *Hidden Figures* [Melfi, 2016], *McFarland U.S.A.* [Caro, 2015], and *Stand and Deliver* [Menéndez, 1988]). This approach supports the philosophy of igniting curiosity and fostering a deep connection to learning.

Engaging in these types of activities with families can reinforce the idea that math is a creative endeavor that opens opportunities to explore relationships, recognize patterns, and find symmetry and beauty in the world. This approach not only supports children’s mathematical development but also helps build their confidence and enthusiasm for math, mirroring the engaging and relevant experiences described in the classroom setting.

Try This: Consider coplanning one or two activities with a colleague who teaches another content area.

Example: Collaboration between the mathematics and physics departments can help educators provide instruction that transfers the mathematical knowledge of parabolic functions to the physical applications of parabolas in sports, architecture, and special effects.

BUILDING A COLLABORATIVE RELATIONSHIP BETWEEN EDUCATORS AND FAMILIES

Effective communication and collaboration between educators and families are crucial for supporting students’ math learning. By fostering open dialogue, creating inclusive environments, and empowering families, we can create a strong foundation for mathematical success.

Effective Communication Strategies

Transparent and frequent communication with families about their child’s math progress and challenges is essential and can occur through consistent updates on a child’s mathematical journey to help caregivers understand their child’s strengths and areas for improvement.

To facilitate frequent interaction, educators can utilize various communication channels:

- **Technology:** Use email, apps, learning management system, or text messaging for quick updates.
- **Newsletters:** Share classroom activities and provide ideas for extending learning beyond the classroom.

- Student-led parent–teacher conferences: Empower students to confidently lead discussions about their academic progress with teachers and caregivers, fostering collaborative goal setting and a shared understanding of their learning journey.
- Workshops: Organize math information sessions where teachers and families learn together; encourage caregivers to facilitate sessions about how they have supported their students with mathematics.

These channels can be used to communicate valuable information about syllabi, study guides and other resources, events, math course pathways, and college access networks (see Figure 1.1).

FIGURE 1.1 EXAMPLE FAMILY LETTER

Welcome, Family Partners!

We are so grateful to you for taking the time to engage with your students' math education journey.

Every unit includes a family letter that provides information about the key math concepts for this unit, connections to experiences beyond the classroom, opportunities to support students during the learning and application of key concepts, and additional resources.

Math 1 begins with a study of one-variable statistics. Statistics encompasses the collection, description, analysis, and interpretation of numerical data. Data play a crucial role in enabling individuals to make well-informed decisions. Posing questions about data collection and interpretation analyses is essential to building critical thinking skills and understanding the world. Students benefit from using data to critique injustice, collectively address community issues, and improve community well-being.

By the end of Unit 1, students will have investigated measures of central tendency (mean and median), created data displays (histograms, dot plots, and box plots), calculated summary statistics using technology, and interpreted the values in context. As students engage with statistics throughout this unit, they develop an understanding of statistical variability, descriptions of distributions, and informal comparisons of distributions.

Supporting Your Student

Multiple lessons in this unit encourage students to “Notice and Wonder.”

Here's how it works:

- Notice: Students start by observing a math problem or data set carefully. They focus on identifying specific details such as shapes, numbers, or patterns. For example, they might notice the symmetry in a shape or the frequency of certain numbers.
- Wonder: After noticing these details, students then reflect on their observations by asking questions and expressing curiosity. They might wonder what a pattern means or how a certain detail relates to the problem

Key Questions to Ask: Talking with Students

Any time is an optimal time to engage with data. While scrolling through social media, you may notice personalized ads designed to match your online shopping habits. These data structures and algorithms have purpose and profitability. Consider initiating a conversation with students about data using the following questions: “What methods were used to collect data? For what purpose? How will data be used to make decisions and by whom? What do you notice? What do you wonder?”

Connections beyond the Classroom

Career spotlight: Statistician

- Meet Tiffany Kelly (<https://bit.ly/TiffK>), IF/THEN Ambassador, from Brooklyn, New York. Tiffany majored in sport and recreation management, statistics, and computer science. Check out more information about her experience as a sports data scientist and other phenomenal women in STEM inducted into the IF/THEN Collection: <https://bit.ly/ifthen>.

Featured Task: The Shape of Distributions

Statistics is about using data to solve problems and make decisions. What’s Going On in This Graph? is a regular feature from the Learning Network and the *New York Times* <https://www.nytimes.com/column/whats-going-on-in-this-graph>. This website offers a variety of graphical representations for families to engage with students, such as a graph about the shape of distributions based on summer temperatures in the northern hemisphere:

<https://www.nytimes.com/interactive/2018/05/03/learning/08WGOITGraphLN.html#:~:text=The%20normal%20distribution%20is%20a,shape%20centered%20at%20the%20mean.>

The purpose of this task is to recognize a relationship between the shape of a distribution and its mean and median. Students can characterize the shape of distributions as symmetric, skewed, bell-shaped, bimodal, or uniform.

As you engage with the Featured Task, ask students the following questions:

- “What is this situation about? What is going on here?”
- “What are the quantities in this situation? A quantity is something that can be counted or measured.”
- “How might we approach this question? What is the first thing you will do?”

Reference

If/Then Collection: <https://www.ifthencollection.org/>

Illustrative Mathematics Task: The Shape of Distributions

<https://accessim.org/9-12-aga/algebra-1/unit-1/section-b/lesson-4?a=student>.

What’s Going On in This Graph? A regular feature from the Learning Network, the *New York Times*. <https://www.nytimes.com/column/whats-going-on-in-this-graph>

Creating Inclusive Learning Environments

Imagine a vibrant school hallway adorned with student artwork and multilingual welcome signs and language interpreters, setting the stage for inclusive Family Math Nights where every family is celebrated through shared meals, culture-based strategy games, and college access counselors. Picture a warm, inviting principal's office where caregivers feel at ease during open office hours to discuss their concerns or ideas. Envision a dedicated space for parent-teacher committees, equipped with resources and technology, where families and educators collaborate

Try This: To build strong partnerships, consider the following examples:

- **Organizing family fun nights that include math games or puzzles like Mancala, Loteria, and Go**
- **Hosting family math-focused office hours with a principal or superintendent to discuss math courses and transitions from elementary to middle and from middle to high school**
- **Hosting quarterly evening or weekend events to provide a space for students and families to access the Internet for academic support and mathematics tutoring**

on addressing home-school issues and developing innovative solutions. These thoughtful design elements and initiatives not only make the school more accessible but also signal to families that their involvement is valued and crucial to their child's education. Creating a welcoming and inclusive school environment encourages family participation, which is essential for fostering strong partnerships between educators and caregivers. Codesigning spaces and events that invite families to engage can empower schools to break down barriers and build a sense of community. Opportunities like these catalyze meaningful interactions with families and transform schools from mere buildings into thriving hubs of community engagement and shared learning experiences.

Empowering Families to Support Math Learning at Home

Learning doesn't stop when students leave school. They are constantly engaging with information from their social communities, and the home environment offers a valuable opportunity for further growth. However, it is essential that families are equipped with the mathematical conceptual understanding and strategies to effectively support their child's learning. Parents and guardians may not always have a strong background in math standards, and that's where educators come in. To assist families, we can share a variety of resources, strategies, and tools that are accessible, engaging, and effective for students of all levels.

1. Interactive Math Activities for Home Practice

To engage students beyond the classroom, create or use interactive math activities composed of rich mathematical tasks such as those from Khan Academy

(<https://www.khanacademy.org/>), Math for Love (<https://mathforlove.com/lessons/rich-tasks/>) and the *Grades 9–12 Illustrative Math Video Lesson Summaries* (<https://hub.illustrativemathematics.org/s/912/912-video-lesson-summaries>) that promote active learning. These resources help reinforce what students are learning in class and provide math practice that is more practical and less abstract. Interactive activities, such as puzzles, brainteasers, and math-based challenges accessible for free on sites like Prodigygame.com, can also keep sixth to eighth grade students engaged while they practice core skills. These resources can be designed in ways that promote joy and hands-on and kinesthetic movement, avoiding a focus solely on skill and drill worksheets and rote memorization, which can be discouraging for students. For example, explore concepts like arc length (Object 1.2) by designing and creating objects with curves and using calculus to calculate their lengths. More specific how-to videos can be accessed via YouTube.

Try This: To increase opportunities for family involvement and create inclusive environments, consider the following examples:

- **Offering flexible meeting times and brief, focused interactions**
- **Providing materials in multiple languages and using interpreters when necessary**
- **Engaging families in activities, such as sharing their personal math narratives and practicing math language skills using websites like *Illustrative Mathematics (2021)* and *Achieve the Core (2024)*, which offer guides, descriptions, and handouts that explain how to implement these routines in everyday conversations (see Chapter 2, *Mathematical Identity and Funds of Knowledge: Enhancing Engagement and Achievement* and Chapter 4, *Mathematical Language Routines*)**
- **Opportunities to meet in-person or virtually**

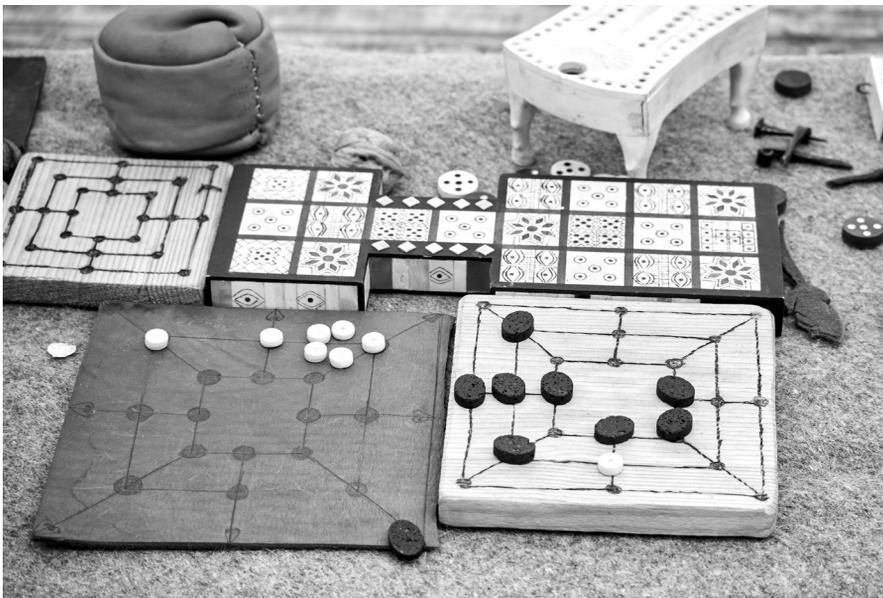


Istock.com/mirzavis

2. Recommendations for Math-Focused Books, Games, and Apps

In the digital age, there are countless resources available to reinforce math learning. Educators can recommend math-focused games, books, and apps that cater to different interests. Games serve as dynamic entry points for mathematics. Indigenous games are inherently engaging for students and are rich in mathematical content. Research from South Africa (Meeran, 2024) highlights how traditional games such as Morabaraba and Ur support the development of mathematical skills including number and geometric pattern reasoning, symmetry, and logic and spatial reasoning.

IMAGE OF THREE MORABARABA AND UR GAME BOARDS



SOURCE: [Istock.com/Andrey Zhuravlev](https://www.istock.com/Andrey_Zhuravlev)

Mancala or Indonesia Wari board games present an array of mathematical concepts and skills—pattern recognition, combinatorial thinking, discourse, and strategic and logical reasoning—that are foundational across grade levels and highly relevant to secondary math instruction, especially when considering family engagement and ethnomathematics.

Contemporary math-themed card games like *The VANG Game: Linear Functions* (Seda Educational Consulting, 2025) offers interactive game play to deepen understanding as students make connections between algebraic, graphical, numerical, and verbal representations of essential math concepts.

Stories involving mathematical concepts, such as *Powerful Mathematicians Who Changed the World: What We Do When Fairness Fails Us*, written



SOURCE: [istock.com/rudi_suardi](https://www.istock.com/rudi_suardi)

by educators for Grades 9–12 (del Rosario Zavala et al., 2023), can provide an interactive way for students to practice their skills beyond the classroom.

Moreover, by recommending resources appropriate for various skill levels, like Desmos (n.d.), which offers a graphing calculator and math activities, and Khan Academy skills practice, educators can ensure that there are options for all families, regardless of their comfort or confidence with mathematics.

Offering Guidance Without Overwhelming Families

Although it's crucial to provide resources and strategies for math learning, it's equally important to offer that support in a way that doesn't overwhelm families. Many parents and guardians may feel unsure about their ability to help with their child's math education, especially as students progress through secondary school. Clear, straightforward guidance is essential for encouraging families to engage without feeling stressed or inadequate. Here are some ways to accomplish this.

1. Focus on Everyday Moments for Math Learning

One effective way to ease families into supporting math learning is to focus on everyday moments. Family math engagement does not require caregivers to be math experts to help their children practice math skills. By guiding them to find math opportunities in regular activities, we can make math feel like a natural part of life rather than a subject to be feared. For example, when

planning a family trip, parents can ask their children to calculate travel time, estimate distances, or budget for expenses. These activities do not require special expertise but can help students understand that math is not just something that happens in school—it’s something that impacts their daily lives (see page 4 FAMILY MATH ENGAGEMENT ACTIVITY AND PROMPTS (PRE-ALGEBRA/ALGEBRA)).

Activity Framework: Strategic Tool Selection for Measuring Area & Volume).

2. Clear and Concise Instructions

Offering resources and tools is important, but clear and concise instructions are just as crucial. We want caregivers to know how to access the math course syllabus so that they know how to contact the teacher and advise their students about

Try This: Offer families straightforward strategies and questions that highlight math’s practicality and relevance in everyday life.

Examples: While grocery shopping, caregivers might encourage their child to calculate discounts, compare prices, or estimate the total bill. When supporting homework, families can engage students by asking questions such as: What is this problem about? What quantities or unknowns are involved? What is your first step? How can you be sure your answer is correct? These approaches build on the strengths and resources families already possess to deepen students’ understanding and appreciation of math.

available resources to support their learning. The strategies for cobuilding engagement are not intended to be overwhelming. We encourage all communication shared from school to home include clear instructions and explanations of how families can offer supports to enhance students’ learning. Avoid jargon or overly complex explanations; instead, for example, educators may share instructional videos from the curriculum and from YouTube, breaking down tasks into manageable steps (i.e., how to use a handheld or online graphing calculator) and providing examples when necessary. This allows caregivers to effectively support their child without feeling lost or uncertain about the process.

Empowering families to support math learning at home requires a careful balance of providing resources, strategies, and guidance that are practical and manageable. Sharing tools for incorporating math into

everyday life, creating interactive and engaging take-home kits, and recommending accessible educational resources can help families become active participants in their child’s learning. Additionally, educators can create a professional social media account (YouTube or Instagram, etc.) and add short instructional videos. However, it is equally important to provide clear and concise guidance that avoids overwhelming families. Focusing on everyday math moments and offering simple instructions can make math feel more accessible and less intimidating. When families are empowered and equipped to support their child’s math education, students could develop a deeper understanding and appreciation for the subject, which will benefit them in the classroom and beyond.

HIGH EXPECTATIONS FOR ALL STUDENTS

In our years of teaching, we have come to understand that our classrooms are as diverse as the world outside our school walls. This diversity can enrich our mathematical journey together. As we navigate this landscape, we recognize that no matter what unique characteristics students and families bring to the math classrooms, all students have the ability to learn and progress in high-level mathematics.



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SOURCE: istock.com/fizkes

Language, far from being a barrier, can be a bridge to deeper understanding. I (Shakiyya) remember a vibrant Family Math Night where the room buzzed with conversations in multiple languages. The joy on caregivers' faces as they engaged with their children's learning in their native tongue was palpable. It wasn't just about translation; it was about creating a space where every family felt seen, heard, and valued.

But language is more than just words on a page. It's about the nuanced "math talk" that can differ across cultures. We delved into exploring how mathematical concepts are expressed in different languages (see Chapter 4, Mathematical Language Routines), uncovering rich metaphors and unique perspectives that broadened our understanding. This approach didn't just help our multilingual families; it opened new avenues of thinking for all of us, reminding us that mathematics is truly a universal language.

Building on the importance of embracing diverse perspectives in mathematical language, it is equally crucial to cultivate learning environments that

Try This: For general math teachers who are engaging in the review process of IEPs and 504 Plans for the first time, we encourage you to offer families opportunities to contribute practical strategies that have proven successful at home.

Example: Ask questions like, “How does your student best tackle multistep problems at home?” or “What methods help break down algebraic and quantitative reasoning concepts in ways their young person understands?” Focusing these discussions on implementing supports turns IEPs and 504 Plans into actionable, responsive, and personalized steps that reflect each student’s unique needs and strengths.

recognize and support the varied ways all students, including those with physical, cognitive, and learning disabilities, understand and communicate their mathematical knowledge. When students with disabilities are in an environment that believes in their abilities and acknowledges that not all students acquire and process information the same way, they can effectively learn and understand mathematics. For example, incorporate hands-on and inquiry-based learning, such as the use of materials coded with Braille for students with vision loss to construct geometric models for city planning. NCTM (2024a) embraces differentiated approaches to math instruction and asset-based beliefs that all students are capable doers of mathematics and can achieve their academic goals. Asset-based perspectives emphasize building on current strengths and available assets instead of highlighting deficiencies or gaps (Steele & Honey, 2025).

Family–school partnerships, formalized through Individualized Education Plans (IEPs) and 504 Plans, are not just legal documents. They are living, breathing roadmaps for success, cocreated with families who know their children best. In our classroom, these plans became springboards for innovation, challenging us to think creatively about how to make mathematics accessible to every learner.

In our experience, we’ve found that approaching these matters with transparency and open communication transforms what could be a bureaucratic process into an opportunity for deeper collaboration. When families understand not just the “what” but the “why” of accommodations and support strategies, they become empowered advocates for their children’s education.

This journey of inclusive family engagement requires us to constantly reflect, adapt, and grow. But the rewards are immeasurable. Each chapter concludes with self-reflection prompts and reflection questions educators can share with caregivers. We’ve seen young people who once shied away from math become eager problem solvers, their confidence bolstered by a support system that spans from classroom to living room.

Every challenge is an opportunity for innovation. Through open dialogue with families, every codeveloped accommodation made is a step toward a more inclusive, vibrant mathematical community.

PRACTICAL STRATEGIES FOR SECONDARY MATH EDUCATORS TO FOSTER FAMILY ENGAGEMENT



► I (Shakiyya) vividly recall our middle school's Museum Nights. What started in the sixth-grade social studies classes quickly became an integrated project across all grades, blossoming into a vibrant science, technology, engineering, arts, and mathematics expo that set our school abuzz with excitement. Families poured in, their eyes wide with wonder as they explored interactive exhibits showcasing the real-world applications of the multiple subjects we'd been studying.

Our collaboration extended to the local university and businesses as well. Parents who were employed at the local universities and owned local businesses invited their colleagues to learn from students about their research. These small open-school events cultivated partnerships with the engineering department at one of the universities, which brought engineer majors to the middle school campus to share their science, technology, engineering, and mathematics (STEM) mobile learning lab.



KEY TAKEAWAYS

- Museum Nights show how blending math into real-world, cross-subject projects can truly engage students and their families. When math comes alive through hands-on exhibits that connect to everyday life, it sparks curiosity and makes learning memorable, not just theoretical.
- The vignette also reveals the power of partnering with local universities, businesses, and parents. Bringing in community experts and college students helps students see how math plays a role in real STEM careers. These connections extend learning beyond the classroom and create a welcoming environment where math feels relevant and connected to the world around them.

These events can do more than just reinforce mathematical concepts. They have the potential to build genuine family math engagement. Families who may have felt intimidated by mathematics may find themselves engaged and finding joy in the learning of mathematical concepts through play. In this grand equation of education, community partnerships and family events are catalysts that can transform the entire formula. They remind us that when it comes to nurturing a love for mathematics, it truly does involve community.

Try This: Encourage school and community organizations led by families to cohost events in partnership with school staff.

Example: Parent-Teacher Associations or similar caregiver groups might organize gatherings where they demonstrate how mathematics is applied in their own careers. These events can also create opportunities for students to explore apprenticeships, allowing families to share their expertise and expand students' real-world understanding of math. The Georgia Department of Education offers quality examples of how families can participate demonstrating how mathematics is applied in their profession outside of the home (Georgia Public Broadcasting, 2025).

Try This: When organizing your school's family math game and information nights, consider district facilitated partnerships with out-of-school networks (i.e., Alliance of Indigenous Math Circles, 2025, <https://aimathcircles.org/materials-for-math-circles/>) to design interactive stations that allow families to engage with mathematics such as, geometric activities using origami or engaging with data science.

Example: Introducing resources like Code.org (<https://code.org/en-US/parents>) can provide families and young people with accessible, gamified practice in coding and machine learning. Offer a variety of hands-on activities that highlight the diverse ways math connects to everyday experiences and emerging technologies, building on the curiosity and strengths that families already bring.

VISION FOR A SUPPORTIVE AND INCLUSIVE APPROACH TO FAMILY ENGAGEMENT

Envision a world where families are not just passive observers in their children's mathematical journey but active, essential partners. It's a world where the language of mathematics is spoken not only in classrooms but also around dinner tables, in parks, and during everyday activities.

Achieving this vision requires more than good intentions—it demands a collective commitment from educators, families, and policymakers to create environments that prioritize collaboration and inclusivity. It's about reimagining roles, breaking down barriers, and building connections that foster understanding.

Organizations like the National Council of Teachers of Mathematics, TODOS: Mathematics for All, and the Center for Family Math are not just resources, they are beacons lighting the way toward a more inclusive future. Their research, tools, and best practices help us work toward a world where every family feels empowered to support their child's growth in mathematics.

As we pursue this vision, we remember that it's not about perfection—it's about progress. We aim to create spaces where mistakes are seen as valuable learning moments, where questions are as important as answers, and where every family's unique perspective enriches our mathematical conversations.

We dream of a future where our classrooms extend far beyond four walls where public spaces turn into geometry lessons, grocery stores become algebraic puzzles, and family game nights evolve into probability workshops. In this future, math isn't just a subject; it's a lens through which we explore and understand our world.

This vision calls us to be more than mathematics teachers within the school. We can be bridge builders, linking school to home, theory to practice, and abstract concepts to real-world experiences. We can be innovators, constantly finding new ways to make math engaging and accessible for all families. And we can be believers in the potential of every student, the power of family engagement, and the transformative impact of mathematics education.

CONCLUSION: RECAP OF KEY POINTS

As we move forward, let's carry with us the stories of ourselves and the students we work with, remembering the powerful impact of partnering with families in education. Together, we can transform math from a source of anxiety into a realm of curiosity and discovery, empowering every family to embrace their role as lifelong mathematical thinkers and problem solvers.

- Parents believe that making math relevant and engaging to students can significantly improve their child's academic performance and their comprehension of mathematical concepts.
- Family math workshops and consistent communication between teachers and families fosters strong partnerships and creates opportunities for open dialogue and collaboration.
- Empowering families to understand and advocate for the specific accommodations outlined in a student's IEP helps them support their child's growth and responsibility in learning.
- Offering clear and concise instructions for families so that they can confidently engage in math activities at home cultivates a deeper connection to the subject.
- Envision a future where families are active partners in their child's math education, bridging classroom learning with real-world experiences, and fostering a collaborative, inclusive environment that empowers every family to engage in mathematics as a tool for understanding the world.

REFLECTION ON PRACTICE

In this chapter, we've explored the importance of family engagement in secondary math education and the ways educators can build stronger relationships with families. As we close this chapter, let us open our hearts and minds to the possibilities that lie ahead. Let us commit to this journey

of continuous improvement, of relentless innovation, and of unwavering belief in the potential of every student and every family.

Together, we're not just teaching math—we're cultivating a generation of confident, curious, and capable mathematical thinkers. And in doing so, we're not just shaping individual futures; we're transforming the very fabric of our communities. This is our calling, our challenge, and our incredible opportunity. Let's embrace it with all the passion, creativity, and dedication that our students and their families deserve.

The equation for success in mathematics education is complex, but with families as our partners, we have all the variables to solve it. Let's move forward, united in our vision, and watch as the solution unfolds—a solution that will ripple through generations, opening doors of opportunity and illuminating the beauty of mathematics for all.

Self-Reflection Prompts

- What are the most effective methods for frequently updating caregivers on their child's math progress?
- What digital tools or platforms can enhance communication between teachers and families regarding math progress?
- How can you tailor your communication approach to accommodate your students' family backgrounds and language needs?

Reflection Questions Educators Can Share with Caregivers

- What method of communication works best for you (e.g., email, text, app notifications, phone calls)?
- What type of tools or resources would help you stay connected to your child's progress in math?
- What type of information about your child's math progress is most meaningful to you (e.g., numerical data, written explanations, or examples of your child's work)?