



October 2021

TEACHER-FAMILY PARTNERSHIPS EMPOWER MATH STUDENTS



**Parent
Organization
Network**

Breaking Through Barriers

STEM⁵⁴



**THE
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expectations**

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INTRODUCTORY LETTER

Dear Reader:

The Parent Organization Network (PON) is committed to removing systemic barriers in public education so that parents and educators can effectively partner to ensure equity and excellence for all students. Together with our partners, who represent practitioners and researchers of family engagement and/or math, we took on a math research and discovery project which consisted of an intensive literature review; identifying organizations in California and across the nation that work with families on math; and interviewing content experts. Our collaboration led to this report, which aims to offer alternatives to broaden and deepen inclusion of family engagement in student math learning.

The report is organized in two sections: family engagement and family math. Each of these sections include highlights of key themes in the research; recommendations to integrate culturally responsive engagement; and resources for educators and families.

KEY TAKEAWAYS

- **To improve inclusion of families in math learning, educators need to update their knowledge and practices of family engagement.** For the past 30 years research and legislation have influenced major shifts in the theory and practice of family engagement. Key shifts include moving away from only training parents to dual capacity building for families and staff; from hosting activities or events for parents for the sake of compliance to differentiated programming to reach all the families; and from an isolated approach to an integrated one where family engagement is present throughout the district's structure, plan, and budget so that equity and student goals are achieved. For this reason, this section reviews current requirements and shares resources to help educators learn about current practices.
- **Families can play a key role in closing math and other achievement gaps, as well as in helping educators enhance the cultural relevancy of lesson plans — if they are included and engaged.** The first steps toward this inclusion are to acknowledge and embrace the funds of knowledge all families possess; get to know them so their experiences can help to adapt lesson plans; and then partner with them to codesign family engagement strategies in math, which will look different across the TK-12 continuum. This report outlines the multiple roles parents play in their children's education, along with strategies that teachers and schools can use to support parents in fulfilling these roles.
- **"Family math" is an emerging field with great potential to impact student outcomes.** Here we highlight a few community-based program models that show promise in expanding effective, culturally relevant practices to capitalize on the ability and desire of parents and families to support student learning.

Given the current equity gaps evident in math learning, and a renewed focus on the "whole child," which highlights the need to shift to relationship-centered education, greater family engagement, the expansion of transitional kindergarten for all four-year-olds, and the influx of federal dollars, California has the opportunity to take a bold step forward in being more inclusive of families. It is only through strong family-school partnerships that we will transform our public education system to fully support all students, especially those from low-income families.

Sincerely,



Araceli Simeón
Executive Director



FAMILY ENGAGEMENT IN SCHOOLS

Decades of research show when parents¹ are engaged in their children’s education, student outcomes and schools improve. More specifically, students demonstrate improved school readiness and attendance; higher test scores, grades, and graduation rates; increased motivation and self-esteem; lower rates of suspension; decreased use of drugs and alcohol; and fewer instances of violent behavior (Boonk, et al, 2018; Reynolds, et al., 2018; Castro, 2015; Henderson & Mapp, 2002). Schools with high family engagement experience increased teacher job satisfaction and improved morale, reducing their likelihood of leaving the profession; higher ratings of teachers by parents; more support from families; better reputations in the community; and higher student achievement (Mapp & Kuttner, 2013; Met Life, 2012). Moreover, while Black, Indigenous, and Latinx parents have much to offer in supporting student learning, both at home and in the classroom, they are typically not invited to be a part of the learning process (TODOS, 2020).

Effective family engagement refers to having “an intentional and systematic partnership of educators, families, and community members ... [who] share responsibility for a student’s preparation for school, work, and life, from the time the child is born to young adulthood” (Weiss, et al., 2010). To build an effective partnership, the California Department of Education (CDE) acknowledges that “educators, families, and community members need to develop the knowledge and skills to work together, and schools must purposefully integrate family and community engagement with goals of students’ learning and thriving” (California Department of Education, 2017).

The Local Control Funding Formula (LCFF), a state law, established eight state priorities that all local education agencies (LEAs) must address annually in their Local Control and Accountability Plans (LCAPs) and report progress via the California School Dashboard. Priority 3 is dedicated to parental involvement, which is now more commonly referred to in the field as family engagement. To reflect on implementation progress for family engagement, LEAs complete the LCFF Priority 3 Self-Reflection Tool. **This Tool includes 12 evidence-based practices within three themes: building relationships between school staff and families; building partnerships for student outcomes; and seeking input for decision making (California Department of Education, 2019).**

¹The term “parent” here is broadly defined to include birth, adoptive, and foster parents, along with legal guardians, as well as grandparents, adult siblings, aunts and uncles, and other relatives and non-relatives who are involved with raising and educating a child.

Roughly half of these practices focus on support provided to parents to engage with school staff and support student learning at home, with the other half focused on support given to staff for engaging families.

Specific practices outlined in the [Self-Reflection Tool](#) which directly relate to teachers include gaging an LEA's progress in:

- Developing the capacity of staff (i.e., administrators, teachers, and classified staff) to build trusting and respectful relationships with families;
- Creating welcoming environments for all families in the community;
- Supporting staff to learn about each family's strengths, cultures, languages, and goals for their children;
- Developing multiple opportunities to engage in two-way communication between families and educators, using language that is understandable and accessible to families;
- Providing professional learning and support to teachers and principals to improve a school's capacity to partner with families; and
- Implementing policies or programs for teachers to meet with families and students to discuss student progress and ways to work together to support improved student outcomes.

KEY LITERATURE THEMES FOR FAMILY ENGAGEMENT

The 12 practices in the Self-Reflection Tool developed after CDE staff and an Ad Hoc Family Engagement Group conducted an extensive review of relevant research for 17 months, from April 2017 through December 2018. Appendix 'A' of the [CDE Family Engagement Toolkit](#) outlines the following key themes from the literature:

- Family engagement must be embedded in goals for student learning.
- A partnership orientation to family engagement has the most promise for improved student outcomes [because partnership requires trust, respect, and sharing accountability for results].
- Family-engagement programs need to focus on building the capacity of both educators and families to work together as partners. Educators need to be culturally responsive to diverse families and use an asset-based approach to understanding families.
- Educators need to build trusting relationships with families, especially with those ...in communities that have longstanding dynamics of miscommunication with and mistrust of schools.
- Creating welcoming school environments is a necessary component of family-engagement efforts.
- Families can most influence student success by providing support at home for learning and engaging in two-way communication with school.

Furthermore, it is crucial for educators to evaluate their beliefs about families and understand the role educators play in building strong home-school partnerships. An essential core belief is that "the responsibility for building partnerships between school and home rests primarily with school staff, especially school leaders" (Henderson, et al., 2007). Traditionally, when it comes to supporting the role of families in their children's education, too often this communication has been focused only on how to help with homework or to attend general school events or meetings; however, this model tends to favor middle-class parents while devaluing or dismissing the knowledge funds and contributions of lower-income parents, those who are non-White, or non-English speakers (Civil et al., 2005, 2010).

For this reason, there is shift to more fully acknowledge the diverse roles parents can play, and to build their capacity as supporters of their children's learning and development; as encouragers of positive self-image; as monitors of time, behavior, needs and resources; as models of lifelong learning; as advocates and activists for improved learning opportunities; as decision-makers on educational options for their children and schools; and as collaborators with school staff on school improvement and reform (Mapp & Kuttner, 2013).

Current best practices to improve family engagement focus on “codesigning” educational programs and individual student academic plans with parents. This concept refers to involving parents from nondominant groups in schooling, not as passive recipients of knowledge, but as expert collaborators, fellow leaders, and equitable partners when it comes to teaching and learning (Ishimaru, et al., 2015). **Codesign starts by “asking questions, listening, empowering, sharing perspectives and information” to then “partnering, implementing, and assessing new approaches and solutions, and supporting parent leadership and advocacy for educational equity and change”** (Weiss, et al., 2018).

For teachers, this means adapting lesson plans and homework assignments after listening to and learning from families, which helps to overcome stereotypes, connects in- and out-of-school knowledge for students, and moves away from individual to communal work (Brown et al., 2018). Teachers, whether working individually or coordinating efforts with others in the school, can also “support [parents] in understanding the goals and strategies being employed in the classroom” and point parents to school resources where they can find support “to effectively engag[e] with their child’s teacher” (Niebuhr & Weller, 2016).

This shift in practice emphasizes the need to provide capacity building to school staff to engage families because educators do not receive meaningful formal training on this important topic in either their teacher preparation programs or induction (Simeon & Massaro, 2020; Shartrand, et al., 1997). Moreover, the 2012 Metlife Survey of the American Teacher in 2012 found that 72% of principals and 73% of teachers surveyed found it “challenging” or “very challenging” to engage parents and the community in improving the education of students.

HOW CAN TEACHERS STRENGTHEN THEIR CAPACITY TO WORK WITH FAMILIES?

According to the key recommendations of Dr. Karen Mapp in *Powerful Partnerships*, teachers can develop the following knowledge and skills to collaborate more effectively with parents:

- Examine your core beliefs about parents and family engagement;
- Learn about your students and their families, then] welcome, honor, and build relationships with them;
- Transform family conferences [so parents and students fully understand academic goals and how progress will be measured, to aid in supporting the student’s learning throughout the school year. Note that not all parents are able to access online “parent portal” platforms or know how to interpret standardized testing. Also, fully nine out of 10 parents, regardless of geography, income, or race, assume that having good grades (i.e., A’s and B’s) indicates proficiency, when this is often not the case (Learning Heroes, 2018). Reviewing standardized test scores with parents is critical for them to fully understand whether their child is performing at grade level or making adequate progress when learning the English language;
- Maintain strong family ties throughout the year;
- Support your work with family-friendly resources [by collaborating with colleagues, classified staff, and parents to find or co-design these resources] and
- [Request support from the school principal for training or professional development on family engagement, and to be given proper support with fully translated written materials and qualified language interpreters.]

RESOURCES TO STRENGTHEN PRACTICES FOR EFFECTIVE FAMILY-TEACHER RELATIONSHIPS

To increase familiarity with these concepts and practices, we recommend exploring some of these resources:

ARTICLES FOCUSED ON THEORY:

Weiss, H., Lopez, M.E., and Caspe, M. (2018). Carnegie Challenge Paper: Joining Together to Create a Bold Vision for Next Generation Family Engagement. Global Family Research Project.

- Caspe, M., Lopez, M.E., Chu, A., and Weiss, H.B. (2011) Teaching the Teachers: Preparing Educators to Engage Families for Student Achievement. National PTA and Harvard Family Research Project Issue Brief: May 2011.
- Edwards, P.A., and White, K.L. (2018). Working with Racially, Culturally, and Linguistically Diverse Students, Families, and Communities: Strategies for Preparing Preservice Teachers. Journal of Family. Diversity in Education, Volume 3: Number 1 2018.
- Mapp, K.L., & Kuttner, P.J. (2013). Partners in Education: A Dual Capacity-Building Framework for Family-School Partnerships. <https://www.dualcapacity.org/>.

PUBLICATIONS FOCUSED ON PRACTICE:

- California Department of Education (2017). Family Engagement Toolkit: Continuous Improvement through an Equity Lens.
- Epstein, J. L. and Associates (2009). School, Family, and Community Partnerships: Your Handbook for Action. Corwin Press: Thousand Oaks, CA. See: Implement Teachers Involve Parents in Schoolwork (TIPS), page 275.
- Flamboyan Foundation (2021). Academic Partnering Toolkit for Teachers. Washington, D.C.
- Hiatt-Michael, D.B. (Ed) (2007). Promising Practices for Teachers to Engage with Families of English Language Learners. Charlotte, NC: Information Age.
- Mapp, K.L., Carver, I., Lander, J. (2017). Powerful Partnerships: A Teacher’s Guide to Engaging Families for Student Success. Scholastic, Inc.
- Moore, T. (2019). Unreached: What Every Educator Wants to Know about Engaging Families for Equity and Student Achievement. Learning Science International: West Palm Beach, FL.

FAMILY ENGAGEMENT PROFESSIONAL DEVELOPMENT PROVIDERS:

- California State PTA: Training “From Compliance to Connection” for administrators – currently being beta tested in Fall 2021. Those interested may inquire at programsupport@capta.org.
- [High Expectations Parental Service](#): Training for teachers and administrators
- NEA and the National Association for Family, School, Community Engagement Association have 8 “[micro credentials](#)” for educators on topics mentioned above
- [Parent Institute for Quality Education \(PIQE\)](#) Teacher-Parent Engagement Workshop
- [Parent Teacher Home Visits](#): Training for teachers
- The Riverside County Office of Education [Parent Engagement Leadership Institute](#) offers ongoing training and extension courses at University of California, Riverside
- The San Bernardino County Superintendent of Schools [Family and Community Engagement Support Services](#)
- [San Diego State University Center for Family, School and Community Engagement](#): Family-Community Engagement Academy for Educators
- [Scholastic Education: Building Powerful Partnerships with Families](#). Webinar Series from Dr. Karen Mapp.
- WestEd Family Engagement — [Academic Parent-Teacher Teams \(APTT\)](#)





THE ROLE OF PARENTS AND FAMILIES IN SUPPORTING MATH

While teachers are responsible for math instruction, families are key collaborators in supporting the development of future mathematicians and “can play a crucial role in their children’s learning and motivation because they know what interests them” but they are “often an untapped resource” (Harackiewicz, 2018). In this section we will explore key literature themes in early math, family math, and list existing resources and supports (i.e., programs and events) which teachers and schools may consider as they evaluate or re-design family math activities.

KEY LITERATURE THEMES FOR EARLY MATH

Early math skills are a critical predictor of children’s later math success in elementary school as well as high school (Eason, et al., 2020). Evidence shows that learning mathematics is vital for a child’s early years and for later success in mathematics as well as better overall academic outcomes in such areas as literacy, science, and technology (Duncan et al., 2007; National Association for the Education of Young Children and National Council of Teachers of Mathematics, 2002). Moreover, positive outcomes in math strongly predict a wide variety of long-term outcomes such as school retention rates as well as employability and wages in adulthood (Geary, et al., 2013). Of great concern is that disparities in children’s early math knowledge are apparent during preschool and persist as they progress in school (Eason, et al., 2020). Also, when it comes to disrupted learning, mathematics often shows the steepest losses over the summer break and during other time outside of school (Quinn & Polikoff, 2017). A similar pattern may develop following disrupted learning due to the COVID-19 pandemic.

Mastery of mathematics in the United States varies widely along socio-economic lines. Access to high-quality early childhood education is contingent on the availability of programmatic “seat” spaces and the income eligibility of families applying. For some low-income parents, engagement in math may be hampered by multiple factors, including feeling less ready to assist their children due to limitations in their own education, specific discomfort with parents’ mathematical skills (sometimes referred to as “math anxiety or phobia”), a lack of awareness of the importance of early mathematics proficiency, and the stress of inadequate financial resources to subsist as well as to pay for out-of-school learning (i.e., after-school and summer programs, sports, music, art, and other enrichment activities) (Knitzer & Lefkowitz, 2006; McLoyd, 1990; Weiss et al., 2018). Moreover, the lack of awareness about the vital research in math learning leads most parents to prioritize language development for their young children over mathematics (Cannon & Ginsburg, 2008)



To address the lack of equitable access to early education, Governor Newsom and the California Legislature approved expanding transitional kindergarten (TK) for all four-year-olds in 2021. This expansion will occur in phases over multiple years, though at the moment it is unclear whether the current TK program will adopt one or multiple early-childhood models or programs currently used across the state. Regardless of the early-childhood program approach, opportunities exist for math learning in TK settings and to facilitate family math (Eason, et al., 2020). However, investments in professional development will be required to support both early childhood teachers and parents. For example, early educators typically have more exposure to the concept of family engagement in their preparation programs but are often uncomfortable teaching mathematics (Clements and Sarama, 2007; Copley, 2004; Ginsburg et al., 2006; Lee and Ginsburg, 2007; Simeon & Massaro, 2020). Many teachers, like parents, avoid teaching mathematics because of their own negative early experiences (“math anxiety” again) or due to a lack of professional development offerings or training.

To ensure that all children develop the mathematical foundation they need for success, parents, early childhood and K-12 teachers, policy makers, and communities need to become familiar with research and best practices, change the way they think about and understand mathematics, and work together across education systems toward this goal. Family engagement must be integrated in the learning goals prioritized by each LEA, in the form of a district-level family engagement team which works with families, paying specific attention to mathematics.

KEY LITERATURE THEMES AND PRACTICES FOR THE ROLES OF PARENTS AND FAMILIES IN MATH LEARNING THROUGH THE PK-TO-12 CONTINUUM

The Family Math Implementation Roadmap Project defines family math as activities that happen outside of the classroom and within the context of family relationships, the community, and everyday life that supports young children and families to:

- **Strengthen their math awareness and concepts;**
- **Feel enthusiastic and confident about their math abilities and develop strong math identities; and**
- **Understand and use resources to help improve understanding of math concepts.**

We know that “families matter when it comes to children’s development and learning, from birth into and through adolescence” (Weiss et al., 2018). Also, “families play multiple roles in students’ development and learning” and may look different “across time and transform according to age and context” (Weiss, et al., 2018). Next, we will describe how each parent role looks when supporting math learning throughout the PK-12 continuum.

PARENT ROLES IN STUDENT MATH LEARNING FOR ALL AGES AND GRADE LEVELS

These descriptions combine knowledge from family engagement and family math research with experiences from practitioners and parent leaders. It is the LEA's responsibility to build capacity of school staff and families so each can effectively play their respective roles to support student learning.



CO-CREATORS:

When participating in school meetings, parents share with educators and other parents successful strategies for how their family supports student math learning at home.



SUPPORTERS:

Parents support student math learning throughout daily routines, family activities and games.



ENCOURAGERS:

Parents encourage children's curiosity, praise their effort, and encourage them to explore math concepts, STEAM-related careers, as well as prominent Black and Latinx professionals in the field.



MONITORS:

Parents partner with teachers and others (e.g., the English Learner coordinator, Title I coordinators, or counselors) to ensure their children are reaching developmental milestones and grade-level proficiency in math but also, in the case of English learners, reading and language development.



ADVOCATES:

Parents reach out to the school if their child is experiencing challenges, needs different types of support, or if changing home circumstances are impacting the child's ability to pay attention in class.

Also, parents advocate for annual training and request for the school to partner with others to bring resources and math programs.



MODELS:

Parents model that making mistakes and learning from them is part of the learning process and that persevering in times when learning is difficult helps to overcome adversity. Also, parents model asking for help when needed and taking initiative to look for community resources.



EARLY YEARS

Most currently available family math programs are tailored to support parents of young children, from birth to age 8. The earlier families are given tools and resources to engage with and support their children's education, the better the outcomes for children and schools.



Supporter: In the early years, parents may play more of a “co-teacher” or “supporter” role in helping children learn concepts of numeracy, spatial reasoning and patterning, so children can be better prepared for kindergarten. Parents also play a key role in:

- Establishing home learning environments; having books, math games and puzzles in the home for children is associated with math achievement (Eason, 2019).
- “The amount of mathematics talk that children hear” (Eason et al., 2020) and playing fun activities and games with children (Boaler, 2008, 2015).
- Exposing children to math concepts as a natural part of everyday tasks, such as cooking, grocery shopping, doing laundry, gardening, bedtime routines, or when



commuting. These activities are “opportunities to meet families where they already are beyond school” by posting games or information in the community, such as at sports facilities, parks, clinics, laundromats, libraries, and public transportation hubs, among many other places (Eason et al., 2020).

- In practice, many programs encourage parents to use online tools to support their children’s learning at home.



Encouragers: Parents also play a critical role in developing growth mindsets, which refers to the idea that intelligence is not fixed, and the brain can become more intelligent.

How parents praise their toddlers matters. The more parents use process praise, acknowledging their children’s efforts in achieving a task when they are 1- to 3-year-olds, the more likely the children are to develop a growth mindset five years later (Gunderson et al., 2013). Additional studies show that middle school students with growth mindsets earned higher math grades and were more likely to be placed into advanced math courses over time when compared to students with fixed mindsets (Blackwell, Trzesniewski, & Dweck, 2007; Romero et al., 2014).



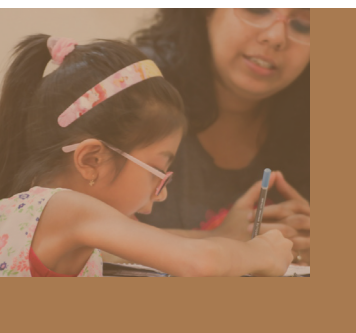
Monitors: Parents partner with the teacher to ensure their child is reaching developmental and kindergarten-readiness milestones. If the child is not reaching developmental milestones (e.g., socio-emotional, language communication, cognitive, movement or physical development), the American Academy of Pediatrics recommends that parents request a developmental screening from their child’s doctor.



Model: Parents need to be self-aware and reflect on their comfort level with math. If parents had negative math experiences in school, they must make a conscious decision to avoid transferring their own fear or anxiety to their child. It is important for them to seek, and for the school to offer, opportunities (e.g., classes, programs, groups) where parents and children can learn math together. This boosts parents’ self-confidence in math and helps them to model perseverance. It also goes a long way toward dispelling the all-too-common “math phobia.”



Advocates: Parents ensure that their early childhood provider has a math and science curriculum that prepares children for those subject matters in kindergarten.



ELEMENTARY

Co-creators: In elementary, many opportunities are available to participate in traditional parent-engagement activities at school sites, such as events, PTA, advisory committees and decision-making councils, and through other volunteer opportunities. To ensure these activities are welcoming of diverse parents and responsive to cultural differences, it is recommended that school administrators create spaces where parents can:

- Share successful strategies that work for their families at home so the school can take into account families’ funds of knowledge and culture, while highlighting practical information that can be used by other parents.
- Request programming that will support parents in helping their children. Parents need to stress that programs go beyond strictly offering subject-matter knowledge by also providing practical strategies to use at home. Families should let the school know if they used these strategies and whether those were effective.





Supporters: It is encouraged for families to:

- Talk to children about what they are learning in math. Ask questions, such as, “What did you learn today?” “If you made a mistake, what did you learn from it?”
- Have children teach family members what they are learning in class.
- Ensure children know basic math facts: multiplication, division, addition and subtraction. Playing family games with children to master these skills is helpful and effective in establishing a strong arithmetic foundation.
- Create family math nights at home with neighbors and friends so math and science become a part of family life, not an add-on.
- Visit local museums to expose children to what math and science can do.



Monitors: **Fully nine out of 10 parents, regardless of geography, income or race, assume that having good grades (i.e., A’s and B’s) indicates proficiency, when this is often not the case (Learning Heroes, 2018).** Reviewing standardized test scores with parents is critical for them to fully understand whether their child is performing at grade level or making adequate progress when learning the English language. For this reason, it is recommended for schools to support parents in:

- Learning how to monitor learning progress beyond report cards. Parents need to become familiar with basic use of technology and the school district’s online parent portal to monitor homework, attendance, standardized test results and, when needed, to request results for benchmarks and other internal diagnostic tools which teachers use to determine a student’s proficiency level in math and language arts.
- Understanding English language-development programs and the English Language Proficiency Assessments for California (ELPAC) assessment so parents can help their EL students to reclassify in elementary school. Timely reclassification facilitates access to advanced math and college-level classes in middle and high school.



MIDDLE AND HIGH SCHOOL



Encouragers: **In middle school and high school, the family’s role is related to “improving or increasing children’s interest, academic persistence and success, standardized test outcomes, [and] career choices,” which include planning for the future and in “brokering their participation in activities that build STEM competencies”** (STEM Next Opportunity Fund, 2019). Research also shows that, “... brief motivational intervention with parents can have large effects on high school STEM preparation, as well as downstream effects on STEM career pursuit five years later [T]eachers and parents can make important contributions to students’ math and science learning and motivation by focusing on its current and future value” (Harackiewicz, 2018). For this reason, it is recommended for parents to:

- Encourage and develop a child’s passion for math by exploring their interests.
- Enroll their children extracurricular STEAM programs and activities that successfully develop strong math and science skills.
- Explore community college dual-enrollment programs and request this from the counselor if the child would benefit from participating in this program. Dual





enrollment allows students to earn credits for college courses completed while they are still in high school, and these courses also count toward their high school diploma.



Supporters: Parents need to:

- Create a learning-support model at home, using online apps and enrichment programs.
- Create strong relationships and meet regularly with math teachers, academic counselors, career advisors, and tutors, along with participating in extracurricular activities that will reinforce or enhance math learning, such as Academic Decathlon, Mathletes club, etc.



Monitors:

- Parents need to make sure their child is successfully completing college preparatory, “A-G” math courses. This effort should begin as early as middle school.
- When children are earning high grades on their report cards, ask what this means. Do not assume they have achieved grade-level proficiency. Whether the child is above or below grade level, ask how differentiation is taking place in class to support his or her learning. Does the student qualify for “tutoring” or “gifted” placement?



Advocates: **Recurring themes in conversations with parent leaders highlighted the need to learn about math pathway programs available at their school or district; how to navigate the school system to access programs and supports; and advocating for their children with academic counselors when they transition from elementary to middle school, and then from middle school to high school.** This advocacy ensures students are given access to advanced or accelerated “honors” classes in math and other subjects so they can meet high school graduation and college admission requirements.

- Teachers and principals often become key allies and champions when parents experience challenges in accessing higher-level classes for their children.
- Educators should expect engaged families to advocate for their children’s success in math. To foster trust and positive relationships, schools need to encourage authentic, meaningful dialogue between teachers and families.
- If an insufficient number or variety of advanced placement (“AP”) classes are available, parents may organize and advocate for increased student access to these courses.



Models: It is recommended that parents:

- Show children how failure is an opportunity to learn and grow.
- Surround their children with role models who excel in math.
- Become strategists and coaches for their children.





CULTURAL TRANSMISSION & FAMILY MATH IN LATINX AND AFRICAN AMERICAN COMMUNITIES

Families are agents of cultural transmission, which includes conveying beliefs, values, and attitudes about mathematics. “Cultural context plays a role in how families engage with young children, both in general and in math” and educators need to be aware of these differences and the “harmful impact of deficit assumptions on populations of students and their families” (Eason, et al., 2020; Caspe, 2018; Solis & Callanan, 2016). Again, because current “mathematics instruction is significantly different than what many parents experienced as students, it is critical to educate parents and guardians about what to expect and about the reasons and research behind the changes. Educating and engaging parents and guardians should include opportunities for them to experience rich, authentic, culturally-sustaining mathematical tasks in active-learning ways (including support for parents who speak languages other than English), not simply written descriptions of it. **Validating and valuing parents’, guardians’, and families’ central contributions to education is enhanced when they have opportunities to use their own language, culture, and knowledge through relevant experiences rooted in the school context” (TODOS, 2020).** Consider as well, that different communities engage in different ways.

ENGAGING LATINX IMMIGRANT FAMILIES

School programs that have been successful in supporting Latinx immigrant families and students with math learning provide information and experiences to support roles as parents, learners of math, teachers of other adults, and as leaders or advocates in their school community (Civil et al., 2005). Acknowledging parents as such allows them to share their personal journeys in education, honor their own experiences in education systems and acknowledge the differences from attending school in other countries, which leads to building trust and then to more openly discuss and address concerns (e.g., math anxiety, language barriers, confusion related to new math standards).

Building the role of parents as learners means helping them review or re-learn math concepts to increase understanding. Parents usually enjoy learning, so increasing their understanding builds self-confidence in their ability to support their children’s learning, and this appreciation for learning helps parents model life-long learning for their children (Civil, 2009). Further developing parents’ capacity to teach other parents and advocate in school decision-making are strategic investments that can lead to greater school improvement and equity in the long run. **When “parents learn mathematics with an emphasis on understanding rather than rote memorization, they are more likely to become quite vocal about the importance of understanding for their children’s mathematics education” (Civil, 2009).**

EXAMPLE OF A FAMILY MATH PROGRAM BY AND FOR LATINX IN SAN FERNANDO VALLEY

[Padres Pioneros](#) - Parent Pioneers, a 27-year-old grassroots group of Mexican American immigrant parent leaders, provides bilingual (English and Spanish) after-school community programs based on popular education, codesigned and facilitated by parent leaders with guidance from a university professor, Dr. Rosa RiVera Furumoto, and supported by student teachers. The Good Heart Chicana/o and Native Science Project (RiVera Furumoto, 2018) is a multi-generational program model that employs bilingual Chicana- Latinx children's literature along with hands-on activities and projects that cultivate elementary students as empowered scientists, artists, humanitarians, and mathematicians, with a focus on Environmental STEAM. Yearly, the program serves about 50 Latinx families from six LAUSD public elementary schools in the San Fernando Valley and trains about 20 future elementary teacher candidates.

ENGAGING AFRICAN AMERICAN FAMILIES

Researchers who are focused on the engagement of African American families in math believe that the role of these families is to expose children to resources beyond the classroom through enrichment activities and supplemental programs, to explain through conversations on how math concepts apply to their personal experiences, and to expand their children's knowledge to more complex concepts and thinking, again through out-of-school opportunities (Brown et al., 2018).

Also, researchers highlight how **African American parents influence math outcomes and general academic competency by having "higher academic expectations for their children"** (Galindo & Sheldon, 2012; Hill & Craft, 2003). Having high expectations for children may "decrease the differential treatment [students often experience in school] that can negatively influence motivation" when learning math (Kurts-Costes & Woods, 2017). Being involved in their children's education and having high expectations is "consistently [a] positive predictor of early elementary school achievement" for children from immigrant families, and this concept applies to African Americans as well (Sibley & Dearing, 2014).

EXAMPLES OF FAMILY MATH PROGRAMS BY AND FOR AFRICAN AMERICANS IN SOUTH LOS ANGELES

[STEM⁵⁴](#) is led by education researcher, Michael Batie, Ph.D., and provides math programming in South Los Angeles that includes Common Core math professional development, parent training courses (e.g., "Empower Math Parents: Helping Our Children Soar in Math"), after-school math programs, school-wide math activities, and hands-on math activities and kits. They are also beginning a collaboration with local community colleges on formal training in math instruction for aspiring early educators.

[The Knowledge Shop](#) works in collaboration with STEM⁵⁴ to provide math and science programs that include tutoring, Saturday school, summer camps and training, and a scholarship club for parents and grandparents. They specialize in serving African American families, and programs focus on understanding whether children are performing at grade level, understanding Common Core math, and helping children learn to add, subtract, multiply and divide by the 3rd grade. Four sessions are dedicated to helping parents develop their children's and their own math identities to maximize math learning.

HOW CAN SCHOOLS AND TEACHERS INCLUDE FAMILIES INTO MATH LEARNING?

According to a research brief from the National Council of Teachers of Mathematics (Civil & Menéndez, 2010) and other sources, key recommendations include:

- **Learning from parents' and families' experiences and knowledge (their funds of knowledge) through ethnographic home visits.** This process invites parents and community members to come to school and talk about their areas of expertise (e.g., construction, medicinal herbs, [canning and drying food]) with an eye on connections to the school curriculum.



- **Offering workshops and short courses in mathematics for parents and their children that are hands-on.** [Researchers stress that it is most powerful to involve] parents as co-facilitators of mathematics workshops for other parents in the community (Civil, et al., 2005). “Creating opportunities for parents to learn or to review the concepts with their children are learning in school may boost their feelings of self-efficacy,” reduce math anxiety, and model growth mindsets (Casper, 2018; Berkowitz, et al., 2017). “Having parents teach other parents is similar to having teachers teaching other teachers in professional development programs,” which fosters greater trust and learning (Civil, et al., 2005). Moreover, this recommendation ensures math materials are culturally relevant and co-designed with parents, as too many “well-intended ... parent education initiatives often mirror a deficit-based approach to parents and families that assumes they are lacking in knowledge and in need of ‘remediation’” (Valencia & Black, 2002).
- **Creating spaces for parents to discuss issues related to teaching and learning mathematics.** This helps develop rapport and trust [between families and staff. Also, it provides ongoing support for families, and helps schools develop a feedback loop to provide information and receive meaningful input about programs and curriculum].
- **Conducting classroom visits with parents.** In this approach, a small group of parents and one or two facilitators (researchers, school-community liaison, school administrator) visit a mathematics classroom and then debrief with observations, either with or without the teacher present.
- **[Embracing parent advocacy.** Once parents understand mathematics programs and pathways at their children's school and in their district, along with the right of students to access advanced math courses, and once they realize the importance of their role in helping their own children excel in math, this natural progression may lead many parents to engage in advocacy to improve math outcomes for all students.]

RESOURCES TO STRENGTHEN FAMILY MATH

RESOURCES FOR FAMILIES TO SUPPORT THEIR CHILD’S LEARNING AT HOME

- The **US Department of Education** publishes a booklet for families to understand how to help their child learn mathematics through everyday activities, grades preschool through 5th grade: [Helping Your Child Learn Mathematics](#) and [Cómo Ayudar a Su Hijo Con Las Matemáticas](#).
- **Engage NY** provides guides families explaining the Common Core shifts and shares ways families can support mastery: [Common Core Shifts for Students and Parents](#). This resource is available in Spanish, Arabic, Bengali, and Haitian Creole.

- **The Council of Great City Schools** parent roadmaps in mathematics provide guidance to parents about what their children will be learning and how they can support that learning in grades K-8. These parent roadmaps for each grade level also provide three-year snapshots showing how selected standards progress from year to year so that students will be college- and career-ready upon their graduation from high school: [Parent Roadmaps to Common Core Standards - Mathematics](#) and [Guía para los padres: Apoyando a su hijo en matemáticas](#).

ORGANIZATIONS FOCUSED ON FAMILY MATH RESEARCH

- [The National Association for Family, School, and Community Engagement](#) (NAFSCE), with its lead partner, the Early Math Collaborative at Erikson Institute, is leading a national movement to advance family math and include the creation of the National Center on Family Math to address the lack of unity and coherence to help close achievement gaps, provide opportunities for families to support children’s math learning, and address systemic challenges facing low-income families and families of color.
- Games for Young Mathematicians is a program of research and development in early mathematics teaching and learning at the [Education Development Center](#) (EDC). Family math tools and resources are available.
- [The Development and Research in Early Math Education](#) (DREME) Network focuses on math from birth through age 8. DREME has a page focused on family math with videos and ideas for parents to support math learning at home.
- [WestEd Early Math Initiative](#) developed a Pre-K curriculum, professional development, personalized coaching and home activities for preschool staff and families to support children’s learning.
- [Math and Parent Partners \(MAPPS\)](#): This organization has curated research and resources on engaging Latinx families in building mathematics agency in students and leadership among parents.

ORGANIZATIONS FOCUSED ON FAMILY MATH PROGRAMS

While a gap does exist in fully supporting families on the topic of math specifically, progress is being made as the number of organizations including family math or developing programs is growing.

- The [PBS SoCal Family Math Program](#) provides tools (activities and videos) and bilingual resources to families with children ages 2-5 to uncover the joy of math in everyday experiences. This program empowers families by providing updated content directly in the home to help prepare children for kindergarten. A series of instructional videos and materials teach sorting and collecting, number sense and counts, patterns, shapes, and spatial sense are available and were codesigned by and for parents.
- [Abriendo Puertas / Opening Doors](#) offers a curriculum which is grounded in research, reflects parent input, and uses the “popular education” approach to engage parents via 10 sessions that use a “dicho,” or popular saying, and incorporates culturally familiar activities and data in Spanish and English. One of the 10-part sessions focuses on early math.
- The [California PTA](#) provides math supports to educators through the [School Smarts Parent Engagement Program](#), which includes a STEAM Toolkit to support educators in creating an event to show parents and their children the STEAM experience. In the toolkit, educators will find sample agendas, videos to show parents, resources, ice-breakers, and more. The program also provides information on the [Common Core State Standards](#) and is available in six languages.
- The National PTA has developed a series of hands-on STEM activities and kits that families can do at home. For more information about these kits and how to integrate them into school learning, visit their website: [STEM + Families](#).
- [United Parent Leaders Action Network](#) provides input on a national plan to support Family Math. They will be releasing a toolkit in Fall 2021 to provide culturally relevant games and activities to integrate math into daily



activities, along with ideas for talking with educators about family math, and advocacy ideas.

- [Zeno](#) promotes five practices for families to support math with young learners: exploring, playing, talking, building, and connecting. Their resources are available in ten languages.
- [MathTalks](#) are 10-minute activities designed by grade level that teachers and parents can use with technology to support learning.
- [youcubed](#) provides resources (videos, articles) for teachers and parents to support learning in the classroom and at home.
- [Linda Levi's Blog](#): Doing Math with Your Child - Promoting Problem Solving; Suggestions for Parents. Also available in Spanish.
- [TODOS LIVE recording](#): Math at Home / Las Matemáticas en Casa
- Last, digital engagement through apps and online games is also increasing in popularity as a result of the COVID-19 pandemic and the increased use of technology for learning. The following are examples of apps used by families:
 - [Bedtime math apps](#) for kindergarten readiness and 3-to-9-year-olds
 - Math Learning Center [apps](#) to practice concepts in grades K-5
 - PBS KIDS offers [apps](#) and over [100 online games](#)
 - [Khan Academy](#) provides excellent resources for math learning in grades K-12.

ORGANIZATION FOCUSED ON SUPPORTING TEACHERS WITH MATH LEARNING for DLL STUDENTS & FAMILIES

- Loyola Marymount University's Center for Equity for English Learners offers a [Dialogic Reading for Teachers and Families of Dual Language Learners](#). This customized 3-5 day professional learning series helps TK and early childhood education teachers create meaningful STEAM language and literacy development opportunities for students and their families.



CONCLUSION

Children face a series of challenges in the quest to master math, from the transmission of adult anxiety and lack of confidence in their own skills, to inequalities in out-of-school learning opportunities, to biases and misconceptions about the level of math support that low-income and immigrant homes can offer. Simply put, families are a major, overlooked component of closing the math gap, especially for students of color.

At the same time, the research is clear: Families, early educators, and LEAs are essential partners to help young children's brains fully develop during the formative years. Doing so will support children's social-emotional development and cultivation of skills to ensure early success in all learning environments. As California expands transitional kindergarten, educators must be engaged and given ongoing professional development to reduce possible math anxiety and ensure that all children receive high-quality math instruction. In doing so, young learners will be prepared to transition into kindergarten having a robust math foundation.

However, success can only be attained by including families as true partners and much work is still to be done to ensure that all families are fully engaged and empowered. We can start by investing in professional development and proactively helping teachers, counselors, administrators and parents in building trusting relationships to support students in math. Moreover, the COVID-19 pandemic shined a bright light on the critical role parents play as the first teachers of their children. Parents, regardless of their economic status, partnered as never before with educators, non-profit organizations, and others to find the tools for their children to participate in distance learning. As students return in person to the classroom, educators can tap into a wealth of expertise by engaging parents as true partners to ensure the best learning outcomes for their children.

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