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Every child. Cradle to career.

Cradle-to-Career Outcomes Playbook: Middle Grade Math

Contents

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Contributors

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Introduction

Proficiency in middle grade math is a key predictor of long-term academic and life success. Research consistently shows that strong math skills in these formative years significantly increase the likelihood of high school graduation and open pathways to higher education and career opportunities. Studies have linked Middle grade math achievement to critical life outcomes, including higher income, lower rates of teenage parenthood and reduced engagement in criminal activity (Heckman, Stixrud, and Urzua 2006; Kane et al. 2022). In fact, researchers from the Urban Institute found that math scores have a significant predictive impact on earnings into adulthood (The 74). Per the Urban Institute, that finding holds true for children of all races and ethnicities — including for Hispanic children who consistently experience the largest gains — and for girls, who tend to see a higher earnings boost than boys. Mastery of eighth grade math is particularly influential, as it increases the likelihood of enrolling in advanced math courses, which further expand access to college and career pathways (Education-to-Workforce Framework).

Beyond academics, middle grade math proficiency plays a crucial role in shaping students' futures, particularly in STEM fields. Early exposure to rigorous math coursework not only enhances problem solving, reasoning and critical thinking skills but also sparks interest in high-demand, high-paying careers in science, technology, engineering and mathematics (Su, Ricci, and Mnatsakanian 2016). Research also shows that access to advanced math courses in middle school strengthens students' ability to succeed in higher-level math, reinforcing the foundation needed for long-term achievement (NCSM).

To support students effectively, community leaders need evidence-based insights on what drives math proficiency by eighth grade, but accessing this information can be challenging. Leaders often spend valuable time conducting research when they could be engaging with their communities. Consider three real examples:

- An organization is launching a new math initiative and needs a comprehensive understanding of the key factors that influence middle grade math success.
- A group is leading a community-wide discussion on middle grade math efforts and requires evidence-based practices to guide the conversation.
- A city planning group focused on children's wellbeing is meeting with local business leaders and needs clear research to advocate for investments in STEM initiatives.

This playbook serves as a comprehensive guide to the latest research and best practices on middle grade math. It equips community leaders with the tools to identify opportunities, co-design effective strategies with their communities and build support for collective investment in middle grade math.

The playbook is organized around 23 essential questions that help communities understand their starting point and identify potential focus areas. Each question aligns to research-based topics that

support middle grade math and offers a menu of possible indicators to track, as well as practices and policies to implement. These indicators, practices and policies have been compiled from a variety of frameworks with sources indicated in parenthesis.

Here's one example:

Example

Essential Question *Areas to focus*	**Indicators** *Metrics to track*	**Practices and Policies** *Actions to take*
Does the Local Education Agency (LEA) have a clear vision and approach for ensuring excellent math instruction in every classroom?	Students from various demographic subgroups are proportionally represented in rigorous courses and programs (Education-to-Workforce Framework). Percentage of schools or teachers reporting adoption of district's standards (RAND). Percentage of schools using the district's math curriculum (edReports).	District leaders prioritize student outcomes by setting clear goals for math instruction and ensuring that all students receive equitable access to high-quality learning (Instruction Partners). District leaders create an instructional vision of excellence for math and ensure resourcing, staffing, training and ongoing support aligns to and supports the vision (EdReports). State leaders can align competitive funding from the SEA with incentives or requirements to implement state math initiatives (CCSSO, A Nation of Problem-Solvers).

Essential Questions for Middle Grade Math

Middle grade math progress. Middle grade math success is defined by ensuring students are prepared and on a path for advanced high school mathematics, including an introduction to calculus by senior year. Beyond academic readiness, math progress also includes developing students' math identity and growth mindset, fostering confidence, persistence and a belief in their ability to excel in mathematics.	
1	Are young learners demonstrating academic progress to be considered on track for math proficiency by eighth grade?
2	Are young learners confident about their ability to do math?
3	Are young learners taking rigorous math courses and on track to complete Algebra I by ninth grade?
Leadership for mathematics. Local Education Agencies (LEAs) need leaders with a clear vision for what excellent math instruction looks like in every classroom and a clear approach for how districts support the implementation of effective math instruction across all schools.	
4	Does the LEA have a clear vision and approach for ensuring excellent math instruction in every classroom?
5	Has the LEA adopted rigorous grade-level standards and coherent, culturally relevant curricular materials aligned to the vision?
6	Does the LEA use quality data and assessment resources consistently, coherently and strategically to drive instructional decision making for all students?
7	Does the LEA ensure equitable access to an advanced mathematics pathway in middle grades and STEM experiences?
Teaching and learning. Schools with well-trained, representative teachers who receive content-specific support can effectively facilitate excellent math instruction and build strong math identities for all students.	
8	Does each school have a well-trained, vertically-aligned math team to ensure cohesive, high-quality math instruction across the middle grades?
9	Are teachers and schools making significant contributions to academic math growth for students?
10	Do students have effective, representative math teachers and leaders?
11	Do students have access to affirming, high-quality instructional materials for math in middle grades?
12	Do students attend schools in systems with adequate funding to support curriculum, professional learning and ongoing coaching needed to implement excellent math instruction?
13	Do students have access to teachers trained, coached and supported to teach mathematics effectively?
14	Are students who are behind grade level identified early and provided high-quality, aligned targeted supports?

Childhood experiences and neighborhood conditions. Children who grow up in resource-rich neighborhoods with opportunities to play with math for fun experience healthy development and a positive association with math.	
15	Do families live in well-resourced neighborhoods that enable students to succeed academically?
16	Do families with children have access to public support?
17	Do students have access to STEM and math enrichment opportunities to prevent learning loss and to connect to potential STEM careers?
18	Do students have access to STEM and math-focused summer enrichment programming?
Positive school environment. Positive school environments foster safety, inclusivity and holistic child development. In math, schools can intentionally cultivate a strong math identity by helping students build confidence in their ability to engage with and overcome mathematical challenges.	
19	Do young learners attend schools with safe, inclusive and supportive environments?
20	Do young learners attend schools that support their social, emotional and physical development and well-being?
21	Are young learners demonstrating consistent attendance?
22	Are there young learners who disproportionately experience exclusionary discipline?
23	Are young learners demonstrating positive behavior?

This guide is not intended to serve as a checklist. Rather, communities should use the essential questions to explore options and choose what works for them.

The Case for Middle Grade Math

Proficiency in middle grade math is a critical determinant of long-term academic and life success. Research consistently shows that strong math skills in the formative middle grade years significantly increase the likelihood of high school graduation and positively impact future educational and career opportunities. Early academic performance, including middle grade math scores, is correlated with key life outcomes such as educational attainment, teenage pregnancy and engagement in illegal activities (Heckman, Stixrud, and Urzua 2006). Simply put, mastering math in middle school lays the foundation for a successful future.

Despite its importance, national data indicates that middle grade math proficiency remains a significant challenge. The 2024 National Assessment of Educational Progress (NAEP) reveals that eighth grade math scores have stagnated following the largest recorded decline in 2022. While fourth grade scores saw a slight two-point increase, this progress was largely driven by high-performing students, with little improvement among struggling students (NAEP). Alarmingly, gaps between higher- and lower-performing students have widened, as have disparities in math

achievement among racial and socioeconomic groups. In 2022, math score gaps between Black, Latine and white students increased, and they continued to grow in 2024 (NAEP). Similarly, students experiencing poverty fell further behind their more affluent peers in eighth grade math scores.

These disparities are further compounded by inequities in access to critical math courses. Research shows that white students are more likely than Black and Latine students to take Algebra I early and successfully complete the course (Education-to-Workforce Framework). Given that Algebra I serves as a gateway to advanced math coursework, these persistent gaps demand urgent attention and investment from schools, communities and policymakers.

The importance of middle grade math proficiency cannot be overstated. Studies show that eighth grade math achievement is a strong predictor of high school graduation (Balfanz, Herzog, and Douglas 2007) and is associated with long-term benefits such as higher income, increased educational attainment and reduced rates of teenage pregnancy, incarceration and arrests (Kane et al. 2022). Mastery of middle grade math also significantly increases the likelihood of enrolling in advanced math courses, which in turn open doors to college and career opportunities (Education-to-Workforce Framework).

Moreover, proficiency in middle grade math plays a pivotal role in shaping students' future career paths, particularly in STEM (science, technology, engineering and mathematics) fields. Strong math skills in middle school not only provide access to these high-paying careers but also ignite students' interest in STEM early on. A solid math foundation fosters critical thinking, reasoning and problem-solving skills — abilities essential for success in both STEM careers and everyday life (Su, Ricci, and Mnatsakanian 2016). Research shows that access to more challenging math courses in middle school increases students' likelihood of succeeding in higher-level math courses later on (NCSM).

Given the profound impact of middle grade math proficiency, it is imperative that educators, policymakers and communities work together to address achievement gaps and expand access to rigorous math education.

What does Middle Grade Math proficiency mean?

Middle grade students are on track for math proficiency when they score proficient on eighth grade standardized math or Algebra I assessments, complete core math courses that prepare them for advanced high school math, and develop a confident, positive math identity.

Effective math instruction focuses on what students need to know and do in math to be successful in college, career and life. Over the past 15 years, a national shift in approach for math has taken place to better align standards, assessment, curriculum and instruction to these goals. The shifts include:

Focus on depth: A clear focus on what's most important at each grade level — not an inch-deep, mile-wide approach.

- In grades K–2: Concepts, skills and problem solving related to addition and subtraction
- In grades 3–5: Concepts, skills and problem solving related to multiplication and division of whole numbers and fractions
- In grade 6: Ratios and proportional relationships, and early algebraic expressions and equations
- In grade 7: Ratios and proportional relationships, and arithmetic of rational numbers
- In grade 8: Linear algebra and linear functions

This focus will ensure students develop a strong foundation, including a deep understanding of mathematical concepts, strong procedural skills and fluency, and the ability to apply their math knowledge to solve problems both in and out of the classroom (The Core Standards).

Coherence: Linking topics and thinking across grade levels**.** Mathematics is not just a series of unrelated topics or shortcuts; it is a unified body of knowledge built on interconnected ideas. As a result, the standards are structured to ensure a smooth and logical progression from one grade to the next (The Core Standards).

- For example, in fourth grade, a common state standard is "apply and extend previous understandings of multiplication to multiply a fraction by a whole number." This often extends to fifth grade, when students are expected to build on that skill to "apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction" (The Core Standards).

Rigor: Pursue conceptual understanding, procedural skills and fluency, and application with equal intensity. The major work of each grade includes three aspects of rigor: conceptual understanding, procedural skills and fluency, as well as application.

- Conceptual understanding: Students must grasp key concepts — like place value and ratios — from multiple angles, seeing math as a connected system rather than isolated rules.
- Procedural skills and fluency: Students need to perform calculations quickly and accurately. Mastery of basic operations, like single-digit multiplication, is necessary for tackling more complex concepts. Some students may need extra practice to achieve fluency.
- Application: Students must apply math in real-world situations. Successful application relies on strong conceptual understanding and procedural fluency.

Mastery of key mathematical concepts and skills. There are key mathematical concepts and skills that schools, systems and communities should know that define what math proficiency looks and sounds like.

- Conceptual understanding assesses students' grasp of foundational concepts (e.g., ratios, proportional reasoning, expressions and equations).

Procedural fluency monitors students' ability to apply efficient and accurate computational strategies, like gaining fluency with multiplication and division facts which enables ease with computations (NCTM, Procedural Fluency).

- Problem-solving and application evaluates students' ability to apply math in real-world contexts, as emphasized in the Common Core State Standards for Mathematical Practice.
- Algebra readiness tracks performance on algebraic reasoning tasks, given that proficiency in algebra is a strong predictor of high school math success.

Tracking math achievement growth in the middle grades helps the identification of skill gaps and designing of effective interventions. Interim assessments like NWEA MAP, iReady and district diagnostics measure progress and support individual student needs.

According to several researchers, including Julia Maria Aguirre, Karen Mayfield-Ingram and Danny Bernard Martin, students' **math identity** — their belief in their ability to succeed in math — heavily influences persistence and achievement. Being proficient in math also means having a growth mindset and positive orientation to learning and applying math. School systems and communities can use a variety of assessments to measure confidence, perception and effort-based improvement (Aguiree, Mayfield-Ingram, and Martin).

About the Middle Grade Math Playbook

StriveTogether's Cradle-to-Career Playbook: Middle Grade Math synthesizes leading research, indicators and evidence-based practices to promote equitable outcomes in middle grade math across communities. While the playbook builds on existing frameworks that are valuable in their own right, it does not replace them. Instead, it serves as a comprehensive tool that guides you to resources in areas where deeper exploration is needed. Communities can use the 23 essential questions to navigate to topics relevant to their specific needs, interests and goals.

The Education-to-Workforce Framework and supporting research

Mathematica's Education-to-Workforce Framework is the inspiration behind the playbook's organization and content. StriveTogether's Cradle-to-Career Playbook: Middle Grade Math includes all of the applicable research, content and aligned essential questions included in the Education-to-Workforce Framework. It is also organized in a similar way. The playbook enhances the Education-to-Workforce Framework by integrating research on eighth grade math proficiency, Algebra I, advanced math access, student math mindsets, teacher development and more. It also expands practices and policies to improve accessibility for community-based organizations. 55 percent of the indicator categories included in this playbook (39 out of 71 total) come from the Education-to-Workforce Framework.

About the playbook structure

The playbook is organized around 23 essential questions that help communities understand their starting point and identify potential focus areas. Each question offers a menu of possible practices and policies to implement, as well as key indicators to track.

Essential questions: areas to focus

There are 23 key questions that communities can ask and answer to identify areas where co-designed solutions can improve middle grade math outcomes. The content of each question provides starting points for designing and collaborating on solutions. Inspired by and aligned with the Education-to-Workforce Framework, these questions are clear, offer various entry points for communities and provide an organizing structure for elaboration.

The playbook includes close to 1,000 indicators, policies, and practices, though implementing all of them is neither necessary nor intended. Each community has its own unique assets, needs, and resources. StriveTogether's Cradle-to-Career Playbook: middle grade math helps communities identify key metrics to track, pinpoint effective strategies and determine where to start, enabling them to steadily improve early literacy for all young learners over time.

Indicators: metrics to track

Contributing indicators help communities see what it looks like when middle grade math outcomes improve for historically marginalized learners across a community. Contributing indicators are valuable because research shows they influence outcomes in a positive direction and are measured at the individual learner level (e.g., percentage of students on track to complete Algebra I before or during grade 9). They can help communities establish student-centered priorities and provide information earlier than outcome data is available, allowing communities to know if an initiative is working and to support continuous improvement of multiple initiatives.

Systems indicators help communities track the supports that influence outcomes at the system level, such as district, city, county or state efforts. These indicators are crucial because they allow communities to monitor the system, identify inequities and address them proactively. Measured at the family, caregiver or geographic level, systems indicators reflect institutional actions and their impact. For example, the percentage of eligible families with access to a library within walking distance is a key systems indicator that reveals how well resources are distributed.

Practices and policies: actions to take

Practices and policies describe what can be done at every level of the system. Practices are evidence-based efforts, like teacher professional development, that create strong conditions for results. Policies are laws, regulations, procedures, administrative actions or incentives of governments or other institutions. Communities may see a policy listed that is currently not enacted in their district, city or state, offering an opportunity to align on advocacy efforts. Federal policies are listed to create awareness so communities can leverage or use them to support state and local efforts.

Scaling a solution often has a lifecycle that starts with a local practice that is proven effective, scaled locally (e.g., scaled from a classroom to a district, then to another district) and then used to inform the creation of a state-level policy that provides

access to funding for further scaling. This approach is outlined within the StriveTogether Theory of Action™. This playbook categorizes strategies into a practice or policy. But a practice can turn into a policy over time, or a policy can initiate a practice if it comes first. Lines begin to blur as scale takes over.

Not every contributing indicator has an identified systems indicator, practice or policy. That may be a result of limited research available or identified to date. Indicators, practices and policies can help answer multiple essential questions, but for simplicity, we've grouped each indicator with one essential question. To help communities choose the most relevant indicators for their context, each indicator is presented as it appears in its original source. This allows communities to understand the specific nuances that may be important to them. However, this approach means the language of indicators may vary, some may be duplicated across different sources, and language choices may need to change based on local preferences.

This resource aims to be a library of evidence-based indicators and implementation strategies that can be used with community groups, referenced during annual planning and leveraged to prioritize initiatives as needed. Its purpose is to help you and your community understand possible levers at every level — learner, neighborhood, school, district, city and state — to improve middle grade math outcomes.

How to use this playbook

How this playbook is used will be different for each organization or community, depending on their planning process, goals and priorities. The playbook might be shared with a community working group in its entirety, referenced internally as a way to brainstorm potential solutions to discuss with others, or leveraged in various other ways. After reading it, leaders can ask: How do we want to use this with our community?

This resource does not replace the voice and perspective of community members, who often know the solutions that will work best in their communities. Instead, consider this playbook a resource that community members can also access to support the co-designing of solutions and to inform your planning. For support on engaging with your community, visit StriveTogether's Results-Based Facilitation 101 course, available for free on The Training Hub.

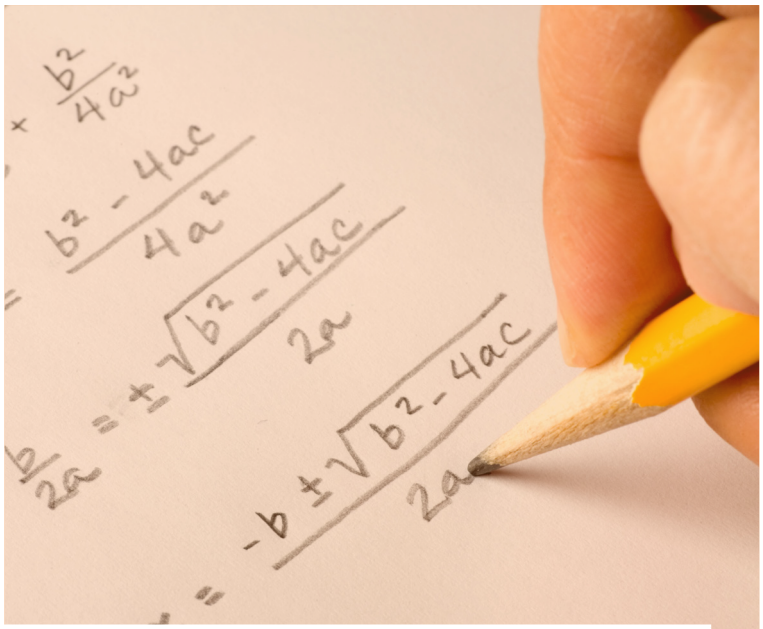
This playbook offers several practical uses for community organizations. It can be used to onboard new staff or introduce organizations to cradle-to-career work. It helps explore aligned practices and policies, guiding the selection of working group topics and potential solutions. Communities can share the entire playbook with working groups or community members to support exploration and implementation. Additionally, it serves as a valuable resource during internal reviews for annual goal setting and planning. Finally, this playbook can be used alongside other StriveTogether resources for a more comprehensive approach. If you are interested in diving deeper into the research supporting the indicators, visit the citations included throughout the playbook. The appendix also includes an annotated bibliography.

We encourage you to adapt the language of the indicators, practices and policies to reflect your local community's values and priorities. The examples provided remain true to their original sources, so you may notice different terms used to express similar ideas.

Due to the limited research on place-based partnerships, StriveTogether's Cradle-to-Career Playbook: middle grade math highlights initiatives and examples from StriveTogether Cradle to Career Network members making clear progress on their middle grade math outcomes, illustrating what has worked for them.

Middle Grade Math Progress

Middle grade students are on track for math proficiency when they score proficient on eighth grade or Algebra I standardized math assessments, complete core math courses, are prepared for advanced high school math, and develop a confident, positive math identity.



1 Are young learners demonstrating academic progress to be considered on track for math proficiency by eighth grade?

Why it matters

Research shows that math proficiency by eighth grade strongly predicts future academic success, college readiness and career opportunities, particularly in STEM fields. Algebra I, often called a "gatekeeper" course, lays the foundation for advanced high school math, including Geometry, Algebra II and Calculus (NCTM, 2018).

Some systems are exploring a new math course pathway, called "Integrated Math" which combines standards from each conceptual category into Mathematics I, II, III, etc. (PPIC, Exploring Math Pathways). Traditional math course pathways and integrated pathway approaches can both lead to students taking Calculus by their senior year. (CEMD, Reflecting on Integrated Math)

Students who complete Algebra I by eighth grade are more likely to take advanced math in high school, score higher on standardized tests (The Education Trust, 2019) and are twice as likely to earn a bachelor's degree (Rose & Betts, 2004). Mastering middle school math also boosts career prospects — workers in math-intensive fields earn 26% more than those in non-math careers (Georgetown University, 2011).

Conversely, students who struggle in middle grade math are more likely to require remedial courses in college, significantly lowering their chances of graduating (Complete College America, 2016). Ensuring students stay on track in math by eighth grade is critical to expanding future opportunities.

6th grade on track

Key source: Education-to-Workforce Framework

Contributing indicators

- Grade 6 students are on track to graduate high school on time. (Education-to-Workforce Framework).
- Percentage of students in grade 6 with passing grades in English language arts and math, attendance of 90 percent or higher, and no in- or out-of-school suspensions or expulsions. (Education-to-Workforce Framework).

8th grade on track

Key source: Education-to-Workforce Framework

- Percentage of students in grade 8 with a GPA of 2.5 or higher, no Ds or Fs in English language arts or math, attendance of 96 percent or higher, and no in- or out-of-school suspensions or expulsions (Education-to-Workforce Framework).
- Students are on track to complete Algebra I or an equivalent course before or during grade 9 (Education-to-Workforce Framework).

Standards for Mathematical Practice

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education (Common Core State Standards for Mathematics).

- Students make sense of problems and persevere in solving them. Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" They can understand the approaches of others to solving complex problems and identify correspondences between different approaches. (Common Core State Standards for Mathematics).
- Students reason abstractly and quantitatively. Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems

involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. (Common Core State Standards for Mathematics).

- Students construct viable arguments and critique the reasoning of others. Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. (Common Core State Standards for Mathematics).
- Students model with mathematics. Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose. (Common Core State Standards for Mathematics).
- Students use appropriate tools strategically. Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts. (Common Core State Standards for Mathematics).
- Students attend to precision. Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions. (Common Core State Standards for Mathematics).
- Students look for and make use of structure. Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. They also can step back for an overview and shift perspective. They can see complicated

things, such as some algebraic expressions, as single objects or as being composed of several objects. (Common Core State Standards for Mathematics).

- Students look for and express regularity in repeated reasoning. Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results. (Common Core State Standards for Mathematics).

Ratios and Proportional Relationships

Indicators

Contributing indicators

- Grade 6: Students understand ratio concepts and use ratio reasoning to solve problems (Common Core State Standards for Mathematics).
- In Grade 6, students use reasoning about multiplication and division to solve ratio and rate problems about quantities. By viewing equivalent ratios and rates as deriving from, and extending, pairs of rows (or columns) in the multiplication table, and by analyzing simple drawings that indicate the relative size of quantities, students connect their understanding of multiplication and division with ratios and rates. Thus students expand the scope of problems for which they can use multiplication and division to solve problems, and they connect ratios and fractions. Students solve a wide variety of problems involving ratios and rates (Common Core State Standards for Mathematics).
- Grade 7: Analyze proportional relationships and use them to solve real-world and mathematical problems. (Common Core State Standards for Mathematics).
- In Grade 7 students extend their understanding of ratios and develop understanding of proportionality to solve single- and multi-step problems. Students use their understanding of ratios and proportionality to solve a wide variety of percent problems, including those involving discounts, interest, taxes, tips, and percent increase or decrease. Students solve problems about scale drawings by relating corresponding lengths between the objects or by using the fact that relationships of lengths within an object are preserved in similar objects. Students graph proportional relationships and understand the unit rate informally as a measure of the steepness of the related line, called the slope. They distinguish proportional relationships from other relationships. (Common Core State Standards for Mathematics)

Policies

- State adoption of rigorous math standards that prioritize depth, coherence and rigor

The Number System

Indicators

Contributing indicators

- Grade 6: Students apply and extend previous understandings of multiplication and division to divide fractions by fractions. (Common Core State Standards for Mathematics).
- Grade 6: Students compute fluently with multi-digit numbers and find common factors and multiples. (Common Core State Standards for Mathematics).
- Grade 6: Students apply and extend previous understandings of numbers to the system of rational numbers. (Common Core State Standards for Mathematics).
- In grade 6 students use the meaning of fractions, the meanings of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for dividing fractions make sense. Students use these operations to solve problems. Students extend their previous understandings of number and the ordering of numbers to the full system of rational numbers, which includes negative rational numbers, and in particular negative integers. They reason about the order and absolute value of rational numbers and about the location of points in all four quadrants of the coordinate plane (Common Core State Standards for Mathematics).
- Grade 7: Students apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. (Common Core State Standards for Mathematics).
- In grade 7 students develop a unified understanding of number, recognizing fractions, decimals (that have a finite or a repeating decimal representation), and percents as different representations of rational numbers. Students extend addition, subtraction, multiplication, and division to all rational numbers, maintaining the properties of operations and the relationships between addition and subtraction, and multiplication and division. By applying these properties, and by viewing negative numbers in terms of everyday contexts (e.g., amounts owed or temperatures below zero), students explain and interpret the rules for adding, subtracting, multiplying, and dividing with negative numbers. They use the arithmetic of rational numbers as they formulate expressions and equations in one variable and use these equations to solve problems (Common Core State Standards for Mathematics).
- Grade 8: Students know that there are numbers that are not rational, and approximate them by rational numbers (Common Core State Standards for Mathematics).

Practices and Policies

Practices

- Teaching Fractions: Help students understand why procedures for computations with fractions make sense. Use area models, number lines, and other visual representations to improve students' understanding of formal computational procedures. Provide opportunities for students to use estimation to predict or judge the reasonableness of answers to problems involving computation with fractions. Address common misconceptions

[3] "Focal" population is defined by local communities, typically considering historically marginalized populations and local data points.

regarding computational procedures with fractions. Present real-world contexts with plausible numbers for problems that involve computing with fractions. (What Works Clearinghouse, Developing Effective Fractions Instruction).

- Teaching Fractions: Develop students' conceptual understanding of strategies for solving ratio, rate, and proportion problems before exposing them to cross-multiplication as a procedure to use to solve such problems. Develop students' understanding of proportional relations before teaching computational procedures that are conceptually difficult to understand (e.g., cross-multiplication). Build on students' developing strategies for solving ratio, rate, and proportion problems. Encourage students to use visual representations to solve ratio, rate, and proportion problems. Provide opportunities for students to use and discuss alternative strategies for solving ratio, rate, and proportion problems. (What Works Clearinghouse, Developing Effective Fractions Instruction).
- Teaching Fractions: Professional development programs should place a high priority on improving teachers' understanding of fractions and of how to teach them. Build teachers' depth of understanding of fractions and computational procedures involving fractions. Prepare teachers to use varied pictorial and concrete representations of fractions and fraction operations. Develop teachers' ability to assess students' understandings and misunderstandings of fractions. (What Works Clearinghouse, Developing Effective Fractions Instruction).

Policies

- State adoption of rigorous math standards that prioritize depth, coherence and rigor

Expressions, Equations and Functions

Indicators

Contributing indicators

- Grade 6: Students apply and extend previous understandings of arithmetic to algebraic expressions. (Common Core State Standards for Mathematics).
- Grade 6: Students reason about and solve one-variable equations and inequalities. (Common Core State Standards for Mathematics).
- Grade 6: Students represent and analyze quantitative relationships between dependent and independent variables. (Common Core State Standards for Mathematics).
- In grade 6 students understand the use of variables in mathematical expressions. They write expressions and equations that correspond to given situations, evaluate expressions, and use expressions and formulas to solve problems. Students understand that expressions in different forms can be equivalent, and they use the properties of operations to rewrite expressions in equivalent forms. Students know that the solutions of an equation are the values of the variables that make the equation true. Students use properties of operations and the idea of maintaining the equality of both sides of an equation to solve simple one-step equations. Students construct and analyze tables, such as tables of quantities that are in equivalent ratios, and they use equations (such as 3x = y) to describe relationships between quantities. (Common Core State Standards for Mathematics).
- Grade 7: Students use properties of operations to generate equivalent expressions.

- Grade 7: Students solve real-life and mathematical problems using numerical and algebraic expressions and equations.
- Grade 8: Students work with radicals and integer exponents (Common Core State Standards for Mathematics).
- Grade 8: Students understand the connections between proportional relationships, lines, and linear equations (Common Core State Standards for Mathematics).
- Grade 8: Students analyze and solve linear equations and pairs of simultaneous linear equations (Common Core State Standards for Mathematics).
- Grade 8: Students define, evaluate, and compare functions (Common Core State Standards for Mathematics).
- Grade 8: Students use functions to model relationships between quantities (Common Core State Standards for Mathematics).
- In Grade 8 students use linear equations and systems of linear equations to represent, analyze, and solve a variety of problems. Students recognize equations for proportions ($y/x = m$ or $y = mx$) as special linear equations ($y = mx + b$), understanding that the constant of proportionality (m) is the slope, and the graphs are lines through the origin. They understand that the slope (m) of a line is a constant rate of change, so that if the input or x-coordinate changes by an amount A, the output or y-coordinate changes by the amount $m \cdot A$. Students also use a linear equation to describe the association between two quantities in bivariate data (such as arm span vs. height for students in a classroom). At this grade, fitting the model, and assessing its fit to the data are done informally. Interpreting the model in the context of the data requires students to express a relationship between the two quantities in question and to interpret components of the relationship (such as slope and y-intercept) in terms of the situation. Students strategically choose and efficiently implement procedures to solve linear equations in one variable, understanding that when they use the properties of equality and the concept of logical equivalence, they maintain the solutions of the original equation. Students solve systems of two linear equations in two variables and relate the systems to pairs of lines in the plane; these intersect, are parallel, or are the same line. Students use linear equations, systems of linear equations, linear functions, and their understanding of slope of a line to analyze situations and solve problems (Common Core State Standards for Mathematics).
- In grade 8 students grasp the concept of a function as a rule that assigns to each input exactly one output. They understand that functions describe situations where one quantity determines another. They can translate among representations and partial representations of functions (noting that tabular and graphical representations may be partial representations), and they describe how aspects of the function are reflected in the different representations. (Common Core State Standards for Mathematics).
- Algebra I students are able to see structure in expressions. They interpret the structure of expressions and write expressions in equivalent forms to solve problems. (Common Core State Standards for Mathematics).
- Algebra I students perform arithmetic with polynomials and rational expressions. They perform arithmetic operations on polynomials, understand the relationship between zero and factors of polynomials, use polynomial identities to solve problems, and rewrite rational expressions. (Common Core State Standards for Mathematics).
- Algebra I students create equations that describe numbers or relationships
- Algebra I students can reason with equations and inequalities. They understand solving equations as a process of reasoning and explain

the reasoning, solve equations and inequalities in one variable, solve systems of equations, and represent and solve equations and inequalities graphically. (Common Core State Standards for Mathematics).

Practices and Policies

Policies

- State adoption of rigorous math standards that prioritize depth, coherence and rigor

Geometry

Indicators

Contributing indicators

- Grade 6: Students solve real-world and mathematical problems involving area, surface area, and volume. (Common Core State Standards for Mathematics).
- Students in Grade 6 build on their work with area in elementary school by reasoning about relationships among shapes to determine area, surface area, and volume. They find areas of right triangles, other triangles, and special quadrilaterals by decomposing these shapes, rearranging or removing pieces, and relating the shapes to rectangles. Using these methods, students discuss, develop, and justify formulas for areas of triangles and parallelograms. Students find areas of polygons and surface areas of prisms and pyramids by decomposing them into pieces whose area they can determine. They reason about right rectangular prisms with fractional side lengths to extend formulas for the volume of a right rectangular prism to fractional side lengths. They prepare for work on scale drawings and constructions in Grade 7 by drawing polygons in the coordinate plane. (Common Core State Standards for Mathematics).
- Grade 7: Draw, construct and describe geometrical figures and describe the relationships between them. (Common Core State Standards for Mathematics).
- Grade 7: Solve real-life and mathematical problems involving angle measure, area, surface area, and volume. (Common Core State Standards for Mathematics).
- In Grade 7 students continue their work with area from Grade 6, solving problems involving the area and circumference of a circle and surface area of three-dimensional objects. In preparation for work on congruence and similarity in Grade 8 they reason about relationships among two-dimensional figures using scale drawings and informal geometric constructions, and they gain familiarity with the relationships between angles formed by intersecting lines. Students work with three-dimensional figures, relating them to two-dimensional figures by examining cross-sections. They solve real-world and mathematical problems involving area, surface area, and volume of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes and right prisms. (Common Core State Standards for Mathematics).
- Grade 8: Students understand congruence and similarity using physical models, transparencies, or geometry software. (Common Core State Standards for Mathematics).
- Grade 8: Students understand and apply the Pythagorean Theorem. (Common Core State Standards for Mathematics).
- Grade 8: Students solve real-world and mathematical problems involving volume of cylinders, cones and spheres. (Common Core State Standards for Mathematics).
- In grade 8 students use ideas about distance and angles, how they behave under translations, rotations, reflections, and dilations, and ideas about congruence and similarity to describe and analyze two-dimensional figures and to solve problems. Students show that the sum of the angles in a triangle is the angle formed by a straight line, and that various configurations of

lines give rise to similar triangles because of the angles created when a transversal cuts parallel lines. Students understand the statement of the Pythagorean Theorem and its converse, and can explain why the Pythagorean Theorem holds, for example, by decomposing a square in two different ways. They apply the Pythagorean Theorem to find distances between points on the coordinate plane, to find lengths, and to analyze polygons. Students complete their work on volume by solving problems involving cones, cylinders, and spheres. (Common Core State Standards for Mathematics).

Practices and Policies

Policies

- State adoption of rigorous math standards that prioritize depth, coherence and rigor

Statistics and Probability

Indicators

Contributing indicators

- Grade 6: Students develop understanding of statistical variability. (Common Core State Standards for Mathematics).
- Grade 6: Students summarize and describe distributions. (Common Core State Standards for Mathematics).
- Building on and reinforcing their understanding of number, students in Grade 6 begin to develop their ability to think statistically. Students recognize that a data distribution may not have a definite center and that different ways to measure center yield different values. The median measures center in the sense that it is roughly the middle value. The mean measures center in the sense that it is the value that each data point would take on if the total of the data values were redistributed equally, and also in the sense that it is a balance point. Students recognize that a measure of variability (interquartile range or mean absolute deviation) can also be useful for summarizing data because two very different sets of data can have the same mean and median yet be distinguished by their variability. Students learn to describe and summarize numerical data sets, identifying clusters, peaks, gaps, and symmetry, considering the context in which the data were collected. (Common Core State Standards for Mathematics).
- Grade 7: Use random sampling to draw inferences about a population. (Common Core State Standards for Mathematics).
- Grade 7: Draw informal comparative inferences about two populations. (Common Core State Standards for Mathematics).
- Grade 7: Investigate chance processes and develop, use, and evaluate probability models. (Common Core State Standards for Mathematics).
- In grade 7 students build on their previous work with single data distributions to compare two data distributions and address questions about differences between populations. They begin informal work with random sampling to generate data sets and learn about the importance of representative samples for drawing inferences. (Common Core State Standards for Mathematics).
- Grade 8: Students investigate patterns of association in bivariate data. (Common Core State Standards for Mathematics).

Practices and Policies

Policies

- State adoption of rigorous math standards that prioritize depth, coherence and rigor

2 Are young learners confident about their ability to do math?

Why it matters

When students believe their abilities can grow and they see math as a creative, exploratory subject — not just about right answers — they become more confident, resilient and engaged. Jo Boaler's work shows that fostering a growth mindset and embracing multiple ways of thinking in math helps middle grade students, especially those who've struggled, build a positive math identity and succeed (Mathematical Mindsets). Developing positive associations with mathematics during middle school is crucial for students' academic success and future opportunities for several key reasons:

Enhanced academic achievement: Students with positive attitudes toward math tend to perform better academically. The Trends in International Mathematics and Science Study (TIMSS) has consistently shown a strong correlation between students' favorable views of mathematics and higher achievement levels. Conversely, a decline in positive attitudes from fourth to eighth grade often parallels decreased performance (Andrusiask, 2021).

Increased engagement and persistence: A growth mindset towards math fosters greater engagement and perseverance. Students who view math favorably are more likely to invest effort, tackle challenging problems and persist through difficulties, leading to deeper understanding and skill development (Toney, 2019).

Boosted confidence and self-efficacy: Positive math attitudes enhance students' confidence in their abilities. This increased self-efficacy encourages them to enroll in advanced math courses, broadening their educational and career prospects (Roberts, 2022). A study by Champion and Mesa (2022) found that 32% of students in the highest quintile of math self-efficacy enrolled in calculus, compared to only 9% in the lowest quintile.

Student perceptions and beliefs

Indicators

Contributing indicators

- Students enjoy math. Students demonstrate interest, liking, or enjoyment of mathematics as well as affective reactions to mathematics. (Mathematica, High Quality Measures).
- Students feel a sense of belonging. Students feel connected to the math learning content and activities and being an accepted, respected, and valued math learner. (Mathematica, High Quality Measures).
- Students see the value and importance of math. A student's perception about the importance of

doing well on mathematics and usefulness of mathematics for many aspects of daily life or fulfilling future goals (Mathematica, High Quality Measures).

- Students demonstrate self-efficacy and confidence. A student's perception of their ability to successfully complete a specific math task, which can vary by task. Math confidence is a student's global assessment of their math ability (Mathematica, High Quality Measures).
- Students demonstrate a growth mindset. A student's belief that math abilities can be developed and improved through hard work, practice, good strategies, and input from others (as opposed to the belief that math abilities are fixed, stable, and unable to change) (Mathematica, High Quality Measures).
- Students demonstrate an interest in math education and career. A student's interest in using and pursuing math beyond the classroom in their future education and career (Mathematica, High Quality Measures).
- Students express interest in the pursuit of STEM education and career (Mathematica, High Quality Measures).

Practices and Policies

Practices

- Use visual representations to illustrate math concepts. Students can benefit from exploring math concepts through the use of visual representations, such as number lines, diagrams, and percent bars (IES, Strategies to engage students and transform the middle school math experience).
- Teachers can use visual representations, such as manipulatives and area models, to help students understand core concepts about computational procedures related to fractions and why they work (IES, Strategies to engage students and transform the middle school math experience).
- Combining visual representations with concrete representations, such as hands-on manipulatives, also can help students transition to more abstract representations of math concepts. For instance, teachers may use three-dimensional objects that can be touched and manipulated (i.e., base 10 blocks, fraction tiles) to make the underlying math concepts more visible (IES, Strategies to engage students and transform the middle school math experience).
- Use real-life connections to give meaning to word problems. This strategy can help students understand abstract math processes, such as fractions and other rational number concepts (IES, Strategies to engage students and transform the middle school math experience).
- Connecting instruction to everyday experiences is a strategy to help students master more complex math concepts. Teachers can engage students by presenting math problems with real-world contexts that are familiar and meaningful to them (IES, Strategies to engage students and transform the middle school math experience).
- Use student discussion to build math engagement and understanding. (IES, Strategies to engage students and transform the middle school math experience).
- Create space for students to reflect on their problem-solving process. Small-group activities can allow students to articulate the process they used to solve a problem and the reasoning for each step. By engaging with peers to share, compare, and discuss their approaches to solving problems, students build skills in communicating their thinking and learn new approaches to solving problems. (IES, Strategies to engage students and transform the middle school math experience).
- Encouraging students to use clear and concise mathematical language in verbal and written explanations can help students build deeper understandings of math concepts and gives teachers an opportunity to check for understanding. (IES, Strategies to engage students and transform the middle school math experience).

- Use computational thinking to build confidence in math. Computational thinking refers to problem-solving strategies that help students approach unfamiliar problems. These strategies encourage student inquiry and emphasize understanding concepts instead of memorizing formulas to deepen mathematical learning. By providing middle school students with concrete strategies for approaching math problems, teachers can help build students' confidence in and increase their engagement with math. (IES, Strategies to engage students and transform the middle school math experience).
- Engagement and achievement through Computational Thinking (ENACT) program in Milwaukee Public Schools (Institute of Education Sciences).
- Teachers should explicitly teach students that academic abilities are expandable and improvable in order to enhance girls' beliefs about their abilities. Students who view their cognitive abilities as fixed from birth or unchangeable are more likely to experience decreased confidence and performance when faced with difficulties or setbacks. Students who are more confident about their abilities in math and science are more likely to choose elective math and science courses in high school and more likely to select math and science-related college majors and careers. (What Works Clearinghouse, Encouraging Girls in Math and Science).
- Teachers encourage students to view intelligence and mathematical ability as qualities that can be developed through effort and perseverance. Research indicates that when teachers adopt a growth mindset, student achievement improves, particularly among girls, English language learners, and economically disadvantaged students. Sharing neuroscience findings about brain plasticity and emphasizing that mistakes are opportunities for learning can help students embrace challenges and persist through difficulties (Crawford, 2018).
- Teach students that working hard to learn new knowledge leads to improved performance. (What Works Clearinghouse, Encouraging Girls in Math and Science).
- Remind students that the mind grows stronger with use and that over time and with continued effort, understanding the material will get easier. (What Works Clearinghouse, Encouraging Girls in Math and Science).
- Teachers should provide students with prescriptive, informational feedback regarding their performance. Prescriptive, informational feedback focuses on strategies, effort, and the process of learning (e.g., identifying gains in children's use of particular strategies or specific errors in problem solving). Such feedback enhances students' beliefs about their abilities, typically improves persistence, and improves performance on tasks. (What Works Clearinghouse, Encouraging Girls in Math and Science).
- Provide students with feedback that focuses on strategies used during learning, as opposed to simply telling them whether they got an answer correct. This strategy encourages students to correct misunderstandings and learn from mistakes. (What Works Clearinghouse, Encouraging Girls in Math and Science).
- Provide students with positive feedback about the effort they expended on solving a difficult problem or completing other work related to their performance. (What Works Clearinghouse, Encouraging Girls in Math and Science).
- Avoid using general praise, such as "good job," when providing feedback to individual students or an entire class. (What Works Clearinghouse, Encouraging Girls in Math and Science).
- Make sure that there are multiple opportunities for students to receive feedback on their performance. (What Works Clearinghouse, Encouraging Girls in Math and Science).
- Teachers should expose girls to female role models who have achieved in math or science

in order to promote positive beliefs regarding women's abilities in math and science. Even in elementary school, girls are aware of the stereotype that men are better in math and science than women are. Exposing girls to female role models (e.g., through biographies, guest speakers, or tutoring by older female students) can invalidate these stereotypes. (What Works Clearinghouse, Encouraging Girls in Math and Science).

- Invite older girls and women who have succeeded in math- or science-related courses and professions to be guest speakers or tutors in your class. (What Works Clearinghouse, Encouraging Girls in Math and Science).
- Assign biographical readings about women scientists, mathematicians and engineers, as part of students' assignments (What Works Clearinghouse, Encouraging Girls in Math and Science).
- Call attention to current events highlighting the achievements of women in math or science. (What Works Clearinghouse, Encouraging Girls in Math and Science).
- When talking about potential careers, make students aware of the numbers of women who receive advanced degrees in math- and science-related disciplines. (What Works Clearinghouse, Encouraging Girls in Math and Science).
- Provide girls and young women with information about mentoring programs designed to support students who are interested in mathematics and science. (What Works Clearinghouse, Encouraging Girls in Math and Science).
- Encourage parents to take an active role in providing opportunities for girls to be exposed to women working in the fields of math and science. (What Works Clearinghouse, Encouraging Girls in Math and Science).
- Create a classroom environment that sparks initial curiosity and fosters long-term interest in math and science. Teachers can foster girls' long-term interest in math and science by choosing activities connecting math and science activities to careers in ways that do not reinforce existing gender stereotypes and choosing activities that spark initial curiosity about math and science content. Teachers can provide ongoing access to resources for students who continue to express interest in a topic after the class has moved on to other areas. (What Works Clearinghouse, Encouraging Girls in Math and Science).
- Embed mathematics word problems and science activities in contexts that are interesting to both boys and girls. (What Works Clearinghouse, Encouraging Girls in Math and Science).
- Provide students with access to rich, engaging relevant informational and narrative texts as they participate in classroom science investigations. (What Works Clearinghouse, Encouraging Girls in Math and Science).
- Capitalize on novelty to spark initial interest. That is, use project-based learning, group work, innovative tasks, and technology to stir interest in a topic. (What Works Clearinghouse, Encouraging Girls in Math and Science).
- Encourage middle and high school students to examine their beliefs about which careers are typically female-oriented and which are typically male-oriented. Encourage these students to learn more about careers that are interesting to them but that they believe employ more members of the opposite gender. (What Works Clearinghouse, Encouraging Girls in Math and Science).
- Connect mathematics and science activities to careers in ways that do not reinforce existing gender stereotypes of these careers. (What Works Clearinghouse, Encouraging Girls in Math and Science).
- Teachers should provide opportunities for students to engage in spatial skills training. Spatial skills training is associated with performance in mathematics and science. (What Works Clearinghouse, Encouraging Girls in Math and Science).

- Recognize that children may not automatically recognize when spatial strategies can be used to solve problems and that girls are less likely to use spatial strategies than boys. Teach students to mentally image and draw spatial displays in response to mathematics and science problems. (What Works Clearinghouse, Encouraging Girls in Math and Science).
- Require students to answer mathematics and science problems using both verbal responses and spatial displays. (What Works Clearinghouse, Encouraging Girls in Math and Science).
- Provide opportunities for specific training in spatial skills such as mental rotation of images, spatial perspective, and embedded figures. (What Works Clearinghouse, Encouraging Girls in Math and Science).
- Regularly assess students' perception of math and their ability to solve challenging problems
- Number Talks are a 10-15 minute mental math routine created by Ruth Parker and Kathy Richardson in the early 1990s to engage students in meaningful mathematical discourse and sense-making as well as transform the culture of the classroom to one of inquiry and curiosity. (Mathematics Education Collaborative).
- Boost participation & gauge understanding with tech-enhanced questions. Offer students the choice to respond to closed-ended questions using traditional thumbs-up/thumbs-down gestures, or leverage technology with online polls or interactive whiteboards. Embrace technology and use online polls or interactive whiteboards to encourage participation in closed-ended questions. This allows everyone to respond anonymously, fostering inclusivity and reducing student anxiety. Bonus: Real-time data visualization on these platforms can give you immediate feedback on student understanding, allowing you to adjust your lesson plan as needed. (National Council of Teachers of Mathematics).
- Make math fun and reflective. Games and activities are a fantastic way to engage students in math. But to maximize learning, take it a step further! After the game, incorporate a "thinking reflection" activity. Ask powerful questions that prompt students to explain their reasoning and problem-solving strategies. For example, instead of just asking if they won, ask: "What strategies did you use to be successful?"; "Were there any specific moves that limited your opponent?"; "How could you have approached the game differently?" By encouraging metacognition (thinking about their thinking), students solidify their understanding and develop stronger problem-solving skills. This approach transforms a fun game into a valuable learning experience. (National Council of Teachers of Mathematics).
- Emphasize engagement and productive struggle in learning. Base the success of your lessons on the extent of students' engagement with ideas rather than their immediate happiness. Encourage your students to embrace and navigate the struggle inherent in the learning process. Present them with challenges that require deep thinking and problem-solving, rather than always offering questions with obvious solutions. When students are uncertain about where to start, guide them with prompts like, "Is there something you can try that might work?" and "Are there any mathematics tools (technology or manipulatives) that could help?" Incorporate modern teaching practices such as collaborative learning, inquiry-based approaches, and the integration of digital tools to enhance their problem-solving experiences. This approach not only builds resilience and critical thinking skills but also prepares students for real-world applications of mathematical concepts. (National Council of Teachers of Mathematics).
- A key component of the district's vision for excellent math instruction is fostering a growth mindset and building students' confidence in math.

3 Are young learners taking rigorous math courses and on track to complete Algebra I by ninth grade?

Why it matters

Establishing a solid foundation in core mathematics during elementary and middle school is essential for preparing young learners for the challenges of Algebra I. And successfully completing Algebra I during middle school is pivotal for young learners, as it lays the groundwork for advanced mathematical studies and enhances future academic and career opportunities. Research underscores several key benefits:

Gateway to advanced mathematics: Algebra I serves as a foundational course that enables students to progress to higher-level math classes, such as Algebra II, Geometry and Calculus. Completion of these advanced courses is strongly correlated with increased college enrollment and completion rates. For instance, students who undertake mathematics courses beyond Algebra II are more than twice as likely to pursue and complete a postsecondary degree (NCTM).

Enhanced college and career prospects: Early success in Algebra I has significant implications for long-term educational and professional outcomes. Proficiency in algebra during middle school is associated with higher achievement in high school mathematics, which in turn influences college admissions and career opportunities. Furthermore, strong algebra skills are essential for success in STEM (Science, Technology, Engineering and Mathematics) fields, which are linked to higher lifetime earnings.

Improved problem-solving skills: Engaging with algebraic concepts enhances critical thinking and problem-solving abilities. These skills are not only vital for academic success but also applicable in real-world scenarios, fostering logical reasoning and analytical thinking.

Preventing the need for remediation: Students who do not master core math concepts before enrolling in Algebra I are more likely to require remedial courses later. Remediation can delay academic progress and is associated with lower college completion rates. Ensuring readiness for Algebra I through mastery of foundational math reduces the likelihood of such setbacks.

Indicators

Contributing indicators

- The percentage of eighth graders scoring proficient or higher on their state's math assessment. If eighth-grade scores are unavailable, we suggest using scores from seventh grade, or sixth grade if seventh is not available. Data should also be disaggregated by student gender, race, ethnicity, disability status, homeless enrolled status, foster care status, and economic status.(StriveTogether, Cradle-to-Career Outcomes Data Guides: Middle Grade Math)
- Percent of 4th and 8th graders proficient in reading and math on NAEP. (Council of the Great City Schools).
- Algebra I completion rates for credit by grade 9. (Council of the Great City Schools).
- Students that completed Algebra I or equivalent in seventh, eighth, or ninth grade disaggregated by gender, race, ethnicity, disability status and economic status. (Council of the Great City Schools).

Systems indicators

- Eighth grade math achievement on NAEP (National Assessment of Educational Progress) in the most recent year, disaggregated by gender, race, ethnicity, disability status, language status, and economic status. (Council of the Great City Schools).
- Trends in eighth grade math achievement on NAEP (National Assessment of Educational Progress) over time, disaggregated by gender, race, ethnicity, disability status, language status, and economic status. (Council of the Great City Schools).

Practices and Policies

Practices

- Lessons should start with checks for understanding. Teachers can figure out what skills and understandings are prerequisites for the new concept they're starting to introduce, and then give students a couple of questions that would allow them to show their knowledge—or demonstrate that they have unfinished learning. Then, teachers can develop a task or mini-lesson to shore up that prerequisite skill, and make explicit its connection to the new learning. For example, teachers could review the basics of linear functions and how to plot them on a graph right before introducing slope-intercept form. (EdWeek, Algebra 1 is a Turning Point).
- Teachers check for understanding using targeted, just-in-time support instead of remediation (i.e. having students repeat entire units from 8th grade math before moving on to Algebra 1 content). Remediation can be demotivating and can push students who are struggling further behind by limiting their access to grade-level content. (EdWeek, Algebra 1 is a Turning Point).
- Teachers can show multiple representations for new concepts, for example, drawing explicit connections between the way a linear function looks written as a mathematical expression, the way it looks as a graph, and real-world examples a student might encounter. (EdWeek, Algebra 1 is a Turning Point).
- The number line doesn't have to stay in 8th grade: Algebra teachers can continue to plot radicals, exponents, and fractions if students are having a hard time conceptualizing their magnitude. For example: The idea that the square root of 16 is the same as 4 is the same as 2 squared can feel really abstract to students,

but plotting numbers like these at the same point on a number line can help them better understand. (EdWeek, Algebra 1 is a Turning Point).

- Teachers can be explicit about the connections between word problems and the equations meant to solve them, teaching solution methods for different types of problems. (EdWeek, Algebra 1 is a Turning Point).
- Group practice allows teachers to listen to students' thought processes. Teachers can listen in to group conversations—asking guiding questions to explore a student's thinking, reinforcing the use of mathematical language, and addressing any misunderstandings in the moment. (EdWeek, Algebra 1 is a Turning Point).
- In math, a focus on relationship building and social-emotional learning isn't an extra; it's integral to students' academic success. If students don't feel comfortable saying they don't understand, if they aren't willing to tackle a challenging problem or share their ideas in a group, then they won't be able to get the practice they need to achieve fluency, or ask the questions that can lead to deep conceptual understanding. (EdWeek, Algebra 1 is a Turning Point).
- Give all students access to grade-level content. Helping students master challenging work with appropriate support keeps them on track, so that they're prepared for higher level math and can succeed in the courses they need for graduation. And it can also build their confidence. (EdWeek, Algebra 1 is a Turning Point).
- The Local Education Agency (LEA) aligns curricular selection, professional learning and instructional support (like coaching) to rigorous math standards
- Middle school is a critical time to capture students' interest in math. Middle school math teachers can boost students' engagement and confidence in math by using student-focused instructional strategies and teaching computational thinking skills. When students learn to believe in their own math skills at school, they carry that confidence in math and in other STEM (science, technology, engineering, and math) topics for a lifetime. (IES, ENACT Math).
- Teachers use student-focused instructional strategies Student-focused instructional strategies help all students see themselves as important contributors to the classroom community, which in turn supports students' self-confidence with math and builds student engagement in math. (IES, ENACT Math).
- Teachers provide opportunities to use computational thinking skills Computational thinking skills are problem-solving strategies that students learn to help them approach unfamiliar problems. These strategies encourage student inquiry and focus on deepening mathematical understanding of concepts instead of memorizing rules. These strategies also help students develop skills and mindsets that unlock pathways into high-wage, in-demand fields. (IES, ENACT Math).
- Teachers instruct students in computational thinking skills: Pattern recognition (i.e. looking for ways that problems or situations are similar or different); Abstraction (i.e. identifying and representing the important information in a problem or situation); Decomposition (i.e. breaking a complex problem into smaller parts that are easier to address); Debugging (i.e. finding and fixing mistakes to improve one's work); Algorithms (i.e. developing and using systematic, step-by-step approaches to problems). (IES, ENACT Math).
- Teachers employ student-focused instructional strategies Connecting math problems to real situations in students' lives; Encouraging students to try different strategies for problem solving; Discussing more than one way to solve a problem; Communicating that students are bringing valuable ideas and work to the classroom; Providing opportunities for raising student voice in every lesson. (IES, ENACT Math).

- Teaching Computational Thinking Skills: Modeling using computational thinking skills for students; Creating opportunities for students to use computational thinking; Building students' confidence in using computational thinking; Helping students make their thinking visible. (IES, ENACT Math).

Policies

- State adoption of rigorous math standards that prioritize depth, coherence and rigor
- The Local Education Agency (LEA) adopts rigorous math standards that prioritize depth, coherence and rigor.
- One increasingly popular approach to improving students' math skills is "algebra for all," which encourages more students to take algebra and at earlier ages. The best study of this approach, using evidence from Charlotte, North Carolina (see "Solving America's Math Problem," Winter 2013), shows that pushing students into course work for which they are ill prepared actually harms their subsequent academic achievement. (Education Next, A Double Dose of Algebra).
- A potentially promising alternative to "algebra for all" is "double-dose" algebra, in which struggling students are given twice as much instructional time as they would normally receive. Researchers found positive and substantial longer-run impacts of double-dose algebra on college entrance exam scores, high school graduation rates, and college enrollment rates, suggesting that the policy had significant benefits that were not easily observable in the first couple of years of its existence. The benefits of double-dose algebra were largest for students with decent math skills but below-average reading skills, perhaps because the intervention focused on written expression of mathematical concepts. (Education Next, A Double Dose of Algebra).
- Researchers found that ninth graders assigned to "double-dose algebra"—an algebra class plus a second class designed to bolster algebra skills—were more likely to stay in, and complete, college compared to similar students who did not take double-dose algebra. However, when students were placed in double-dose classes with much-lower-skilled peers the program had no effect. (PNAS, Effects of double-dose algebra on college persistence and degree attainment).
- Double-dose algebra shows real promise for helping median-skill students in Chicago neighborhood schools to gain math skills, take more college-preparatory math classes, achieve more years of schooling, and earn college degrees. The success of the double-dose approach is consistent with evidence of a similar successful intervention in college—offering a remedial course along with a core math course (e.g., statistics) to those who do not meet the minimum math requirement. (PNAS, Effects of double-dose algebra on college persistence and degree attainment).
- In 2015, the California Legislature passed a new law-the California Mathematics Placement Act to address widespread concern over equity in the math placement process. The law is aimed at improving the measurement of student performance (creating a more fair, transparent, and objective math placement process) in order to move more students successfully through the high school curriculum. The law requires districts to include certain practices, such as relying on multiple objective measures in placement decisions, using student performance data to ensure equity and efficacy, and ensuring the consistency of placement policies between elementary and high school districts. (PPIC, Math Placement in California's Public Schools).
- Large numbers of students who took Algebra in eighth grade have often been required to repeat the course in high school, even though many were considered proficient on algebra tests, one California study found, noting that students of color were more likely to meet that fate. One possible explanation was that the majority of districts relied on parental requests,

which could increase access to advanced math courses for more privileged students. As a result of these concerns, California legislators passed a law on math placement intended to address disparities as students transition from middle school to high school. (Just Equations, Math Misplacement).

- Research on postsecondary placement may hold key lessons for K-12 schools. Postsecondary research has shown that placement reforms are most effective when paired with math pathway reforms. Even for students who aren't fully prepared, evidence has demonstrated clearly that supporting them to succeed in college-level courses is a more effective way to boost math achievement than assigning them to remedial sequences. (Just Equations, Math Misplacement).
- Numerous studies have demonstrated that far more students ultimately succeed in college-level math courses if they're allowed to enroll in them and receive just-in-time support. Beginning in 2018, the 23-campus California State University system embarked on an extensive reform, eliminating the use of placement tests and banning remedial courses for entering students. In the past, one out of every 17 Latinx students and one out of every 11 African American students were "disenrolled" after failing remedial courses. Under the new policies, all entering students begin their math sequence at the college-level, though they may be referred to "corequisite" versions that provide just-in-time support. In its first year of implementation, college-level math courses were taken by eight times as many students who would have been deemed "not ready" in prior years. And the pass rate in those courses even went up slightly. In eliminating remedial courses and providing co-requisite support, CSU didn't just change how it placed students, it also changed the math sequences themselves. (Just Equations, Math Misplacement).
- A 2017 California law bars community colleges from placing students in remedial courses unless evidence shows that doing so will boost their success in college-level math. (And given what existing research says, there is rarely justification for placing students in remedial courses.) The law has led to significant increases in student enrollment in and passage of college-level math courses, across racial and ethnic groups, according to a recent report by the Public Policy Institute of California. However, the report also noted that equity gaps in math completion remain, particularly for Black students. (Just Equations, Math Misplacement).
- Improving the transition between eighth and ninth grade ideally requires considering inequities in students' middle school math opportunities, given that only some students have access to accelerated options, which too often predetermines their high school trajectories. As the postsecondary reforms illustrate, high schools need to focus not just on placement, but on the quality and variety of the math pathways students ultimately can pursue. (Just Equations, Math Misplacement).

Leadership for Mathematics

Local Education Agencies (LEAs) need leaders with a clear vision for excellent math instruction and a strong plan for district-wide implementation.

4 **Does the LEA have a clear vision and approach for ensuring excellent math instruction in every classroom?**

Why it matters

School district leaders play a pivotal role in shaping the quality of mathematics instruction within their schools. Establishing a clear vision and strategic approach for excellent math education is essential for several reasons:

District-wide vision for excellent math instruction: An instructional vision defines the desired teaching and learning outcomes for a subject area. While standards specify what students should know and do, and instructional shifts outline the required teaching approaches, an instructional vision outlines the daily experiences and broader goals for student learning. A clear vision helps guide material selection and ensures alignment with the district's objectives (edReports).

Focusing on student outcomes: Instruction Partners emphasizes that district leaders must prioritize student outcomes by setting clear goals for math instruction and ensuring that all students receive equitable access to high-quality learning. By aligning resources and policies to measurable student outcomes, districts can create systems that support continuous improvement in both teaching and learning (Instruction Partners).

Building a cohesive strategy across schools: Both TNTP and Instruction Partners highlight the importance of a unified, district-wide strategy for math instruction. District leaders need to work collaboratively across schools to ensure that instructional practices are aligned and that students have access to coherent, high-quality math experiences from early grades through high school.

Supporting instructional leadership: Effective instructional leadership is essential to fostering a culture of high expectations in math instruction. District leaders should invest in building the capacity of school leaders to guide teachers, monitor progress and create environments where math instruction thrives. Both TNTP and Instruction Partners advocate for a strong instructional leadership model to drive improvements at the classroom level.

Prioritizing continuous professional development: High-quality, sustained, content-specific professional development is a key part of a district's strategy. District leaders must support ongoing training for math teachers to improve their content knowledge and teaching strategies, ensuring that teachers remain equipped to meet students' evolving needs.

Vision and Strategy

Indicators

Contributing indicators

- Students from various demographic subgroups are proportionally represented in rigorous courses and programs (Education-to-Workforce Framework).
- Differences in the participation rates for students from key demographic subgroups in rigorous courses and programs relative to those students' representation in their school population as a whole, including opportunities, such as the following: Gifted and talented programs and Algebra I in middle school (Education-to-Workforce Framework).

Systems indicators

- Percentage of math courses taught by in-field or certified instructors within the school/district (Research in Educational Policy and Management).
- Percentage of schools or teachers reporting adoption of district's standards (RAND).
- Percentage of schools using the district's math curriculum (edReports).

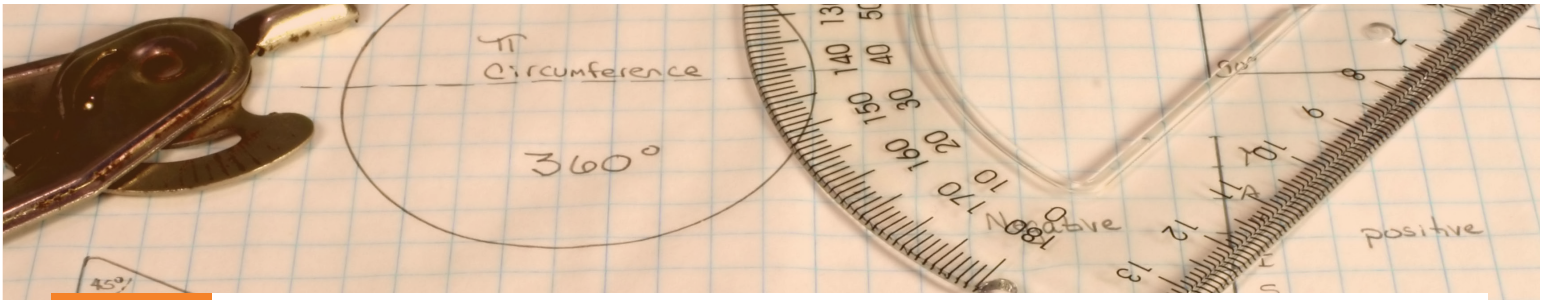
Practices and Policies

Practices

- District leaders prioritize student outcomes by setting clear goals for math instruction and ensuring that all students receive equitable access to high-quality learning (Instruction Partners).
- District leaders create an instructional vision of excellence for math and ensure resourcing, staffing, training and ongoing support aligns to and supports the vision (EdReports).
- State leaders can convene regular meetings with staff from all relevant offices at the state level (e.g., curriculum and instruction, special education, school improvement, early education and human capital) to align on a coherent vision for math improvement. (CCSSO, A Nation of Problem-Solvers).
- State leaders can build SEA knowledge, coherence and capacity related to evidence-based instructional practices through staff training and strategic use of external experts. (CCSSO, A Nation of Problem-Solvers).

Policies

- States can align their priorities and resources to support their vision for high-quality math instruction. A clear, coherent approach eliminates confusion and ensures a consistent, statewide focus to drive improved student outcomes. State chiefs can prioritize coherence across often-siloed departments and designate staff to fully support priorities, creating a systematic and comprehensive education approach that supports all students' success. (CCSSO, A Nation of Problem-Solvers).
- State leaders can align competitive funding from the SEA with incentives or requirements to implement state math initiatives. (CCSSO, A Nation of Problem-Solvers).
- State leaders can train regional educational service centers to ensure their support aligns with the state math strategy. (CCSSO, A Nation of Problem-Solvers).
- State leaders can coordinate the strategy for school improvement with the state's math priorities to ensure that systems of support for the lowest-performing schools enhance the math priorities. (CCSSO, A Nation of Problem-Solvers).
- State leaders can create a plan to communicate the state's math strategy with families, educators, school and district leaders, community advocates and policymakers. (CCSSO, A Nation of Problem-Solvers).
- To support its math initiatives, Nebraska has increased coherence in its vision and messaging regarding instruction. Cross-divisional teams from offices responsible for teaching and learning — such as assessment, school support, special education and early childhood education — meet to align their priorities to support math. These teams have focused on how states can promote instructional coherence through high-quality K-3 instructional materials and the state's MTSS and interventions for schools identified as low-performing. Nebraska has also improved coherence among its 17 regional ESUs, which have traditionally delivered professional development and assistance to district educators. The Math Acceleration Project, a multiyear capacity-building endeavor launched by the Nebraska Department of Education (NDE), aims to create sustainable positive change and inform NDE's decisions about future policies, guidance, practices and support. As a part of the project, NDE engaged the nonprofit organization Instruction Partners to support the implementation of HQIM, teaming up with ESUs to offer individualized engagements that developed leaders' capacity to provide deep, lasting, replicable support to districts adopting and implementing HQIM. (CCSSO, A Nation of Problem-Solvers).



5 Has the LEA adopted standards-aligned, coherent, culturally relevant curricular materials aligned to the vision?

Why it matters

Adopting standards-aligned and coherent math curricula is essential for Local Education Agencies (LEAs) to enhance math instruction and improve student outcomes. As we note in Essential Question 13, ensuring educators receive strong curriculum-based professional learning is key to high-quality instructional materials working (National Implementation Research Network).

Improved math teacher instruction and student engagement: Using standards-aligned math materials helps teachers implement effective instructional practices, leading to increased student engagement in math. According to EdReports, math teachers using aligned curricula are more likely to engage students in problem solving and mathematical reasoning (edReports).

Boosted student achievement in math: High-quality, standards-aligned math curricula have a significant positive impact on student math achievement. Studies show that when students are taught with materials aligned to standards like the Common Core, they demonstrate higher performance in math assessments. The National Association of State Boards of Education reports that rigorous, standards-based math curricula are linked to both quality and equity in math education (Nasbe.org).

Consistency and coherence in math instruction: Aligning math curricula with standards ensures that all students receive a consistent and coherent math education, which is critical for mastery of math concepts. Research from Learning Forward emphasizes that alignment helps guide both teachers' practices and the curriculum structure, ensuring students progress logically through math topics, building on prior knowledge in a coherent way. (Learning Forward).

Efficient use of instructional time: Standards-aligned math materials allow teachers to spend more time on instruction rather than creating resources. This efficiency leads to more effective math teaching and deeper student understanding of mathematical concepts. The National Association of State Boards of Education highlights how high-quality math curricula support teachers in developing strong subject expertise and improve the quality of math instruction (nasbe.org).

Curricular materials

Indicators

Contributing indicators

- Percentage of lessons as demonstrated through walk-through or other observable data that are focused on grade-level content or scaffolding to grade-level content (Instruction Partners).
- % of students in classrooms where adopted curricular materials are being utilized

Practices and Policies

Practices

- Professional learning and implementation needs to be considered from the beginning of selection processes (edreports).
- Focus and Coherence: Do the curricular materials and aligned assessments assess grade-level content, and are they coherent and consistent with the Common Core State Standards (CCSS)? Criteria related to coherence determine whether instructional materials are consistent with progressions of the CCSS and are coherent within a single grade. (Analyzing Middle School Math Curricula). [Editor's note: As of April 2025, we were unable to access this content on Mathematica's website.]
- Rigor and Math Practices: Do the materials meet the CCSS expectations for rigor and mathematical practices? Criteria related to rigor determine if each grade's instructional materials reflect the balances set forth in the CCSS, helping students develop conceptual understanding, procedural skill and fluency, and application. Criteria related to mathematical practice determine how well materials meaningfully connect the Standards for Mathematical Content and the Standards for Mathematical Practice. (Analyzing Middle School Math Curricula). [Editor's note: As of April 2025, we were unable to access this content on Mathematica's website.]
- Instructional Supports and Usability: Do the materials and aligned professional learning support teachers in fully using the curriculum, understanding students' skills and learning, and supporting a range of learners? The criteria determine how well instructional materials support student learning and engagement and support teacher learning and understanding of the standards. Other criteria include usability of assessments and incorporation of technology into the instructional materials. (Analyzing Middle School Math Curricula). [Editor's note: As of April 2025, we were unable to access this content on Mathematica's website.]
- The Culturally Responsive Mathematics Teaching (CRMT) curriculum coding tool measures the prevalence of a curriculum's guidance for enacting culturally responsive instruction, such as connecting content to student culture and identities, providing all students with rigorous material, and attending to the power and participation of students throughout the learning process. (Analyzing Middle School Math Curricula). [Editor's note: As of April 2025, we were unable to access this content on Mathematica's website.]
- Community and Cultural Funds of Knowledge: How does the lesson as written help students connect mathematics with meaningful issues or situations in their lives? Key practices include: Reference students' community and home knowledge, culture, or experiences; Inquire about student backgrounds and experiences; Ask students to reflect on instances in which they might have seen a topic in their own life, ask them to discuss the experience, and adapt it as a problem for the class. (Analyzing Middle School Math Curricula). [Editor's note: As of April 2025, we were unable to access this content on Mathematica's website.]
- (Re) Humanizing: How does the lesson as written support creativity, broaden what counts as mathematical knowledge, and affirm positive mathematics identities for all students? Key practices include: Affirm positive mathematics identities for all races, genders, and ethnicities;

Include mathematical problems that honor students' diversity and culture or include how other cultures or communities have used mathematics to honor their traditions; Acknowledge that individuals around the world have been successfully involved with mathematics in various ways for centuries. (Analyzing Middle School Math Curricula). [Editor's note: As of April 2025, we were unable to access this content on Mathematica's website.]

- Student Ideas and Thinking: How does the lesson as written create opportunities to elicit, express, and build on student mathematical thinking in a variety of ways? Key practices include: Include guidance for teachers to encourage students to share their reasoning, ask questions of one another, discuss each other's ideas, or promote a shared understanding across the whole class; Include guidance for teachers to encourage and value a variety of forms of communication, including hand gestures, pictures or drawings, and diverse responses. (Analyzing Middle School Math Curricula). [Editor's note: As of April 2025, we were unable to access this content on Mathematica's website.]
- Cognitive Demand: How does the lesson as written enable all students to closely explore and analyze mathematics concept(s), procedure(s), and problem-solving or reasoning strategies? Key practices include: Include mathematical tasks that emphasize underlying concepts, patterns, and properties; Include tasks that require students to explain their reasoning. (Analyzing Middle School Math Curricula). [Editor's note: As of April 2025, we were unable to access this content on Mathematica's website.]
- Maintain Rigor: How does the lesson as written maintain high rigor with strong support for all students? Key practices include: Ensure that scaffolds do not lower the expectation for some students; Include opportunities for students assigned lower-level tasks to reconnect to rigorous content. (Analyzing Middle School Math Curricula). [Editor's note: As of April 2025, we were unable to access this content on Mathematica's website.]
- Affirm Multilingualism: How does the lesson as written position multilingual learners (MLL) as competent learners in mathematics activities? Key practices include: Include prompts for teachers to encourage students to lean on their linguistic resources and home language to help make sense of mathematics; Include guidance for teachers to lift up the language that students use and share it with the class; Reference strategies that develop academic language, such as repeating all or part of what a student said to ensure understanding or using graphic organizers to visualize or present information in a way that is easy to comprehend. (Analyzing Middle School Math Curricula). [Editor's note: As of April 2025, we were unable to access this content on Mathematica's website.]
- Distribute Intellectual Authority: How does the lesson as written distribute mathematics authority and make space for a variety of forms of knowledge and communication? Key practices include: Include prompts for teachers to encourage students to draw on their experiences and knowledge to make sense of and connect with the mathematics concepts they are learning; Ensure that mathematical tasks include opportunities for students to share their reasoning with one another, whether in pairs or small groups; Include guidance for teachers to encourage student input and ownership through inquiry-based instruction. (Analyzing Middle School Math Curricula). [Editor's note: As of April 2025, we were unable to access this content on Mathematica's website.]
- Disrupt Power: How does the lesson as written disrupt status differences, entrenched stereotypes, and inequitable power relationships present in all mathematics classrooms? Key practices include: Include teacher prompts for explicitly addressing and challenging stereotypes; Include teacher guidance for using inclusive talk that builds up students instead of tearing down ideas or insisting on one correct way; Include teacher prompts for implementing classroom norms to ensure that each student speaks during a lesson. (Analyzing Middle School Math Curricula). [Editor's note: As of April 2025, we were unable to access this content on Mathematica's website.]
- Taking Action: How does the lesson as written support students' use of mathematics to analyze,

critique, and address power relationships and injustice in their lives (economic, social, environmental, legal, political, patriarchal)? Key practices include: Provide students with mathematical tasks that involve analyzing, critiquing, or addressing an issue they strongly connect to, such as a topic on social justice; Provide students with mathematical problems related to current or historical issues of injustice or social justice, such as calculating the cost of buying bottled water when lead is discovered in the water system or the cost of rent when families are displaced by hurricane damage to their homes. (Analyzing Middle School Math Curricula). [Editor's note: As of April 2025, we were unable to access this content on Mathematica's website.]

- Elementary and middle school mathematics curricula should include a focused, coherent progression of mathematics learning, emphasizing proficiency in key topic areas. (CCSSO, A Nation of Problem-Solvers).
- Districts build a coherent instructional system that aligns to their instructional vision that includes district leadership across multiple units (curriculum, finance, superintendent, student services, human resources, etc.) (National Implementation Research Network).

Policies

- High-quality instructional materials (HQIM), at a minimum, are aligned to academic state standards, are easy to use, include implementation support and educative teacher guides, have inclusive practices and are aligned to evidence-based best practices by content area. For math, these materials provide focus and coherence, rigor and mathematical practices, balance among conceptual understanding, procedural skill and fluency and application. (CCSSO, A Nation of Problem-Solvers).
- Funding for curriculum adoptions and implementation is allocated at the state and/or district level (edreports).

6 Does the LEA use quality data and assessment resources consistently, coherently and strategically to drive instructional decision making for all students?

Why it matters

Consistent, coherent and strategic use of assessments and data is essential for improving math outcomes. A comprehensive assessment system — including diagnostic assessments, universal screeners, progress monitoring, formative and summative assessments — helps educators identify student needs early and provide targeted support.

When used effectively, these assessments inform data-driven instruction, guiding interventions and adjustments that enhance conceptual understanding, procedural fluency and problem-solving skills — especially for students who need additional support.

Data-driven instruction

Indicators

Contributing indicators

- Percentage of middle school students completing standards and curriculum aligned formative math assessments in regular intervals (National Council of Teachers of Mathematics).

Practices and Policies

Practices

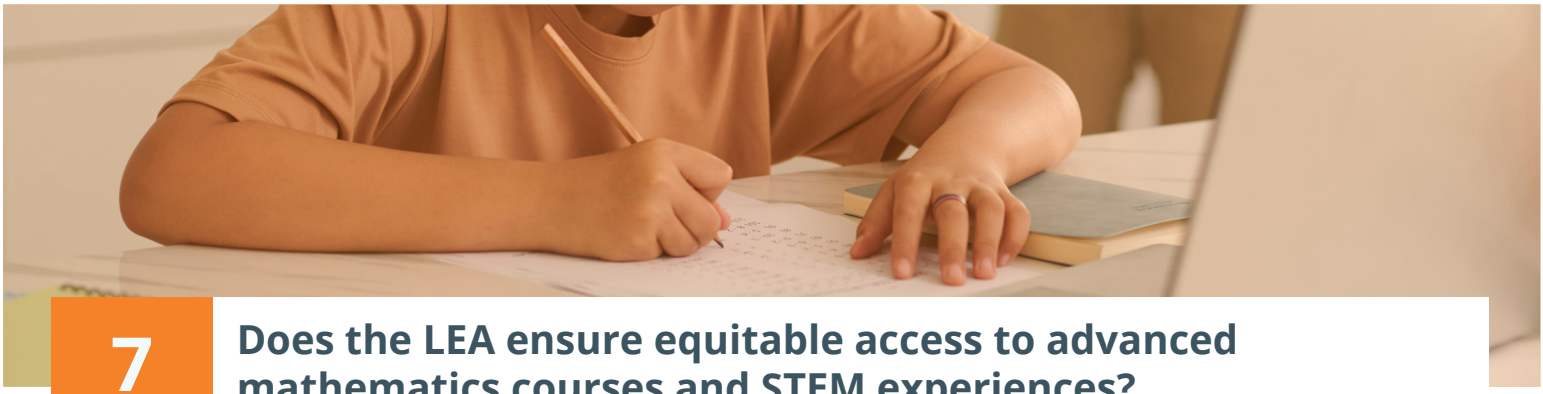
- Leverage integrated technology and artificial intelligence to support assessment analysis and interventions for students
- State leaders support districts in streamlining assessment systems to leverage real-time student data. When teachers are clear on the purpose of their assessments and are equipped to use the data in real time, they are empowered with immediate, actionable insights to improve instruction for students. States can support districts in developing a coherent assessment plan, including curriculum-based assessments, that teachers use to address student needs in real time. (CCSSO, A Nation of Problem-Solvers).
- Redundant data can be hard to interpret. States are leading the way in improving assessment methods by implementing frequent, ongoing assessments throughout the year. These assessments are aligned with the teacher's curriculum and provide more immediate data that contribute to a comprehensive year-end summative report. (CCSSO, A Nation of Problem-Solvers).
- States can assist by creating a coherent assessment plan to clarify the purpose of each assessment and eliminate redundancies, reducing testing time and increasing instructional time. This plan should consider how assessments can better connect to daily instruction through the curriculum and articulate how the state, district, teachers and families will use the results of each assessment. (CCSSO, A Nation of Problem-Solvers).
- Teachers' regular use of formative assessment improves their students' learning, especially if teachers have additional guidance on what instructional experiences might be best for students based on their results. (CCSSO, A Nation of Problem-Solvers).

Policies

- State leaders can articulate a clear vision across academic and assessment divisions for the role of state and local assessments. (CCSSO, A Nation of Problem-Solvers).
- State leaders can incentivize partnerships with third-party providers to support districts in auditing their current assessment systems, ensuring a streamlined and coherent approach. (CCSSO, A Nation of Problem-Solvers).
- State leaders can limit excessive or unnecessary testing that does not directly align with the curriculum or classroom learning and consider innovative approaches to state assessment. (CCSSO, A Nation of Problem-Solvers).
- State leaders can partner with state-vetted professional learning providers to embed real-time use of curriculum-based assessments to address unfinished learning. (CCSSO, A Nation of Problem-Solvers).
- State leaders can provide districts with guidance and best practices for using real-time data in professional learning communities to align student support across core, intervention and other supplemental experiences such as tutoring and summer school. (CCSSO, A Nation of Problem-Solvers).
- Montana received a federal waiver in 2023 from the U.S. Department of Education, allowing

schools participating in a pilot program for innovative assessment to eliminate double-testing requirements for schools. The waiver allowed the state to expand the Montana Aligned to Standards Through-Year (MAST) program, a through-year assessment developed and designed by the Montana Office of Public Instruction in partnership with New Meridian. The goal of the assessment is to provide instructionally useful data to teachers throughout the year, as well as a scaled summative score for accountability at the end of the year. (CCSSO, A Nation of Problem-Solvers).

- Montana's new assessment approach organizes the state's mathematics standards into 12 smaller testlets, allowing districts to align their curriculum's scope and sequence and assess content throughout the school year. Each testlet takes around 20-30 minutes to complete, with weekly reporting that provides teachers with timely, actionable feedback. The reports will include item-level reporting based on the specific skills embedded in the content standards. Another innovative feature of the MAST assessment is misconception reporting, which helps educators identify and address specific student misunderstandings. At the end of the year, the system compiles the mini-test scores into a summative score that meets federal accountability requirements. (CCSSO, A Nation of Problem-Solvers).
- Local education agencies establish policies for how assessments are utilized for instruction in an effort to prevent over-testing and maximize student supports.



7 Does the LEA ensure equitable access to advanced mathematics courses and STEM experiences?

Why it matters

Ensuring equitable access to advanced mathematics courses and STEM (Science, Technology, Engineering and Mathematics) experiences is crucial for local education agencies, as it significantly influences students' academic achievements, college readiness and future career opportunities.

Impact on academic achievement and college readiness

Research indicates that students who engage in advanced math courses during high school are more likely to enroll in and complete college degrees. The Learning Policy Institute highlights that such coursework enhances college enrollment, retention and degree completion rates, irrespective of students' racial backgrounds. Furthermore, exposure to rigorous, college-preparatory classes correlates with higher earnings in the labor market (The Learning Policy).

Addressing disparities in access

Despite the benefits, access to advanced math and science courses remains uneven. Schools with high proportions of students of color or those experiencing poverty often offer fewer advanced

courses compared to schools serving more advantaged populations. For instance, only 52% of schools with high student of color enrollment offer Calculus, compared to 76% of schools with low student of color enrollment (Rand, 2023). This disparity is not due to lack of student interest or potential, but often stems from systemic resource gaps. Schools serving historically marginalized communities frequently face shortages of qualified teachers, particularly in specialized subjects like advanced math and science. They may also lack funding for the materials, technology and scheduling flexibility required to offer a broad range of advanced courses. As a result, students in these schools are less likely to have access to the rigorous coursework that can open doors to postsecondary STEM opportunities and long-term economic mobility.

Early Access to Advanced Courses

Indicators

Contributing indicators

- Percentage of students, disaggregated, who take and pass Algebra I in 8th grade

Practices and Policies

Practices

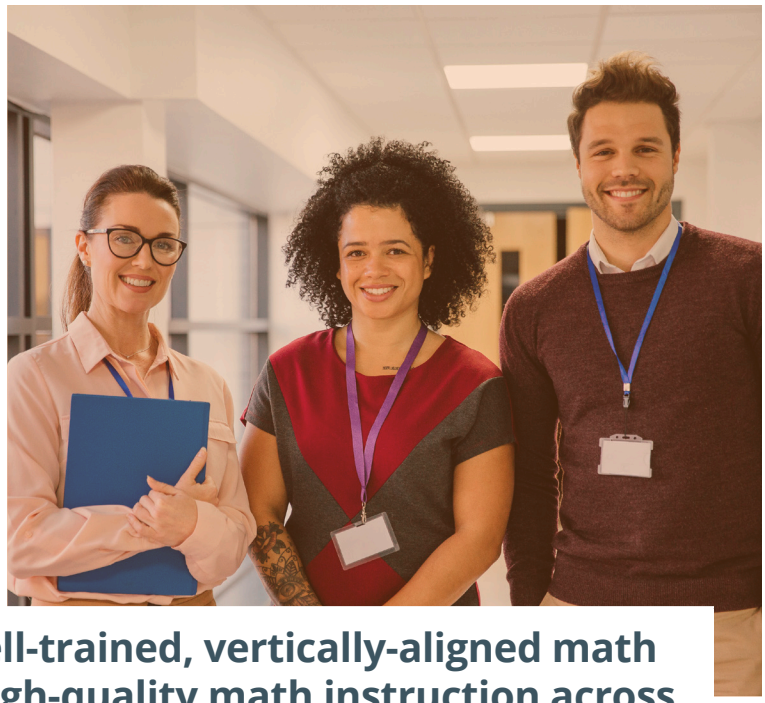
- School districts should ensure more students are prepared for and have early access to algebra when appropriate. (CCSSO, A Nation of Problem-Solvers).
- State policies can help expand early access to advanced math courses. Students need the opportunity to take rigorous math courses throughout high school to ensure college and career preparedness. Offering Algebra I in middle school creates space in high school schedules for students to go beyond the common math sequence of requirements mandated by most states. This allows students to enroll in advanced courses such as statistics, calculus or data science. (CCSSO, A Nation of Problem-Solvers).
- States generally approach eligibility for advanced math through opt-in or opt-out policies. Opt-in policies often require teachers, advisors, families or students to request that a student be placed in a more advanced course; however, critics argue this method leaves room for bias and inequitable access for students. Opt-out policies typically automatically enroll in an accelerated course any student who meets the state standard on the statewide exam in the preceding mathematics level (or through another measure). More states, including Colorado, North Carolina, Texas and Washington, are turning toward opt-out policies to ensure equitable opportunities to access rigorous and potentially college-credit-bearing courses for all students. (CCSSO, A Nation of Problem-Solvers).
- If considering an "opt-out" policy for advanced math courses, states should consider the qualifications for enrolling students. If opt-out policies are too broad, districts risk enrolling students in middle school Algebra I who are not adequately prepared. This can result in less rigorous Algebra I courses and cause students to struggle with advanced math courses later in high school. (CCSSO, A Nation of Problem-Solvers).
- Many state math policies focus on Algebra I offerings in middle school, as Algebra I is generally considered a gatekeeper to higher mathematics. Offering Algebra I earlier than high school opens doors to a sequence of advanced math courses later in high school, including calculus and statistics, which are sometimes required or strongly encouraged for

college admission. Early exposure to Algebra I is associated with increased enrollment and success in postsecondary education and career opportunities. (CCSSO, A Nation of Problem-Solvers).

- State leaders can create policies and regulations that ensure students have the opportunity to take Algebra I in middle school as they are ready. (CCSSO, A Nation of Problem-Solvers).
- State leaders can create recommended data thresholds to support districts in determining student placement in math classes. This should include using multiple data points. (CCSSO, A Nation of Problem-Solvers).
- State leaders can work with their SEA data team and districts to track student performance in Algebra I and advanced math courses so the entry threshold can be adjusted based on the most successful students. (CCSSO, A Nation of Problem-Solvers).
- State leaders can review state accountability systems to ensure they reflect the critical importance of student mastery of algebra. (CCSSO, A Nation of Problem-Solvers).
- State leaders can craft a sample communications plan or toolkit to support districts in raising students' and families' awareness of the availability and benefits of advanced math courses, particularly targeting underrepresented groups. (CCSSO, A Nation of Problem-Solvers).
- State leaders can establish mechanisms to collect data and regularly assess the impact of early access to Algebra I on student outcomes and make adjustments based on data-driven insights. (CCSSO, A Nation of Problem-Solvers).
- Washington state passed a bill in 2013 encouraging school districts to adopt an automatic enrollment policy for advanced courses. The legislature allocated grant funds to cover costs such as teacher training, technology, transportation, books and fees. By 2019, Washington became the first state in the country to mandate an automatic enrollment policy for advanced math classes in all high schools. This policy requires districts to automatically enroll students who meet or exceed state standards on the eighth grade or high school math statewide assessments into advanced math courses. Districts must also notify students and their guardians about the policy and the advanced courses available. Since the implementation of this policy, many districts across Washington have seen increased enrollment in advanced math classes, helping to ensure that more students have access to rigorous coursework. The state has also provided one-time grants to schools to help expand their capacity for offering advanced math classes. As a result, Washington has observed improvements in math performance among high school students, reflecting the positive impact of the automatic enrollment policy. (CCSSO, A Nation of Problem-Solvers).
- North Carolina passed a bill in 2018 that requires students — starting with those in third grade — who score at the highest level on end-of-year math assessments to be automatically placed in advanced math classes. The bill also specifically guarantees access to a high school-level math course (Math 1 in the North Carolina context) in eighth grade for qualified students. Families can opt out if they do not wish their child to take the course. The bill was revised in 2019 to include annual reports on implementing this policy. As a result of this revision, North Carolina's Department of Public Instruction created a district reporting mechanism and aggregates data for an annual report to the General Assembly. Since implementing this policy, North Carolina has seen an increase in the percentage of high-performing students in seventh grade placed in advanced math in eighth grade. (CCSSO, A Nation of Problem-Solvers).
- Provide educators with standards-aligned curriculum materials and professional development to enhance the quality of math instruction (Rand, 2023).

Teaching and Learning

Schools with well-supported, representative teachers who receive content-specific support can deliver excellent math instruction and strengthen students' math identities.



8 Does each school have a well-trained, vertically-aligned math team to ensure cohesive, high-quality math instruction across the middle grades?

Why it matters

Establishing a well-trained, vertically-aligned mathematics team is essential for delivering cohesive, high-quality math instruction across middle grades. Vertical alignment ensures that the curriculum and teaching strategies are consistent and build progressively from one grade level to the next, fostering a seamless learning experience for students.

According to Linda Gojak, former president of the National Council of Teachers of Mathematics, effective vertical mathematics teams provide structured professional development opportunities, enabling teachers to deepen their content knowledge and align instructional practices across grade levels. This collaboration leads to a more coherent mathematics program that supports student growth and understanding.

Vertical alignment helps educators ensure that students develop the necessary foundational skills to succeed in higher-level math courses. By facilitating conversations among teachers across different grade levels, schools can address common misconceptions, bridge learning gaps and create a consistent progression of mathematical concepts.

A well-trained, vertically-aligned math team enhances instructional quality by promoting collaboration among educators, ensuring a logical progression of mathematical concepts, and providing students with a consistent and comprehensive learning experience throughout the middle grades.

Vertically-aligned math teams

Practices and Policies

Practices

- Math teachers across all grade levels operate as a "math team", collaborating on annual, unit and lesson planning, connecting concepts across grades and meeting students' needs. These structures are often called "Professional Learning Communities" (Education-to-Workforce).

High-quality professional learning

Practices and Policies

Practices

- Recent research consistently demonstrates teacher use of high-quality instructional materials (HQIM) boosts student achievement in reading and math. However, the curriculum alone is not enough; teachers' craft and skillful use of materials are critical to achieving the full impact of HQIM. (CCSSO, A Nation of Problem-Solvers).
- Research indicates professional learning experiences that help teachers use their specific curriculum to make informed decisions for their students can result in transformational changes in teaching and learning. (CCSSO, A Nation of Problem-Solvers).
- Research documenting the potential impact of professional learning (RPPL).
- Incentivize district partnerships with high-quality professional learning providers. Teachers require high-quality learning experiences that connect directly with the curriculum they use in their daily practice. Research shows that more than half of the potential impact of adopting a stronger curriculum is lost if it is not accompanied by a corresponding shift in teaching practices that specifically support the new materials. (CCSSO, A Nation of Problem-Solvers).
- High-quality professional learning experiences are curriculum-based and directly applicable to teachers' everyday work. Effective curriculum-based professional learning (CBPL) should include initial training aligned with specific curricular materials, regular collaborative planning opportunities for teachers such as unit and lesson internalization, lesson rehearsal, student work analysis and ongoing observation and feedback. (CCSSO, A Nation of Problem-Solvers).
- Some states, including Colorado and Louisiana, are making strides by incentivizing the use of curriculum-based professional learning (CBPL). To ensure meaningful impact, professional development must focus on concrete concepts, connect directly to daily lessons and provide pedagogical strategies with clear, practical examples for use in the classroom. (CCSSO, A Nation of Problem-Solvers).
- State chiefs can vet and curate a list of high-quality CBPL providers for districts. (CCSSO, A Nation of Problem-Solvers).

- State chiefs can provide grant funding to incentivize districts to choose providers from the state-curated list. (CCSSO, A Nation of Problem-Solvers).
- State chiefs can convene state-approved professional learning partners quarterly to monitor progress using common data collected and ensure alignment with the state's vision. (CCSSO, A Nation of Problem-Solvers).
- State chiefs can establish common contracts that ease procurement barriers, making it easy for districts to purchase from providers on the state list. (CCSSO, A Nation of Problem-Solvers).
- State chiefs can audit all existing state training offerings to ensure they focus on CBPL practices. (CCSSO, A Nation of Problem-Solvers).
- State chiefs can train regional education service centers (ESCs) to provide district materials selection and implementation support and ongoing, embedded professional development aligned to the state's vision for CBPL. (CCSSO, A Nation of Problem-Solvers).
- State chiefs can create guidance for districts to ensure that core instructors, special educators, interventionists and supplemental instructors all participate in professional learning. (CCSSO, A Nation of Problem-Solvers).
- In 2022, Alabama passed the Alabama Numeracy Act, which required the state to convene a task force focused on math. In addition to reviewing HQIM for core instruction and intervention, the task force provides a continuum of hiqh-quality professional learning opportunities centered on foundational math knowledge with funding and support for educators. (CCSSO, A Nation of Problem-Solvers).
- The Alabama Numeracy Act requires the task force to monitor the implementation of intensive professional development for full support and limited support schools. The department regularly gathers data (e.g., usage data, surveys, site visits) on professional learning, the use of instructional materials, state-provided resources and technical assistance. Recent reports highlight Alabama's commitment to mathematics, recognizing it as one of the only states where average student achievement exceeds pre-pandemic levels in math. (CCSSO, A Nation of Problem-Solvers).
- Nebraska is increasing access to HQIM and training for educators through partnerships and incentive programs. Nebraska's Instructional Materials Collaborative (NIMC) provides tools and resources for districts related to HQIM and curriculum-based professional learning. (CCSSO, A Nation of Problem-Solvers).
- The NIMC math materials selection process provides districts with a three-phase process to select instructional materials and plan for the necessary professional learning aligned to the selected materials, as well as other required actions for successful implementation. (CCSSO, A Nation of Problem-Solvers).
- Nebraska incentivizes the effective use of high-quality materials through the Nebraska Instructional Materials: Professional Learning Innovation Network Fellowship. This fellowship is designed to prepare districts and Educational Service Unit (ESU) teams to select quality materials, prepare to implement those materials and support teaching and professional learning aligned to the effective use of the materials and the vision for instructional excellence. (CCSSO, A Nation of Problem-Solvers).
- Nebraska is partnering with regional ESUs and proven vendors, such as Zearn, which show evidence of a positive impact on math performance for elementary and middle school students. More than 50 percent of elementary and middle school students have access to HQIM in math. Additionally, more than two-thirds of elementary students of color and students from low-income families have access to HQIM in math, which has increased significantly from 2019, when the number was less than 5%. More broadly, the percentage of Nebraska students in grades 3-8 who tested proficient on the state math assessment rose by double digits from 2021-

2022 to 2022-2023. (CCSSO, A Nation of Problem-Solvers).

- A study by Kathleen Lynch, Kathryn E. Gonzalez, Heather C. Hill, and Ramsey Merritt looked at math and science PD focusing on teacher knowledge (content and pedagogical content knowledge) and classroom instruction (practices within the classroom, including how teachers engage students, manage class time, and apply content-specific instructional strategies). The study found that professional development that emphasized both teacher content knowledge and instructional practice in concert had the largest positive effects on classroom instruction. The findings suggest that while gains in teacher content knowledge alone don't directly boost student achievement, PD focused on boosting teachers' math and science content knowledge and improving classroom instruction has the greatest effect on students' math and science achievement. (NCTQ, Professional development that delivers).

Policies

- A study by Heather C. Hill, Brian Rowan, and Deborah Loewenberg Ball with the University of Michigan found that teachers' mathematical knowledge was significantly related to student achievement gains in both first and third grades after controlling for key student- and teacher-level covariates. This finding provides support for policy initiatives designed to improve students' mathematics achievement by improving teachers' mathematical knowledge. In particular, the study showed that a teacher's mathematical knowledge for teaching (i.e. their classroom explanations, representations, and interactions with students' mathematical thinking) and not simply a teacher's computational facility or course taking, is positively related to student achievement (Effects of Teachers' Mathematical Knowledge for Teaching on Student Achievement).

9 Are teachers and schools making significant contributions to academic math growth for students?

Why it matters

Schools' contribution to student outcomes: School effectiveness measures aim to capture schools' impacts on student achievement on test scores, as well as more long-term outcomes, such as high school graduation, college access and success, and eventual earnings. (Education-to-Workforce). Analyses of nationwide data by the Educational Opportunity Project at Stanford University showed that, although test scores are higher, on average, in more affluent school districts, the relationship between school affluence and student outcomes does not hold when examining student learning growth (Education-to-Workforce).

Teachers' contribution to student learning: Research has proven that teachers are one of the

most important contributors to student learning and social-emotional development. Measuring their contributions to student learning relies on measuring their students' growth on learning outcomes (sometimes called "value-added"). Value-added models measure contributions to student outcomes by considering students' initial performance levels (for example, using prior test scores) or other background characteristics. Value-added measures (VAM) in early grades like K-2, where standardized testing is not typically administered, rely on alternative methods to estimate student growth. One method involves calculating teacher contribution scores based on cohort growth, comparing the progress of a teacher's students to that of similar students within the district or state, accounting for factors like prior achievement and demographics. Additionally, classroom observations, student work portfolios and other qualitative proxies are often incorporated to provide a more comprehensive view of teacher impact in the absence of standardized tests. These methods are widely discussed in research on early childhood education and teacher evaluation systems (e.g., McCaffrey et al., 2004; Kane & Staiger, 2012).

Multilingual learner progress: True fluency in multiple languages is an incredible asset to individuals, their families and global society. Multilingual learners (MLs), also known as English Learners (ELs) or English Language Learners (ELLs), represent a rapidly growing population in American public schools, accounting for over 10% of all students nationwide. These students have the opportunity to continue developing proficiency in their home language while acquiring English as a second — or sometimes third or fourth — language. However, this process is complex and demanding, particularly in systems that often face challenges such as a shortage of multilingual teachers, inconsistent implementation of bilingual or dual-language programs, and the pressures of high-stakes accountability testing. Research shows significant disparities in outcomes between MLs and their non-ML peers, with long-term English learners — those who have not achieved English proficiency after five to seven years — being particularly at risk. These students often have a GPA below 2.0 and perform two to three years below grade level in English language arts and math. Additionally, they face higher dropout rates and lower rates of college enrollment, underscoring the critical need for targeted support and resources to help MLs succeed (Education-to-Workforce).

School's contributions to student outcomes *Key source: Education-to-Workforce Framework*

Indicators

Systems indicators

- Schools' contributions to student outcomes, including achievement, attendance, social-emotional learning, college enrollment, and earnings, using value-added models. Note that value-added and other growth models require linking schools to student outcome data (such as test scores from two or more academic years, so growth can be measured). In places that do not already calculate value-added or similar measures, framework users should consult with experts to implement this indicator, as there are different approaches to computing value-added that have different technical and practical considerations. In practice, many states use other approaches to incorporating student growth data as part of their school accountability systems, which vary in validity and comparability as measures of schools' contributions to student outcomes. Users should also carefully consider the results of value-added measures so as not to reinforce existing inequalities by "explaining away" inter-group differences that might be addressed by system conditions or interventions (Education-to-Workforce Framework).

Practices and Policies

Practices

- Prioritize, support, and invest in results-driven initiatives to transform low-performing schools into high-quality teaching and learning environments in which all children, including those from low-income families and high-poverty neighborhoods, are present, engaged, and educated to high standards (Annie E. Casey Foundation).

Teachers' contributions to student learning growth *Key source: Education-to-Workforce Framework*

Indicators

Contributing indicators

- Students demonstrate growth on math assessments from beginning of the year to the end of the year
- The percentage of students across a district, school and classrooms who meet their annual growth targets in math

Systems indicators

- Percentage of instructors demonstrating above average contributions to student learning, as measured by student growth on state standardized tests or other outcomes (for example, using value-added models or student growth percentiles). Note that value-added and other growth models require linking instructors to student outcome data (such as test scores from two or more academic years, so growth can be measured). The Education-to-Workforce Framework cautions against using value-added data as the only measure of teaching effectiveness and recommends also including measures based on classroom observation and student survey data. When used for high-stakes accountability, measures of teachers' contributions to student learning may have unintended consequences (for example, leading to practices such as "teaching to the test") (Education-to-Workforce Framework).
- Schools' contributions to student outcomes, including achievement, attendance, social-emotional learning, college enrollment, and earnings, using value-added models. Note that value-added and other growth models require linking schools to student outcome data (such as test scores from two or more academic years, so growth can be measured). In places that do not already calculate value-added or similar measures, framework users should consult with experts to implement this indicator, as there are different approaches to computing value-added that have different technical and practical considerations. In practice, many states use other approaches to incorporating student growth data as part of their school accountability systems, which vary in validity and comparability as measures of schools' contributions to student outcomes. Users should also carefully consider the results of value-added measures so as not to reinforce existing inequalities by "explaining away" inter-group differences that might be addressed by system conditions or interventions (Education-to-Workforce Framework).
- Collective teacher efficacy: The collective belief of teachers in their ability to positively affect students. The effect size (1.57) demonstrates a strong correlation to student achievement (Hattie).

Practices and Policies

Practices

- Teachers prepare problems and use them in whole-class instruction (What Works Clearinghouse, Improving Mathematical Problem Solving).

- Teachers include both routine and non-routine problems in problem-solving activities (What Works Clearinghouse, Improving Mathematical Problem Solving).
- Teachers ensure that students will understand the problem by addressing issues students might encounter with the problem's context or language (What Works Clearinghouse, Improving Mathematical Problem Solving).
- Teachers consider students' knowledge of mathematical content when planning lessons (What Works Clearinghouse, Improving Mathematical Problem Solving).
- Teachers assist students in monitoring and reflecting on the problem-solving process (What Works Clearinghouse, Improving Mathematical Problem Solving).
- Teachers provide students with a list of prompts to help them monitor and reflect during the problem solving process (What Works Clearinghouse, Improving Mathematical Problem Solving).
- Teachers model how to monitor and reflect on the problem-solving process (What Works Clearinghouse, Improving Mathematical Problem Solving).
- Teachers use students' thinking about a problem to develop students' ability to monitor and reflect (What Works Clearinghouse, Improving Mathematical Problem Solving).
- Teachers teach students how to use visual representations (What Works Clearinghouse, Improving Mathematical Problem Solving).
- Teachers select visual representations that are appropriate for students and the problems they are solving (What Works Clearinghouse, Improving Mathematical Problem Solving).
- Teachers use think-alouds and discussions to teach students how to represent problems visually (What Works Clearinghouse, Improving Mathematical Problem Solving).
- Teachers show students how to convert the visually represented information into mathematical notation (What Works Clearinghouse, Improving Mathematical Problem Solving).
- Teachers expose students to multiple problem-solving strategies (What Works Clearinghouse, Improving Mathematical Problem Solving).
- Teachers provide instruction in multiple strategies (What Works Clearinghouse, Improving Mathematical Problem Solving).
- Teachers provide opportunities for students to compare multiple strategies in worked examples (What Works Clearinghouse, Improving Mathematical Problem Solving).
- Teachers ask students to generate and share multiple strategies for solving a problem (What Works Clearinghouse, Improving Mathematical Problem Solving).
- Teachers help students recognize and articulate mathematical concepts and notation (What Works Clearinghouse, Improving Mathematical Problem Solving).
- Teachers describe relevant mathematical concepts and notation, and relate them to the
- problem-solving activity (What Works Clearinghouse, Improving Mathematical Problem Solving).
- Teachers ask students to explain each step used to solve a problem in a worked example (What Works Clearinghouse, Improving Mathematical Problem Solving).
- Teachers help students make sense of algebraic notation (What Works Clearinghouse, Improving Mathematical Problem Solving).
- Space learning over time. Arrange to review key elements of course content after a delay of several weeks to several months after initial presentation. (What Works Clearinghouse, Organizing Instruction and Study to Improve Student Learning).
- Identify key concepts, terms, and skills to be taught and learned. (What Works Clearinghouse,

Organizing Instruction and Study to Improve Student Learning).

- Arrange for students to be exposed to each main elements of material on at least two occasions, separated by a period of at least several weeks—and preferably several months. (What Works Clearinghouse, Organizing Instruction and Study to Improve Student Learning).
- Arrange homework, quizzes, and exams in a way that promotes delayed reviewing of important course content. (What Works Clearinghouse, Organizing Instruction and Study to Improve Student Learning).
- Interleave worked example solutions and problem-solving exercises. Have students alternate between reading already worked solutions and trying to solve problems on their own. (What Works Clearinghouse, Organizing Instruction and Study to Improve Student Learning).
- Have students alternate between reading already worked solutions and trying to solve problems on their own. (What Works Clearinghouse, Organizing Instruction and Study to Improve Student Learning).
- As students develop greater expertise, reduce the number of worked examples provided and increase the number of problems that students solve independently. (What Works Clearinghouse, Organizing Instruction and Study to Improve Student Learning).
- Combine graphics with verbal descriptions. Combine graphical presentations (e.g., graphs, figures) that illustrate key processes and procedures with verbal descriptions. (What Works Clearinghouse, Organizing Instruction and Study to Improve Student Learning).
- Use graphical presentations (e.g., graphs, figures) that illustrate key processes and procedures. This integration leads to better learning than simply presenting text alone. (What Works Clearinghouse, Organizing Instruction and Study to Improve Student Learning).
- When possible, present the verbal description in an audio format rather than as written text. Students can then use visual and auditory processing capacities of the brain separately rather than potentially overloading the visual processing capacity by viewing both the visualization and the written text. (What Works Clearinghouse, Organizing Instruction and Study to Improve Student Learning).
- Connect and integrate abstract and concrete representations of concepts, making sure to highlight the relevant features across all forms of the representation. (What Works Clearinghouse, Organizing Instruction and Study to Improve Student Learning).
- Use quizzing to promote learning. Use quizzing with active retrieval of information at all phases of the learning process to exploit the ability of retrieval directly to facilitate long-lasting memory traces. (What Works Clearinghouse, Organizing Instruction and Study to Improve Student Learning).
- Prepare pre-questions, and require students to answer the questions, before introducing a new topic. (What Works Clearinghouse, Organizing Instruction and Study to Improve Student Learning).
- Use quizzes for retrieval practice and spaced exposure, thereby reducing forgetting. (What Works Clearinghouse, Organizing Instruction and Study to Improve Student Learning).
- Use game-like quizzes as a fun way to provide additional exposure to material. (What Works Clearinghouse, Organizing Instruction and Study to Improve Student Learning).
- Help students allocate study time efficiently. Assist students in identifying what material they know well, and what needs further study, by teaching children how to judge what they have learned. (What Works Clearinghouse, Organizing Instruction and Study to Improve Student Learning).
- Conduct regular study sessions where students

are taught how to judge whether or not they have learned key concepts in order to promote effective study habits. (What Works Clearinghouse, Organizing Instruction and Study to Improve Student Learning).

- Teach students that the best time to figure out if they have learned something is not immediately after they have finished studying, but rather after a delay. Only after some time away from the material will they be able to determine if the key concepts are well learned or require further study. (What Works Clearinghouse, Organizing Instruction and Study to Improve Student Learning).
- Remind students to complete judgments of learning without the answers in front of them. (What Works Clearinghouse, Organizing Instruction and Study to Improve Student Learning).
- Teach students how to use these delayed judgments of learning techniques after completing assigned reading materials, as well as when they are studying for tests. (What Works Clearinghouse, Organizing Instruction and Study to Improve Student Learning).
- Use quizzes to alert learners to which items are not well learned. (What Works Clearinghouse, Organizing Instruction and Study to Improve Student Learning).
- Provide corrective feedback to students, or show students where to find the answers to questions, when they are not able to generate correct answers independently. (What Works Clearinghouse, Organizing Instruction and Study to Improve Student Learning).
- Teach students how to use delayed judgment of learning techniques to identify concepts that need further study. (What Works Clearinghouse, Organizing Instruction and Study to Improve Student Learning).
- Use tests and quizzes to identify content that needs to be learned. (What Works Clearinghouse, Organizing Instruction and Study to Improve Student Learning).
- Help students build explanations by asking and answering deep questions. Use instructional prompts that encourage students to pose and answer "deep-level" questions on course material. These questions enable students to respond with explanations and supports deep understanding of taught material. (What Works Clearinghouse, Organizing Instruction and Study to Improve Student Learning).
- Encourage students to "think aloud" in speaking or writing their explanations as they study; feedback is beneficial. (What Works Clearinghouse, Organizing Instruction and Study to Improve Student Learning).
- Ask deep questions when teaching, and provide students with opportunities to answer deep questions, such as: What caused Y? How did X occur? What if? How does X compare to Y? (What Works Clearinghouse, Organizing Instruction and Study to Improve Student Learning).
- Challenge students with problems that stimulate thought, encourage explanations, and support the consideration of deep questions. (What Works Clearinghouse, Organizing Instruction and Study to Improve Student Learning).
- Encourage students to develop a deeper understanding of algebra. Although proficiency in arithmetic operations is important to becoming proficient in algebra, instruction should move students beyond superficial mathematics knowledge and toward a deeper understanding of algebra. This includes encouraging students to make connections between algebraic concepts and the procedures present in problems, and helping students recognize how the placement of the quantities relative to the operations in problems impacts the solution strategy. Teachers can prompt students to consider: What am I being asked to do in this problem? What do I know about the form of this expression or equation? What are the relationships between the quantities in this expression or equation? How can I check that my

solution is correct? (What Works Clearinghouse, Teaching Strategies for Improving Algebra Knowledge).

- Promote process-oriented thinking. Instruction should move beyond a primary focus on the correct final answer to algebra problems to also promoting the understanding of the processes by which one arrives at an answer. For example, teachers could encourage students to consider questions such as the following: What decisions did you make to solve the problem? What steps did you take to solve the problem? Was this a good strategy? Why or why not? Are there other ways to solve the problem? Can you show (through manipulatives, pictures, or number-lines) how you solved the problem? (What Works Clearinghouse, Teaching Strategies for Improving Algebra Knowledge).
- Encourage precise communication. Teachers should provide frequent opportunities for students to reason with and talk about mathematical concepts, procedures, and strategies using precise mathematical language. This communication plays a key role in helping students develop mathematical understanding. For example, teachers could ask students: How would you describe this problem using precise mathematical language? How would you describe your strategy for solving this problem using precise mathematical language? (What Works Clearinghouse, Teaching Strategies for Improving Algebra Knowledge).
- Use solved problems to engage students in analyzing algebraic reasoning and strategies. Compared to elementary mathematics work like arithmetic, solving algebra problems often requires students to think more abstractly. Algebraic reasoning requires students to process multiple pieces of complex information simultaneously, which can limit students' capacity to develop new knowledge. (Such reasoning is sometimes described as imposing high cognitive load or challenging working memory, which can interfere with students' ability to learn.) Solved problems can minimize the burden of abstract reasoning by allowing students to see the problem and many solution steps at once—without executing each step—helping students learn more efficiently. Analyzing and discussing solved problems can also help students develop a deeper understanding of the logical processes used to solve algebra problems. Discussion and the use of incomplete or incorrect solved problems can encourage students to think critically. (What Works Clearinghouse, Teaching Strategies for Improving Algebra Knowledge).
- Have students discuss solved problem structures and solutions to make connections among strategies and reasoning. Create opportunities for students to discuss and analyze solved problems by asking students to describe the steps taken in the solved problem and to explain the reasoning used. (What Works Clearinghouse, Teaching Strategies for Improving Algebra Knowledge).
- Select solved problems that reflect the lesson's instructional aim, including problems that illustrate common errors. (What Works Clearinghouse, Teaching Strategies for Improving Algebra Knowledge).
- Use whole-class discussions, small-group work, and independent practice activities to introduce, elaborate on, and practice working with solved problems. (What Works Clearinghouse, Teaching Strategies for Improving Algebra Knowledge).
- Teach students to utilize the structure of algebraic representations. Structure refers to an algebraic representation's underlying mathematical features and relationships, such as: the number, type, and position of quantities, including variables; the number, type, and position of operations; the presence of an equality or inequality; the relationships between quantities, operations, and equalities or inequalities; the range of complexity among expressions, with simpler expressions nested inside more complex ones. Paying attention

to structure helps students make connections among problems, solution strategies, and representations that may initially appear different but are actually mathematically similar. (What Works Clearinghouse, Teaching Strategies for Improving Algebra Knowledge).

- Promote the use of language that reflects mathematical structure. (What Works Clearinghouse, Teaching Strategies for Improving Algebra Knowledge).
- Encourage students to use reflective questioning to notice structure as they solve problems. (What Works Clearinghouse, Teaching Strategies for Improving Algebra Knowledge).
- Teach students that different algebraic representations can convey different information about an algebra problem. (What Works Clearinghouse, Teaching Strategies for Improving Algebra Knowledge).
- Teach students to intentionally choose from alternative algebraic strategies when solving problems. A strategy involves a general approach for accomplishing a task or solving a problem. Unlike an algorithm, which contains a sequence of steps that are intended to be executed in a particular order, a strategy may require students to make choices based on the specifics of the problem as well as their problem-solving goals. A strategy might also include alternative approaches that consider variations of a problem or unexpected results a student might encounter while implementing the steps of the solution. Strategies are general and broadly applicable, making them useful in solving a variety of problems. (What Works Clearinghouse, Teaching Strategies for Improving Algebra Knowledge).
- Teach students to recognize and generate strategies for solving problems. Provide students with examples that illustrate the use of multiple algebraic strategies. Include standard strategies that students commonly use, as well as alternative strategies that may be less obvious. Students can observe that strategies vary in their effectiveness and efficiency for solving a problem. (What Works Clearinghouse, Teaching Strategies for Improving Algebra Knowledge).
- Encourage students to articulate the reasoning behind their choice of strategy and the mathematical validity of their strategy when solving problems. Have students describe their reasoning while analyzing the problem structure, determining their solution strategy, solving a problem, and analyzing another student's solution. Describing their reasoning helps students understand the choices they make and goals they set when selecting a strategy. Students should communicate their reasoning verbally and through written work. (What Works Clearinghouse, Teaching Strategies for Improving Algebra Knowledge).
- Have students evaluate and compare different strategies for solving problems. Encourage students to compare problem structures and solution strategies to discover the relationships among similar and different problems, strategies, and solutions. Begin comparison activities after students understand one strategy, so that students are able to identify similarities and differences between the familiar strategy and the newly learned strategy. (What Works Clearinghouse, Teaching Strategies for Improving Algebra Knowledge).
- Prioritize, support, and invest in results-driven initiatives to transform low-performing schools into high-quality teaching and learning environments in which all children, including those from low-income families and high-poverty neighborhoods, are present, engaged, and educated to high standards (Annie E. Casey Foundation).

Policies

- Teacher evaluation systems that use Value-Add Measures to determine the impact a teacher has on student learning

Indicators

Contributing indicators

- Students' perceptions of their teacher's effectiveness, using a survey instrument such as the Pedagogical Effectiveness subscale of the Panorama Student Survey, the Tripod Student Survey, the Ambitious Instruction and Supportive Environment domains of the 5Essentials Survey, or the Elevate survey's Feedback for Growth, Meaningful Work, Student Voice, Teacher Caring, Learning Goals, Supportive Teaching, and Well-organized Class scales (Education-to-Workforce Framework).

Practices and Policies

Practices

- Teachers encourage students to view intelligence and mathematical ability as qualities that can be developed through effort and perseverance. Research indicates that when teachers adopt a growth mindset, student achievement improves, particularly among girls, English language learners, and economically disadvantaged students. Sharing neuroscience findings about brain plasticity and emphasizing that mistakes are opportunities for learning can help students embrace challenges and persist through difficulties (Crawford, 2018).
- Classroom Engagement: The classroom environment facilitated by the teacher encouraged students to generate ideas, questions, conjectures, and/or propositions that reflected engagement or exploration with important mathematics and science concepts. (UTeach Observation Protocol for Mathematics and Science).
- Classroom Interactions: Interactions reflected collegial working relationships among students (e.g., students worked together productively and talked with each other about the lesson). (UTeach Observation Protocol for Mathematics and Science).
- Classroom On-Task: The majority of students were on task throughout the class.(UTeach Observation Protocol for Mathematics and Science).
- Classroom Management: The teacher's classroom management strategies enhanced the classroom environment.(UTeach Observation Protocol for Mathematics and Science).
- Classroom Organization: The classroom is organized appropriately such that students can work in groups easily and get to lab materials as needed, and the teacher can move to each student or student group.(UTeach Observation Protocol for Mathematics and Science).
- Classroom Equity: The classroom environment established by the teacher reflected attention to issues of access, equity, and diversity for students (e.g., cooperative learning, language-appropriate strategies and materials, attentiveness to student needs). (UTeach Observation Protocol for Mathematics and Science).
- Lesson Importance: The structure of the lesson allowed students to engage with and/or explore important concepts in mathematics or science (instead of focusing on techniques that may only be useful on exams). (UTeach Observation Protocol for Mathematics and Science).
- Lesson Assessments: The structure of the lesson included opportunities for the instructor to gauge student understanding. (UTeach Observation Protocol for Mathematics and Science).
- Implementation Questioning: The teacher used questioning strategies to encourage

participation, check on skill development, and facilitate intellectual engagement and productive interaction with students about important science and mathematics content and concepts. (UTeach Observation Protocol for Mathematics and Science).

- Implementation Involvement: The teacher involved all students in the lesson (calling on non-volunteers, facilitating student–student interaction, checking in with hesitant learners, etc.). (UTeach Observation Protocol for Mathematics and Science).
- Implementation Connections: The instructional strategies and activities used in this lesson clearly connected to students' prior knowledge and experience. (UTeach Observation Protocol for Mathematics and Science).
- Content Relevance: During the lesson, it was made explicit to students why the content is important to learn. (UTeach Observation Protocol for Mathematics and Science).
- Content Societal Impact: During the lesson, there was discussion about the content topic's role in history, current events, or relevant "real-world" problems. (UTeach Observation Protocol for Mathematics and Science).

Policies

- States and districts implement a validated student perception survey, such as Panorama or Tripod, to systematically collect student feedback. The data gathered informs continuous improvement efforts and integrates into teacher, leader, school, and district accountability frameworks.

Multilingual learner progress

Key source: Education-to-Workforce Framework

Indicators

Contributing indicators

- Percent of multilingual learners who are (or have ever been) classified as English language learners (Californians Together).
- Percent of multilingual learners who are classified as Long-Term English language learners (LTELs) (Californians Together).
- Percent of multilingual learners who are classified as "At-Risk" Long-Term English language learners (AR-LTELs) (Californians Together).
- Percent of multilingual learners who had been classified as English Language Learners but are now reclassified as Fluent English Proficient (RFEP) (Californians Together).
- Percent of English Language Learners who make progress towards English language proficiency. The California Schools Dashboard has a measure called the English Learner Progress Indicator (ELPI) which determines whether an English Language Learner has made adequate progress, as measured by the English Language Proficiency Assessment for California (ELPAC) (Californians Together).
- Percent of multilingual learners who participate in a Dual Language Immersion or Developmental Bilingual Programs (Californians Together).
- Percent of students who participate in programs leading to proficiency in two or more languages (Californians Together).
- Percent of multilingual learners who are chronically absent (Californians Together).
- Percent of multilingual learners who have a breakfast meal before school. (Tracked through student response surveys like the California Healthy Kids Survey) (Californians Together).
- Percent of multilingual learners who have access to expanded learning opportunities (Californians Together).

- Percent of multilingual learners who have a caring adult relationship at school. (Tracked through student response surveys like the California Healthy Kids Survey) (Californians Together).
- Percent of multilingual learners who experience chronic sadness or hopelessness in school (tracked through student response surveys like the California Healthy Kids Survey) (Californians Together).

Systems indicators

- Number of bilingual teacher preparation programs at state-approved education preparation programs (Californians Together).
- Percent of teachers who have access to a supportive school environment and high-quality professional learning that includes designated and integrated English Language Development strategies (Californians Together).

Practices and Policies

Practices

- Extra support for English language learners to help them master the language and content, including extra time for individualized instruction and materials that are relevant. (Annie E. Casey Foundation)
- School and system schedules provide the appropriate amount of time for language instruction educational program (LIEP) services such as bilingual education or English language development (ELD) programs and services. This may or may not be state or locally mandated. (Instruction Partners)
- All young children are capable of learning two languages. Becoming bilingual has long-term cognitive, academic, social, cultural, and economic benefits. Bilingualism is an asset. (Annie E. Casey Foundation)
- Young multilingual learners require systematic support for the continued development for their home language. (Annie E. Casey Foundation)
- Loss of the home language has potential negative long-term consequences for the multilingual child's academic, social, and emotional development, as well as for the family dynamics. (Annie E. Casey Foundation)
- Teachers and programs can adopt effective strategies to support home language development even when the teachers are monolingual English speakers. (Annie E. Casey Foundation)
- Dual-language programs are an effective approach to improving academic achievement for multilingual children, while providing benefits to native English speakers. (Annie E. Casey Foundation).
- Scheduling regular peer-assisted learning opportunities. English language learners of varying language proficiency should work together several times a week on structured academic tasks. (NCTQ Teacher Prep Review)
- Capitalizing on students' home language, knowledge, and cultural assets. This instruction could include providing a preview of content in a child's home language, reading stories in the child's home language, offering definitions of vocabulary in the home language, helping children learn cognates for English words (for example, asking Spanish-speaking students to identify cognates like "mysterioso" and "mysterious"), and connecting key concepts with children's prior knowledge. (NCTQ Teacher Prep Review)
- Providing visual and verbal supports to help students understand core content. These could include instructional videos, visuals, and graphic organizers. English learners benefit more than their English-proficient peers from the teacher providing students with information rather than engaging them in the creation of information. (NCTQ Teacher Prep Review)

Policies

- Policymakers can ensure that ELs have fair opportunities to access Dual-language immersion programs by locating them in schools with significant EL populations, reserving seats for native speakers of non-English languages, and expanding the number of available DLI seats by investing in growing programs to train more bilingual teachers (The Century Foundation).
- State leaders, including legislators, state agencies, and boards set clear statewide goals for multilingual learner outcomes and track progress towards these goals (Californians Together).
- States improve tracking and reporting of public data regarding multilingual students and their outcomes. This includes high school graduation and outcomes for Reclassified Fluent English Proficient (RFEP) students, equitable access to rigorous coursework, access to bilingual programs, and teacher supply and attrition (Californians Together).
- States invest in the expansion of Bilingual Pathways and programs (Californians Together).
- States invest in community schools and initiatives that support the whole child. This includes ensuring that investments center the needs of ELs, support bilingualism and multilingualism, and are aligned to state goals for multilingual student achievement (Californians Together).
- States support legislation that address the bilingual teacher shortage. Invest in proven programs, such as Bilingual Teacher Residencies and the Bilingual Teacher Professional Development Program (BTPDP) and remove barriers to a bilingual authorization (Californians Together).

10 Do students have effective, representative math teachers and leaders?

Why it matters

Effective, representative teachers and leaders are essential for advancing mathematics outcomes, as they shape instructional quality, school culture, and equitable access to mathematical success. Research consistently shows that strong school leadership and effective teaching are among the most significant factors influencing student achievement (Leithwood et al., 2004; Kane et al., 2010).

Teachers who implement evidence-based mathematics instruction and use data-driven approaches ensure that all students develop foundational mathematical skills. At the same time, school leaders play a critical role in creating the conditions for success by providing high-quality professional development, aligning resources with mathematics goals, and fostering a culture of accountability and continuous improvement. Research on principals' impact on student achievement highlights this influence, showing that highly effective principals can increase student

learning by the equivalent of two to seven additional months in a given school year, whereas ineffective principals can negatively impact achievement by the same margin (Education-to-Workforce Framework).

Additionally, representative teachers and leaders—those who reflect the diversity of their student populations—help build stronger connections with families and communities, enhance student engagement, and support culturally responsive instruction, all of which contribute to improved mathematics outcomes. Studies have shown that cultural matching between teachers and students can positively influence student engagement and academic achievement (Lindsay et al., 2017)

Effective program and school leadership *Key source: Education-to-Workforce Framework*

Indicators

Contributing indicators

- Percentage of school leaders rated as effective, using an evaluation system that includes multiple measures, such as the Administrator Evaluation component of the Tennessee Educator Acceleration Model (TEAM) (Education-to-Workforce Framework).
- Staff surveys that can be used to measure effective school leadership include the Effective Leaders subcomponent of the UChicago 5E's survey instrument, Panorama Teacher and Staff Survey, or The New Teacher Project's (TNTP) Instructional Culture Insight Survey. However, no research has emerged at this point to show that staff surveys are valid and reliable measures of school leader effectiveness, and survey measures run the risk of offering a biased or potentially politicized rating of a leader, underscoring the importance of examining multiple measures (Education-to-Workforce Framework).

Systems indicators

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Practices and Policies

Practices

- Ensure program directors and school principals have the capacity to provide instructional leadership that supports effective teaching (Alliance for Early Success).
- Louisiana's Content Leaders, who are local educators with the knowledge, skills, and resources to provide high-quality, content-rich, and curriculum specific professional development to teachers in their school (Louisiana Department of Education).
- Louisiana's Mentor Teachers, who are local educators who have the knowledge and skills to effectively coach and support new and resident teachers in their districts (Louisiana Department of Education).

Indicators

System indicators

- Teacher retention: Percentage of teachers who return to teaching in the same school from year to year. Educator retention can be computed using administrative records from districts' or states' staff data management systems linking teachers and principals to schools from one year to the next (Education-to-Workforce Framework).
- School leader tenure: Percentage of school leaders who have served in their current positions for less than two years, two to three years, and four or more years. For school leaders, the Education-to-Workforce Framework recommends examining their tenure in the same school. A recommended best practice is to disaggregate retention by measures of educator effectiveness, such as those based on teacher performance ratings or value-added scores, to better assess the impact of staff turnover (Education-to-Workforce Framework).
- North Carolina's Teacher Working Conditions Survey offers a systematic way to capture teachers' perspectives on the conditions in which they work (NC TWC Survey).

Practices and Policies

Policies

- States and/or districts have career progression pathways to support the retention of highly-effective teachers, such as Louisiana's Content-Leaders and Mentor Teacher roles (Louisiana Department of Education).
- States and/or districts have differentiated compensation structures that provide higher rates of pay for teachers demonstrating the most effectiveness, such as Texas' Teacher Incentive Allotment (TEA Teacher Incentive Allotment).

Teacher leadership

Indicators

Systems indicators

- Percentage of teacher leaders rated effective based on multiple measures of performance (National Education Association).
- Percentage of teacher leaders who occupy hybrid roles (National Education Association).
- Percentage of teacher leaders with a leadership endorsement/certificate (National Education Association).
- Presence of an educator shortage (National Education Association).

Practices and Policies

Policies

- State codifies the Teacher Leadership Competencies and/or other standards for teacher leadership (National Education Association).
- State includes a state-level endorsement/certificate for teacher leaders (National Education Association).
- State provides resources to complete voluntary national certification and endorsements that promote teacher leadership opportunities (National Education Association).
- Districts have pathways for teachers who want to remain in their teaching role but make a bigger impact and larger salary. For example, North Carolina's Advanced Teaching Roles, including the Multi-Classroom Teacher-Leader Role (Department of Public Instruction for the state of North Carolina).

Teacher recruiting and hiring

Indicators

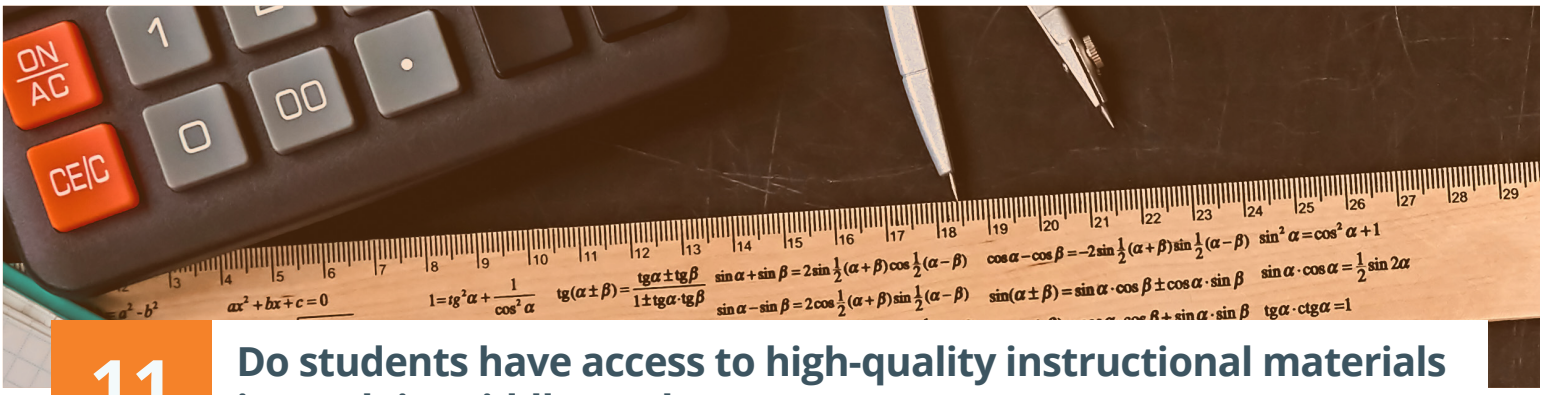
Systems indicators

- The percentage of teaching positions that remain unfilled at the start of the school year (Tennessee Department of Education).
- The number of applicants per open teaching position, a common measure used across districts.
- Districts have plans to recruit and retain accomplished educators (National Education Association).
- Districts have plans to recruit educators for shortage areas, such as special education and second language acquisition (National Education Association).
- Hiring high quality staff (Results for America).
- State tracks educator shortages (National Education Association).

Practices and Policies

Practices

- Districts begin cultivation and recruitment a year prior to the present school year (National Education Association).



11 Do students have access to high-quality instructional materials in math in middle grades?

Why it matters

Access to high-quality instructional materials (HQIM) in middle grade mathematics is crucial for enhancing student achievement and supporting effective teaching practices.

Impact on student achievement

Research indicates that high-quality instructional materials (HQIM) can lead to significant improvements in student learning outcomes. For instance, a study highlighted by the Rennie Center found that access to HQIM resulted in student performance gains comparable to more than half a year of additional learning (Rennie Center).

Support for effective teaching

HQIM not only benefits students but also empowers educators. According to EdReports, teachers using aligned materials engage students

in mathematical practices at a significantly higher rate than those without access to such curricula (EdReports).

Equity

Adopting HQIM is a cost-effective strategy for improving educational outcomes. EdSurge notes that implementing HQIM can be more economical than other reforms, such as reducing class sizes, while still delivering substantial benefits in ensuring all students have access to grade-level, affirming content (EdSurge).

Access to quality, culturally responsive curriculum *Key source: Education-to-Workforce Framework*

Indicators

Contributing indicators

- Every student should have opportunities to grapple meaningfully with key ideas and, in doing so, to become a knowledgeable, flexible, and resourceful mathematical thinker and problem solver. Teachers should have opportunities to consider and discuss how each lesson's activities connect to the concepts, practices, and habits of mind they want students to develop over time. (Teaching for Robust Understanding Observation Guide for Mathematics).
- All students work on core mathematical issues in ways that enable them to develop conceptual understandings, develop reasoning and problem solving skills, and use mathematical concepts, tools, methods and representations in relevant contexts. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Each student engages with grade level mathematics in ways that highlight important concepts, procedures, problem solving strategies, and applications. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Each student has opportunities to develop productive mathematical habits of mind. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Each student has opportunities for mathematical reasoning, orally and in writing, using appropriate mathematical language (Teaching for Robust Understanding Observation Guide for Mathematics).
- Each student explains their reasoning processes as well as their answers. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Students have opportunities to grapple with and make sense of important mathematical ideas and their use. Students learn best when they are challenged in ways that provide room and support for growth, with task difficulty ranging from moderate to demanding. The level of challenge should be conducive to what has been called "productive struggle." (Teaching for Robust Understanding Observation Guide for Mathematics).
- All students have opportunities to make their own sense of important mathematical ideas, developing deeper understandings, connections, and applications by building on what they know. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Each student engages individually and collaboratively with challenging ideas. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Each student actively seeks to explore the limits of their current understanding. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Each student is comfortable sharing partial or incorrect work as part of a larger conversation.

(Teaching for Robust Understanding Observation Guide for Mathematics).

- Each student reasons and tests ideas in ways that connect to and build on what they know. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Each student explains what they have done so far before asking for help • Continues to wrestle with an idea after the teacher leaves. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Classroom activities invite and support the meaningful engagement with core mathematical content and practices by all students. Finding ways to support the diverse range of learners in engaging meaningfully is the key to an equitable classroom. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Each student contributes to collective sense making in any of a number of different ways (e.g., proposing ideas, asking questions, creating diagrams…). (Teaching for Robust Understanding Observation Guide for Mathematics).
- Each student actively listens to other students and builds on their ideas. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Each student supports other students' developing understandings. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Each student explains, interprets, applies and reflects on important mathematical ideas. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Each student participates meaningfully in the mathematical work of the class. (Teaching for Robust Understanding Observation Guide for Mathematics).
- All students are supported in access to central mathematical content, and participate actively in the work of the class. Diverse strengths and needs are built on through the use of various strategies, resources, and technologies that enable all students to participate meaningfully.. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Every student has opportunities to explore, conjecture, reason, explain, and build on emerging ideas, contributing to the development of agency (the willingness to engage academically) and ownership over the content, resulting in positive mathematical identities. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Each student takes ownership of the learning process in planning, monitoring, and reflecting on individual and/or collective work. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Each student asks questions and makes suggestions that support analyzing, evaluating, applying and synthesizing mathematical ideas. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Each student builds on the contributions of others and helps others see or make connections. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Each student holds classmates and themselves accountable for justifying their positions, through the use of evidence and/or elaborating on their reasoning. (Teaching for Robust Understanding Observation Guide for Mathematics).
- All students build productive mathematical identities through taking advantage of opportunities to engage meaningfully with the discipline and share and refine their developing ideas. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Classroom activities elicit all students' thinking and subsequent interactions respond to that thinking, by building on productive beginnings

or by addressing emerging misunderstandings. High quality instruction "meets students where they are" and gives them opportunities to develop deeper understandings, both as shaped by the teacher and in student-to-student interactions. (Teaching for Robust Understanding Observation Guide for Mathematics).

- Each student explains their thinking, even if somewhat preliminary. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Each student sees errors as opportunities for new learning. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Each student consistently reflects on their work and the work of peers. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Each student sees fellow students as resources for their own learning. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Each student provides specific and accurate feedback to fellow students. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Each student makes use of feedback in revising their work. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Every student's learning is continually enhanced by the ongoing strategic and flexible use of techniques and activities that allow students to reveal their emerging understandings, and that provide opportunities both to rethink misunderstandings to build on productive ideas. (Teaching for Robust Understanding Observation Guide for Mathematics).

Systems indicators

- Teachers highlight important ideas and provide opportunities for students to engage with them. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Teachers use materials or assignments that center on key ideas, connections, and applications. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Teachers explicitly connect the lesson's big ideas to what has come before and will be done in the future. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Teachers support the purposeful use of academic language and of representations (e.g., graphs, tables, symbols) central to mathematics. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Teachers support students in seeing mathematics as being coherent, connected, and comprehensible. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Teachers position students as sense makers who can make sense of key conceptual ideas.. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Teachers use or adapt materials and activities to offer challenges that students can use, individually or collectively, to deepen understandings. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Teachers build and maintain classroom norms that support every student's engagement with those materials and activities. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Teachers monitor student challenge, adjusting tasks, activities, and discussions so that all students are engaged in productive struggle. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Teachers support students without removing the

challenge from the work they are engaged in. (Teaching for Robust Understanding Observation Guide for Mathematics).

- Teachers create safe environments. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Teachers use tasks and activities that provide multiple entry points and support multiple approaches to the mathematics. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Teachers provide opportunities for students to see themselves, and their personal and community interests, reflected in the curriculum. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Teachers validate different ways of making contributions. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Teachers build and maintain norms that support every student's participation in group work and whole class activities. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Teachers support particular needs, such as those of language learners, for full participation. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Teachers expect and support meaningful mathematical engagement from all students, helping them contribute and build on contributions from others. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Teachers create safe climates in which students feel free to express their ideas and understandings. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Teachers use materials that elicit multiple strategies, and have students explain their reasoning, in order to gain information about student' emerging understandings. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Teachers flexibly adjust content and process, providing students opportunities for re-engagement and revision. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Teachers provide timely and specific feedback to students, as part of classroom routines that prompt students to make active use of feedback to further their learning. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Teachers create opportunities for students' individual and collaborative reflection on their knowledge and learning. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Teachers provide time for students to develop and express mathematical ideas and reasoning. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Teachers work to make sure all students have opportunities to have their voices heard. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Teachers encourage student-to-student discussions and promote productive exchanges. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Teachers assign tasks and pose questions that call for mathematical justification, and for students to explain their reasoning. (Teaching for Robust Understanding Observation Guide for Mathematics).
- Teachers employ a range of techniques that attribute ideas to students, to build student ownership and identity. (Teaching for Robust Understanding Observation Guide for Mathematics).

Practices and Policies

Practices

- Schools and instructors use a standards-aligned core course curriculum that meets quality standards (as defined by EdReports) and is culturally relevant, centering the lived experiences and heritage of students' ethnic or racial backgrounds (Education-to-Workforce Framework).
- The Tier 1 curriculum, assessments, and instructional resources in use are closely aligned (Instruction Partners).
- When and if appropriate, additional culturally and/or linguistically relevant materials are used alongside curricular materials to support students in making personal connections (Instruction Partners).
- Tiered intervention programs in use are structured and systematic; they amplify and accelerate learning from Tier 1 materials (Instruction Partners).
- Curriculum-embedded assessments and materials are used seamlessly to design whole- and small-group learning experiences that move every student toward reading proficiency (Instruction Partners).
- The school/system uses quality data and assessment resources consistently, cohesively, and strategically to drive instructional decision making for all students (Instruction Partners).
- Implement developmentally and culturally appropriate early learning standards that reflect approaches to learning, social/emotional, physical, cognitive, and language development; and build foundational skills in literacy, math, science, social studies, and the arts (Alliance for Early Success).
- Schools adopt content-rich, developmentally appropriate curricula linked to standards and assessments (Annie E. Casey Foundation).

Policies

- State leaders signal quality and incentivize adoption of high-quality instructional materials. Providing students with rigorous, evidence-based, grade-level math instruction through high-quality materials boosts their achievement and prepares them for future success. States can ensure all students, including those with special needs, have access to HQIM for grade-level math by setting clear guidelines and requirements. (CCSSO, A Nation of Problem-Solvers).
- States, including Massachusetts, Mississippi, New Mexico and Rhode Island, provide the rubrics used to identify the state-reviewed HQIM for knowledge-building or for districts to use to evaluate the curriculum themselves. Other states, such as Arkansas, incentivize using HQIM through state law, pricing agreements or grants for districts and schools. States should continue to review new product releases for quality and support districts in selecting and using the highest-quality math materials available. (CCSSO, A Nation of Problem-Solvers).
- State leaders curate a list of quality materials that signal to districts the materials they should use. (CCSSO, A Nation of Problem-Solvers).
- State leaders provide training to districts on selecting materials from the approved list and effectively implementing the selected curriculum. (CCSSO, A Nation of Problem-Solvers).
- State leaders provide tools and resources, such as rubrics, to inform district selection and adoption of curricula. (CCSSO, A Nation of Problem-Solvers).
- State leaders establish common contracts that ease procurement barriers, making it easy for districts to purchase materials from the state list. (CCSSO, A Nation of Problem-Solvers).
- State leaders use available funding to create grants for local curricular purchases for materials from the state list. (CCSSO, A Nation of Problem-Solvers).
- State leaders create policies requiring schools needing improvement to purchase and use HQIM

from the state's list as a condition of federal grant funds and use mandated school improvement plans to design an implementation strategy. (CCSSO, A Nation of Problem-Solvers).

- Since 2019, Mississippi has prioritized HQIM. The State Board of Education reviewed and adopted five high-quality math curricula for grades K-8. The Mississippi Department of Education and Mississippi teachers partnered with the nonprofit organization EdReports to create the High-Quality Instructional Materials Review Rubric for K-8 and High School. (CCSSO, A Nation of Problem-Solvers).
- In addition to creating a list of approved materials, Mississippi incentivized using these materials by providing an exemption for bidding in the purchase of the state-adopted HQIM, making it easier for districts to purchase off the approved list. (CCSSO, A Nation of Problem-Solvers).
- As a part of the regional service delivery model, Mississippi provided training on how to use these rubrics and department-provided tools to develop standards-based, differentiated instruction and classroom assessments using HQIM. (CCSSO, A Nation of Problem-Solvers).
- Mississippi also provided training on Mathematics Design Collaborative practices and offered a menu of services for professional learning and technical assistance from which districts select. (CCSSO, A Nation of Problem-Solvers).
- As of 2023, about 40 percent of Mississippi students had access to HQIM in math. Access is even higher among students from low-income families, with more than 75 percent benefiting from these resources. Additionally, Mississippi's proficiency rates on grades 3-8 state tests suggest students have recovered or exceeded pre-pandemic levels in math. (CCSSO, A Nation of Problem-Solvers).
- In 2019, Rhode Island passed a law requiring the commissioner of elementary and secondary education and the Department of Education (RIDE) to develop statewide academic standards and curriculum frameworks, identify at least five examples of high-quality curriculum for each core subject area (math, English language arts and science) and support local education agencies (LEAs) in the selection and implementation of curricular materials. (CCSSO, A Nation of Problem-Solvers).
- Under Rhode Island's legislation, LEAs must adopt HQIM aligned to academic standards, curricular frameworks and statewide standardized tests from an approved list. The Department of Education (RIDE) primarily used EdReports to drive its materials adoption. The department also considered other material reviews, the extent to which materials met the needs of multilingual learners, cultural responsiveness and representation of student identities. (CCSSO, A Nation of Problem-Solvers).
- Rhode Island's law was passed to codify the practices the Department of Education (RIDE) had already begun prior to 2019 to incentivize districts to select and use HQIM. Since this work began, Rhode Island has shown a positive trend in math achievement on state tests. Student proficiency in math rose nearly 2 percentage points from 2022 to 2023 on the Rhode Island Comprehensive Assessment System (RICAS). Since 2021, proficiency has increased by nearly 10 percentage points. Furthermore, the proficiency levels in grades 4-6 in 2023 matched or exceeded pre-pandemic scores, demonstrating significant recovery and improvement. (CCSSO, A Nation of Problem-Solvers).
- A high-quality curriculum not only provides a clear framework for teachers, but also ensures coherence across grades and schools. It is essential that legislators promote the selection and periodic review of evidence-based instructional materials and resources in districts. This will help determine if they meet students' needs or if additional materials and supports are necessary. Don't remove resources, even flawed ones, without providing educators with effective alternatives first. (Model state: Delaware) (Shanker Institute).

Practices and Policies

Practices

- The school/system uses quality data and assessment resources consistently, cohesively, and strategically to drive instructional decision making for all students (Instruction Partners).
- Universal screening involves assessing all students to identify those performing at grade level and those who may be struggling. This proactive approach allows educators to detect learning gaps early and implement timely interventions. Research indicates that universal screeners can accurately predict students' future performance in mathematics, facilitating data-driven instructional planning (Foegen, 2009).
- The assessment system in place includes progress monitoring tools to determine how students are progressing toward their individual goals and student growth targets based on nationally-normed benchmarks (Instruction Partners). Regular progress monitoring involves frequent assessments to track students' advancement toward individual goals and growth targets. This ongoing evaluation enables educators to adjust instruction based on students' evolving needs. Studies have demonstrated that systematic progress monitoring in mathematics leads to improved student achievement by providing continuous feedback and informing targeted teaching strategies.
- The assessment system in place includes a diagnostic assessment that pinpoints the specific skills that students have mastered and/or where they need further instruction and practice (Instruction Partners).
- The assessment system in place includes formative assessments (e.g., from the curriculum, anecdotal records) to assess students' mastery of what is being taught. Note that it is important to consider that additional or alternative assessment data may be necessary to yield a holistic picture of students' knowledge and skills, particularly for students in priority groups. For instance, a test given in English may not capture the language skills of a Spanish-speaking student; providing them an assessment in Spanish may offer educators a more accurate picture of their skills and knowledge (Instruction Partners).
- Assessment and evaluation honor multilingual learners' (MLs') primary languages and current English proficiency levels. There is a written policy to ensure that MLs are not held back in the curriculum sequence or small-group work based on primary language influence or current English proficiency level (Instruction Partners).
- Each student has clear, individual learning goals and learning targets that teachers, students, and families/caregivers understand (Instruction Partners).
- There is a clear and efficient data cycle process in place that supports leaders and teachers in collecting and analyzing student data as well as adjusting instruction based on what is and is not working (Instruction Partners).
- When analyzing student data, all educators providing or supporting early literacy instruction are included (e.g., K–2 and language development teachers) (Instruction Partners).
- Student data is gathered from multiple forms of assessment (e.g., universal screener, progress monitoring, curriculum assessment, teachers' observation notes about skills individual students have and have not yet mastered) (Instruction Partners).
- Data is analyzed collaboratively from each form of assessment alongside student goals to determine what is working and what may need to be refined to support students in moving toward skill mastery (Instruction Partners).
- Data analysis adjusts tier placement for students based on clear entry and exit criteria for intervention with an emphasis on exiting

students as flexibly and quickly as possible (Instruction Partners).

- Student data is disaggregated and analyzed by demographics; team members use this data to ensure that the needs of students in priority groups are centered when making instructional decisions (Instruction Partners).
- Families and caregivers are kept up-to-date on their child's progress toward goals and play an active role in supporting their child's journey to becoming a skilled reader (Instruction Partners).
- Ensure child assessment tools are developmentally, culturally, and linguistically appropriate (Alliance for Early Success).

12 Do students attend schools in systems with adequate funding to support curriculum, professional learning and ongoing coaching needed to implement excellent math instruction?

Why it matters

Adequate funding is crucial for providing equitable access to high-quality math curricula and professional development, thereby enhancing math outcomes for all students. Research indicates that investing in evidence-based math curricula and ongoing teacher training is essential for effective math instruction (National Mathematics Advisory Panel, 2008). Without sufficient funding, schools may struggle to acquire comprehensive, standards-aligned materials or offer teachers the necessary professional development to implement them effectively (Steiner, 2017).

Moreover, equitable funding ensures that schools in underserved areas have access to the same quality resources and professional learning opportunities as those in more affluent districts (Chingos & Whitehurst, 2012). This investment is particularly important in math education, where teachers need to be equipped with the knowledge and skills to deliver explicit, systematic instruction. Ongoing professional development ensures that instructional practices remain aligned with the latest research and effectively address the diverse needs of students (Sarama, Clements,Wolfe and Spitler).

Access to quality, culturally responsive curriculum *Key source: Education-to-Workforce Framework*

Indicators

Systems indicators

- Equitable weighted student funding formula (Data sources: Local policy and practice assessments) (StriveTogether 2021).
- Equity factor, or the degree of variance between district per-student funding to state average (Data source: U.S. Department of Education) (StriveTogether 2021).

Practices and Policies

Practices

- Adequate school funding to ensure access to the resources that afford every child the opportunity to learn. (Annie E. Casey Foundation)
- State has an independent body of stakeholders that includes active pre-K through grade 12 educators and administrators who annually assess if state funding is sufficient to provide all students the opportunity to meet rigorous academic standards (National Education Association).

Policies

- Districts implement measures to broaden their tax base (National Education Association).
- Districts use "pupil weights" in their base formula to adjust for diverse student needs (National Education Association).
- State funds local efforts to diversify revenue streams (National Education Association).
- Passage of voter-approved children's funds at local levels (Children's Funding Project).
- State implements measures to broaden its tax base (National Education Association).
- Access to resources: School finance equity (Birth to Grade 3 Indicator Framework).

13 Do students have access to teachers trained, coached and supported to teach mathematics effectively?

Why it matters

Teachers equipped with deep mathematical content knowledge and specialized training are better positioned to deliver high-quality instruction, identify individual student needs and provide targeted interventions. Research indicates that teachers' specialized knowledge of mathematics significantly correlates with student achievement (Adamuti-Trache, Nadakumar, Saenz, 2021).

Investing in professional development that enhances teachers' mathematical knowledge, pedagogical skills and implementation of high-quality instructional materials is crucial. Studies have shown that content-intensive professional development positively impacts teachers' knowledge and instructional practices (Garet, et. al, 2016).

By prioritizing ongoing, content-specific professional development, including coaching, schools can enhance the quality of math instruction, improve student achievement and address disparities in math proficiency, particularly for students from underserved communities.

Indicators

Contributing indicators

- The percentage of students, disaggregated by race, ethnicity and income, that have access to fully certified math teachers

Systems indicators

- The percentage of math teachers in a district who are fully certified to teach math.
- The percentage of math teachers who are teaching "out of certification" areas.
- The percentage of "emergency certification" teachers who are teaching math

Practices and Policies

Practices

- Districts partner with teacher preparation programs on teacher residencies and induction (National Education Association).
- Percentage of preparation program graduates surveyed indicating satisfaction with their preparedness to serve as the teacher-of-record (National Education Association).
- Preparation programs survey graduates about their preparedness to serve as the teacher-of-record and report their response rates (National Education Association).
- Preparation programs use pre-service performance assessments to determine candidate preparedness prior to program completion and/or initial licensure (National Education Association).
- Preparation programs work with local school districts to recruit high-achieving high school graduates to pursue careers in education (National Education Association).
- Research supports the conclusion that improving the content knowledge of instructors has a significant positive effect on student learning. Moreover, programs which blend discipline content knowledge (i.e. a teacher's proficiency in traditional undergraduate mathematics), classroom content knowledge (i.e. the instructor's ability to correctly perform a computation that he or she is presenting in the classroom, a thorough understanding of why the process is correct, and a repository of alternate representations and mathematical methodologies for the problem), and pedagogical content knowledge (i.e. understanding of common student conceptions and misconceptions, proficiency in the design of course and lesson plans, and the use of instructional technology) have shown the most success in aiding student achievement. (A Model for Community Partnerships in Mathematics).

Policies

- Districts mandate successful completion of a residency program prior to obtaining initial licensure (National Education Association).
- Preparation programs require school-based experiences beyond a semester of student teaching (National Education Association).
- State provides funding for induction programs (National Education Association).
- State provides funding for preparation programs to establish residency programs with local school districts (National Education Association).
- State provides resources to grow preparation programs in minority-serving institutions (National Education Association).
- Investing in hiring, training and retaining a high-quality and diverse workforce of educators (Urban Institute).

Teacher experience *Key source: Education-to-Workforce Framework*

Indicators

Systems indicators

- Percentage of novice math teachers in schools and the district

Practices and Policies

Practices

- Qualified, experienced teachers for all students, especially the students who need them most. (Annie E. Casey Foundation)

Representational racial and ethnic diversity of educators *Key source: Education-to-Workforce Framework*

Indicators

Systems indicators

- Same-race student-teacher ratio by race/ethnicity (Data sources: Local school, LEA or SEA human resources, administrative and/or enrollment data) (Education-to-Workforce Framework and StriveTogether 2021).
- Educational staff composition by race and ethnicity compared to student composition by race and ethnicity (Education-to-Workforce Framework and StriveTogether 2021).
- Percentage of program sites that support a language other than English (STEP Forward with Data Framework).
- Percentage of program sites where children from focal populations are exposed to staff in their program who reflect their own identities (STEP Forward with Data Framework).
- Percentage of workforce members who are fluent in the language spoken by the children they serve (STEP Forward with Data Framework).

Practices and Policies

Practices

- Districts have plans to recruit educators from underrepresented populations (National Education Association).
- Districts have plans to retain educators from underrepresented populations (West Ed).
- Re-evaluate "last-in, first-out" practices which are more likely to remove early career teachers who identify as people of color (TNTP).
- Build partnerships with organizations that recruit and develop educators of color, such as the Center for Black Educator Development and Men of Color in Educational Leadership.

Policies

- State policy supports recruitment of promising future educators, including underrepresented populations (National Education Association).
- Making educator diversity data visible and actionable to all stakeholders (Education Trust).
- Setting clear goals at the state, district and teacher preparation levels to increase educator diversity (Education Trust).
- Investing in efforts to retain teachers of color that improve working conditions and provide opportunities for personal and professional growth (Education Trust).

Indicators

Systems indicators

- Teachers' overall ratings on a math specific observation rubric, similar to Instruction Partners' modified Instructional Practice Guide for Math (Instruction Partners).
- Teachers' overall and subscale scores on an observation rubric associated with an educator observation system (Education-to-Workforce Framework).
- Percentage of teachers rated effective based on multiple measures of performance (National Education Association).
- Teacher coaching and professional development (Education-to-Workforce Framework).
- Percentage of educators surveyed indicating alignment among professional learning, standards, curriculum and assessments (National Education Association).
- Percentage of educators surveyed indicating satisfaction with professional learning time and opportunities (National Education Association).
- Percentage of educators who participated in job-embedded professional learning opportunities in the previous year (National Education Association).

Practices and Policies

Practices

- Districts design, monitor and implement evaluation systems based on state framework in partnership with educators and their associations (National Education Association).
- Districts align professional learning with standards, curriculum and assessments (National Education Association).
- Districts use evaluations aligned with induction (National Education Association).
- Districts use performance evaluations employing multiple measures (National Education Association).
- Districts provide "peer assistance" or "peer assistance and review" (PAR) teams (National Education Association).
- Districts have professional learning plans, including induction and mentoring, for teachers, education support professionals (ESPs) and specialized instructional support personnel (SISP) (National Education Association).
- Districts provide educators with targeted support based on formative and summative evaluation results (National Education Association).
- Districts provide extra resources and assistance for those educators in hard-to-staff schools (National Education Association).
- Districts provide funding for educators to access professional learning that addresses new education research and technology that will help improve instruction or support for students (National Education Association).
- Districts provide ongoing professional learning and support to administrators, including training in equity and racial and social justice to better support Indigenous educators and students as well as educators and students of color (National Education Association).
- Districts provide teacher leadership development (National Education Association).
- Districts support regular, job-embedded professional learning opportunities (National Education Association).
- Districts use a variety of student, educator

and systems data to plan, assess and evaluate professional learning (National Education Association).

- Providing training and classroom materials (Results for America).

Policies

- State develops a comprehensive culturally-responsive teaching policy, covering equity and racial and social justice, to increase educators' cultural and linguistic competence through pre-service education, licensure and ongoing professional learning (National Education Association).
- State provides funding and technical assistance to strengthen professional learning in areas with high concentrations of poverty, Indigenous students and students of color, with emphasis on mentoring, implicit bias and cultural competency (National Education Association).
- State provides funding for job-embedded professional learning opportunities to help educators improve their instructional repertoire (National Education Association).
- State policy mandates multiprofessional collaboration on educator support and evaluation systems staffed by active pre-K through 12 educators (National Education Association).
- State policy requires that evaluations be based on multiple measures of performance to determine effectiveness. Measures may include classroom observations, portfolios, leadership roles and professional learning (National Education Association).
- State provides funding for "peer assistance" and "peer assistance and review" (PAR) teams (National Education Association).

Teacher rewards, recognition and benefits

Indicators

Systems indicators

- Percentage of teachers surveyed indicating satisfaction with the conditions of employment (National Education Association).
- Percentage of teachers surveyed indicating satisfaction with the terms of employment (National Education Association).

Practices and Policies

Practices

- Districts have differentiated pay structures for clearly defined roles and responsibilities that account for hybrid/varied educator roles within a school (National Education Association).
- Districts offer financial incentives for educators working in hard-to-staff schools (National Education Association).
- Districts offer incentives for teachers to take on differentiated or hybrid roles (National Education Association).
- Districts offer teachers starting salaries comparable to other professionals with similar skills, knowledge and education. Additionally, education support professionals (ESPs) are paid at least a minimum wage (National Education Association).
- State and/or district contributions for health coverage increase at least enough to keep up with health care inflation (National Education Association).
- State or district provides access to affordable, quality health insurance for education employees and their families (National Education Association).

Teacher voice in decision making

Indicators

Systems indicators

- Percentage of educators surveyed indicating satisfaction with the number of opportunities to participate in district policy setting (National Education Association).
- Percentage of educators surveyed indicating satisfaction with the number of opportunities to participate in school policy setting (National Education Association).

Practices and Policies

Practices

- Districts obtain educator input on instructional minutes (National Education Association).
- Districts provide formal opportunities for educators to participate in district policy setting (e.g., accountability systems, hiring and evaluation of administrators) (National Education Association).

Policies

- Districts dedicate funding to support educator engagement with educator leadership organizations and learning networks (National Education Association).
- Districts dedicate resources to design professional learning that supports educator leadership and teacher agency (National Education Association).
- Districts dedicate resources toward lifting and amplifying educator voice (e.g., dedicate funds to engagement) (National Education Association).
- State has an autonomous standards board, the majority of whom are active pre-K through grade 12 educators and are ethnically and racially representative of the student body (National Education Association).
- State requires that all planning and decision-making bodies related to the educator profession include active pre-K through grade 12 educators (National Education Association).

Teacher preparation programs

Indicators

Systems indicators

- Teacher preparation programs give aspiring teachers opportunities to practice providing instruction, in a simulated or real classroom setting, or opportunities to practice giving an assessment. In teacher preparation, practice takes many forms, such as one-on-one tutoring with a student, administering a mock assessment to fellow teacher candidates, or conducting a lesson during a field experience (NCTQ Teacher Prep Review).
- Teacher preparation programs give aspiring teachers preparation to teach a range of students with diverse needs in learning to read. This includes English language learners (students in the process of acquiring English and who have a first language other than English), struggling readers (students who experience academic difficulties in the area of reading, including students with dyslexia), and students who speak language varieties other than mainstream English (such as speakers of African American English (AAE)) (NCTQ Teacher Prep Review).

Practices and Policies

Practices

- State leaders visit classrooms, talk to teachers and staff, and collect qualitative data to help inform approval decisions for teacher preparation programs (NCTQ Teacher Prep Review).
- Teacher preparation programs dedicate at least 105 instructional hours to preparing elementary teacher candidates in Elementary Mathematics content knowledge (i.e. Numbers & Operations, Algebraic Thinking, Geometry & Measurement, Data Analysis & Probability) and 45 instructional hours to preparing candidates in Mathematics Pedagogy. Content knowledge references the foundational understanding of mathematics. Programs can instill this knowledge in candidates through coursework that focuses on a conceptual understanding of the mathematics topics that are addressed in the elementary grades. Pedagogical knowledge references the methods of effective instruction that use content knowledge in the classroom. Together, they ensure that teachers know what they need to teach and also know how to teach it. (NCTQ, Preparation for Teaching Elementary Mathematics).
- Teacher preparation programs dedicate at least 45 instructional hours (i.e. one full 3-credit course) to preparing elementary teacher candidates in Numbers & Operations content. (NCTQ, Preparation for Teaching Elementary Mathematics).
- Teacher preparation programs dedicate at least 20 instructional hours (i.e. just under half of a 3-credit course) to preparing elementary teacher candidates in Algebraic Thinking content. (NCTQ, Preparation for Teaching Elementary Mathematics).
- Teacher preparation programs dedicate at least 25 instructional hours (i.e. just over half of a 3-credit course) to preparing elementary teacher candidates in Geometry & Measurement content. (NCTQ, Preparation for Teaching Elementary Mathematics).
- Teacher preparation programs dedicate at least 15 instructional hours (i.e. one-third of a 3-credit course) to preparing elementary teacher candidates in Data Analysis & Probability content. (NCTQ, Preparation for Teaching Elementary Mathematics).
- Teacher preparation programs dedicate at least 45 instructional hours (i.e. one full 3-credit course) to preparing elementary teacher candidates in Mathematics Pedagogy. (NCTQ, Preparation for Teaching Elementary Mathematics).
- Lacking a system of strong diagnostic testing at the point of admissions, teacher preparation programs will need to provide most teacher candidates three content courses and one course in pedagogy. Specifically, elementary teachers need a strong conceptual understanding of four content topics (Numbers and Operations; Algebraic Thinking; Geometry and Measurement; and Data Analysis and Probability), in addition to Math Pedagogy. This knowledge is specialized, so should be aimed only at a teacher audience, not the broader campus population. (NCTQ, Preparation for Teaching Elementary Mathematics).
- In the case of graduate programs, teacher preparation programs must make more extensive use of content knowledge tests during admissions, even if only for the purpose of diagnosing where candidates are going to need additional support and coursework rather than rejecting applicants. Regardless, graduate programs also need to add more time to the requisite coursework dedicated to mathematics. (NCTQ, Preparation for Teaching Elementary Mathematics).
- Teacher preparation programs build partnerships with nearby districts to create specific feedback loops related to elementary mathematics instruction, reviewing course materials and content expectations for teacher

candidates to determine if the program is meeting districts' needs. Consider the use of focus groups or surveys to understand specifically which key topic areas recent teacher candidates felt well-prepared to teach and which they did not. (NCTQ, Preparation for Teaching Elementary Mathematics).

- Teacher preparation programs ensure student teaching placements occur with mentor teachers who have demonstrated knowledge of math content. A large amount of recent research has demonstrated that student teachers who are paired with a more effective cooperating teacher are more effective in their first year of teaching. Programs should also consider how well-versed their program supervisors are in math content. (NCTQ, Preparation for Teaching Elementary Mathematics).

Policies

- State policymakers make current standards for elementary mathematics preparation more explicit and assess programs on their alignment to the standards during the program approval process. Currently [as of May 2022], 11 states provide detailed math standards for elementary teacher preparation programs. Arkansas, Massachusetts, and New Mexico stand out for their development of competencies for elementary teachers as a component of teacher preparation program requirements. Another 16 states adopted CAEP standards or require CAEP accreditation that also includes detailed math standards. Further, state education agencies should use these standards for elementary mathematics preparation in their review of programs. (NCTQ, Preparation for Teaching Elementary Mathematics).
- State policymakers examine the state licensure tests for elementary licensure candidates to ensure alignment between what is required of elementary teachers and expectations for students. Ensure that the licensure tests require candidates to demonstrate knowledge of the essential math topics found in the standard. (NCTQ, Preparation for Teaching Elementary Mathematics).
- State policymakers hold teacher preparation programs accountable for fully preparing any candidate they have admitted by scrutinizing program pass rates on state licensing tests, particularly the first-time pass rates. Only 21 states currently [as of May 2022] use pass rate data in their program approval systems, with none examining the first-time pass rates, the best indicator of program commitment to preparing all of their teacher candidates to meet state standards. To learn more about this issue and how many programs achieve high first-time pass rates regardless of the populations they serve, policymakers can review their state-specific dashboards here. (NCTQ, Preparation for Teaching Elementary Mathematics).
- If shortages are a concern, state policymakers could consider creating a certification pathway in mathematics that would qualify a teacher to teach only the early elementary grades (K-2) when much less math knowledge is needed and therefore less preparation coursework would be required. (NCTQ, Preparation for Teaching Elementary Mathematics).

14 Are students who are behind grade level identified early and provided high-quality, aligned interventions?

Why it matters

Early identification and intervention for students who are behind grade level in math are critical strategies for long-term academic success, particularly in the middle grades. Research shows that students who do not develop strong foundational math skills early on are more likely to struggle academically, face higher dropout rates and experience lower lifetime earnings (Deke et al., 2016). In middle school, students who struggle with key math concepts such as fractions, decimals and ratios often face increasing challenges in more advanced content like algebra and geometry (National Mathematics Advisory Panel, 2008).

Early math intervention, focusing on building fluency, conceptual understanding and problem-solving skills, has been shown to accelerate growth and prevent long-term difficulties (Fuchs et al., 2007; Gersten et al., 2009). Effective middle school interventions include personalized high-dosage tutoring, small group instruction and targeted practice that emphasizes the connections between mathematical concepts. Interventions that included the instructional components of explicit instruction, multiple representations, problem-solving strategies, mathematical language and graphic organizers were found to be effective (Powell, Mason, Lembke, 2010).

Studies confirm that early, intensive math interventions are far more effective than later remediation, as they leverage the brain's plasticity during critical developmental periods (Bryant et al., 2008). Regular progress monitoring ensures that interventions remain responsive to student needs, helping teachers make timely adjustments to instruction (Fuchs & Fuchs, 2006). Without timely support, struggling math learners are likely to fall further behind, reinforcing cycles of academic inequity (Gersten et al., 2009). Investing in evidence-based math interventions and ensuring targeted support in the middle grades is essential for closing math gaps and promoting equitable educational opportunities.

Access to early intervention screening *Key source: Education-to-Workforce Framework*

Indicators

Contributing indicators

- Percentage of children with identified concerns who are connected to services (Education-to-Workforce Framework).

Systems indicators

- Percentage of educators surveyed indicating feelings of confidence in analyzing and interpreting formative and summative assessment data (National Education Association).

- Percentage of educators surveyed indicating satisfaction with the time allotted to analyze assessment results and inform instruction (National Education Association).
- Percentage of teachers indicating satisfaction with the sources used to measure student growth (National Education Association).
- Percentage of teachers surveyed indicating assessments adhere to the principles of Universal Design for Learning (UDL) (National Education Association).
- Percentage of teachers surveyed indicating satisfaction with the quality of student assessments (National Education Association).

Practices and Policies

Practices

- Districts provide resources and funding for job-embedded professional learning for teachers to become proficient users of formative and summative assessment data (National Education Association).
- Districts release assessment results in time to inform learning (National Education Association).
- Districts train school personnel to interpret data system results to inform and improve instruction and identify needed supports (National Education Association).
- Districts use both formative and summative student assessments that adhere to the principles of UDL (National Education Association).
- Screen all students (i.e. Tier 1) to identify those at risk for potential mathematics difficulties and provide interventions to students identified as at risk. As a district or school sets up a screening system, have a team evaluate potential screening measures. The team should select measures that are efficient and reasonably reliable and that demonstrate predictive validity. Screening should occur in the beginning and middle of the year. Select screening measures based on the content they cover, with an emphasis on critical instructional objectives for each grade. In grades 4 through 8, use screening data in combination with state testing results. Use the same screening tool across a district to enable analyzing results across schools. (What Works Clearinghouse, Assisting Students Struggling with Mathematics: Response to Intervention).
- Instructional materials for students receiving interventions (i.e. Tier 2 and 3) should focus intensely on in-depth treatment of whole numbers in kindergarten through grade 5 and on rational numbers in grades 4 through 8. These materials should be selected by committee. For students in kindergarten through grade 5, tier 2 and tier 3 interventions should focus almost exclusively on properties of whole numbers and operations. Some older students struggling with whole numbers and operations would also benefit from in-depth coverage of these topics. For tier 2 and tier 3 students in grades 4 through 8, interventions should focus on in-depth coverage of rational numbers as well as advanced topics in whole number arithmetic (such as long division). Districts should appoint committees, including experts in mathematics instruction and mathematicians with knowledge of elementary and middle school mathematics curricula, to ensure that specific criteria are covered in-depth in the curriculum they adopt. (What Works Clearinghouse, Assisting Students Struggling with Mathematics: Response to Intervention).
- Instruction during the intervention should be explicit and systematic. This includes providing models of proficient problem solving, verbalization of thought processes, guided practice, corrective feedback, and frequent cumulative review. Ensure that instructional materials are systematic and explicit. In particular, they should include numerous clear models of easy and difficult problems, with accompanying teacher think-alouds. Provide

students with opportunities to solve problems in a group and communicate problem-solving strategies. Ensure that instructional materials include cumulative review in each session. (What Works Clearinghouse, Assisting Students Struggling with Mathematics: Response to Intervention).

- Interventions should include instruction on solving word problems that is based on common underlying structures. Teach students about the structure of various problem types, how to categorize problems based on structure, and how to determine appropriate solutions for each problem type. Teach students to recognize the common underlying structure between familiar and unfamiliar problems and to transfer known solution methods from familiar to unfamiliar problems. (What Works Clearinghouse, Assisting Students Struggling with Mathematics: Response to Intervention).
- Intervention materials should include opportunities for students to work with visual representations of mathematical ideas and interventionists should be proficient in the use of visual representations of mathematical ideas. Use visual representations such as number lines, arrays, and strip diagrams. If visuals are not sufficient for developing accurate abstract thought and answers, use concrete manipulatives first. Although this can also be done with students in upper elementary and middle school grades, use of manipulatives with older students should be expeditious because the goal is to move toward understanding of—and facility with—visual representations, and finally, to the abstract. (What Works Clearinghouse, Assisting Students Struggling with Mathematics: Response to Intervention).
- Interventions at all grade levels should devote about 10 minutes in each session to building fluent retrieval of basic arithmetic facts. Provide about 10 minutes per session of instruction to build quick retrieval of basic arithmetic facts. Consider using technology, flash cards, and other materials for extensive practice to facilitate automatic retrieval. For students in kindergarten through grade 2, explicitly teach strategies for efficient counting to improve the retrieval of mathematics facts. Teach students in grades 2 through 8 how to use their knowledge of properties, such as commutative, associative, and distributive law, to derive facts in their heads. (What Works Clearinghouse, Assisting Students Struggling with Mathematics: Response to Intervention).
- Monitor the progress of students receiving supplemental instruction and other students who are at risk. Monitor the progress of tier 2, tier 3, and borderline tier 1 students at least once a month using grade-appropriate general outcome measures. Use curriculum-embedded assessments in interventions to determine whether students are learning from the intervention. These measures can be used as often as every day or as infrequently as once every other week. Use progress monitoring data to regroup students when necessary. (What Works Clearinghouse, Assisting Students Struggling with Mathematics: Response to Intervention).
- Include motivational strategies in tier 2 and tier 3 interventions. Reinforce or praise students for their effort and for attending to and being engaged in the lesson. Consider rewarding student accomplishments. Allow students to chart their progress and to set goals for improvement. (What Works Clearinghouse, Assisting Students Struggling with Mathematics: Response to Intervention).

Policies

- State accountability system holds schools accountable for multiple measures of school quality and student success (multiple measures may include chronic absenteeism, school climate and access to advanced and rigorous courses) (National Education Association).
- State develops a policy that requires the use

of both formative and summative student assessments that adhere to the principles of UDL (National Education Association).

- State has a comprehensive, aligned and integrated information management system that enables districts and schools to analyze, evaluate and continuously improve student, educator and school performance (National Education Association).
- School and district accountability systems advance continuous improvement and a comprehensive vision of student success (Urban Institute).

Extra student support (e.g., intervention, accommodation, extended learning)

Practices and Policies

Practices

- Research does not support blanket recommendations for instruction to be exclusively "student-centered" or "teacher-directed." Effective math education incorporates multiple instructional approaches to meet the needs of students. There is a common misconception that special needs students benefit only from explicit instruction. However, this is not true; all students, including those with special needs, benefit from a balanced approach that includes both explicit and conceptual instruction. (CCSSO, A Nation of Problem-Solvers).
- Provide systematic instruction during intervention to develop student understanding of mathematical ideas. Effective interventions for improving mathematics achievement for students struggling with mathematics share one key feature: the design of the curricular materials and the instruction provided are systematic. The term systematic indicates that instructional elements intentionally build students' knowledge over time toward an identified learning outcome(s). Systematic intervention materials are designed to cover topics in an incremental and intentional way. Systematic interventions most often include a "bundle" of practices used to build and support student learning strategically (What Works Clearinghouse, Assisting Students Struggling with Mathematics: Intervention in the Elementary Grades).
- Teach clear and concise mathematical language and support students' use of the language to help students effectively communicate their understanding of mathematical concepts. Mathematical language is academic language that precisely conveys mathematical ideas, including the vocabulary, terminology, and language structures used when thinking about, talking about, and writing about mathematics. Understanding mathematical language is critical to students' learning because it is used in textbooks, curricular and assessment materials, and teachers' instruction (What Works Clearinghouse, Assisting Students Struggling with Mathematics: Intervention in the Elementary Grades).
- Use a well-chosen set of concrete and semi-concrete representations to support students' learning of mathematical concepts and procedures. Students who struggle to learn mathematics need additional, focused instruction using representations to model mathematical ideas. Choose representations carefully and connect them explicitly to the abstract representations (mathematical notation). It is also important to provide students with many opportunities to use representations (What Works Clearinghouse, Assisting Students Struggling with Mathematics: Intervention in the Elementary Grades).
- Use the number line to facilitate the learning of

mathematical concepts and procedures, build understanding of grade-level material, and prepare students for advanced mathematics. The ability to represent different sets of numbers makes the number line a powerful tool for helping students develop a unified understanding of numbers and for supporting their learning of advanced mathematics. Number lines are an important tool for teaching and understanding magnitude and operations for both whole numbers and fractions, graphing coordinates, and displaying and analyzing data (What Works Clearinghouse, Assisting Students Struggling with Mathematics: Intervention in the Elementary Grades).

- Provide deliberate instruction on word problems to deepen students' mathematical understanding and support their capacity to apply mathematical ideas. Learning to solve word problems is an important part of the elementary mathematics curriculum because word problems help students apply the mathematics they are learning, develop critical thinking skills, and begin to connect mathematics to a variety of scenarios or contexts. Becoming successful at solving word problems can deepen students' understanding of grade-level content and set students up for success in advanced mathematics courses and the workforce (What Works Clearinghouse, Assisting Students Struggling with Mathematics: Intervention in the Elementary Grades).
- Regularly include timed activities as one way to build students' fluency in mathematics. Quickly retrieving basic arithmetic facts is not easy for students who struggle with mathematics. Automatic retrieval gives students more mental energy to understand relatively complex mathematical tasks and execute multistep mathematical procedures. Thus, building automatic fact retrieval in students is one (of many) important goals of intervention. In addition to basic facts, timed activities may address other mathematical subtasks important for solving complex problems. This could include, for example, recalling equivalencies for fraction benchmarks of 1/2 and 1, or quickly evaluating and estimating place value. The goal of these activities is to move students toward accurate and efficient performance of these smaller mathematical tasks so that this knowledge can be easily accessed when necessary for solving problems (What Works Clearinghouse, Assisting Students Struggling with Mathematics: Intervention in the Elementary Grades).

Policies

- State policy should keep a strong focus on progress monitoring through valid and reliable assessments. (Shanker Institute)
- Provide guidance and support to districts to align supplemental and intervention learning experiences to core instruction. Student learning accelerates the most when students receive targeted support that reinforces and extends what they are learning in their classroom each day. At some point in their school experience, all students will benefit from additional practice and support in mastering grade-level math concepts. Supplemental and intervention supports — whether through tutoring, summer school, after-school or MTSS/RTI models — should reinforce and extend classroom learning using evidence-based materials aligned with the concepts being taught in core instruction. The ultimate goal of these supports is to ensure students are ready to master future grade-level content, not to remediate all prior unfinished learning. (CCSSO, A Nation of Problem-Solvers).
- States can help districts evaluate alignment between supplemental and core curricula by comparing representations and strategies used in the most critical content focus areas. When compared side by side, these curricular resources should be largely similar to create a clear, coherent approach for teachers, students and families. (CCSSO, A Nation of Problem-Solvers).

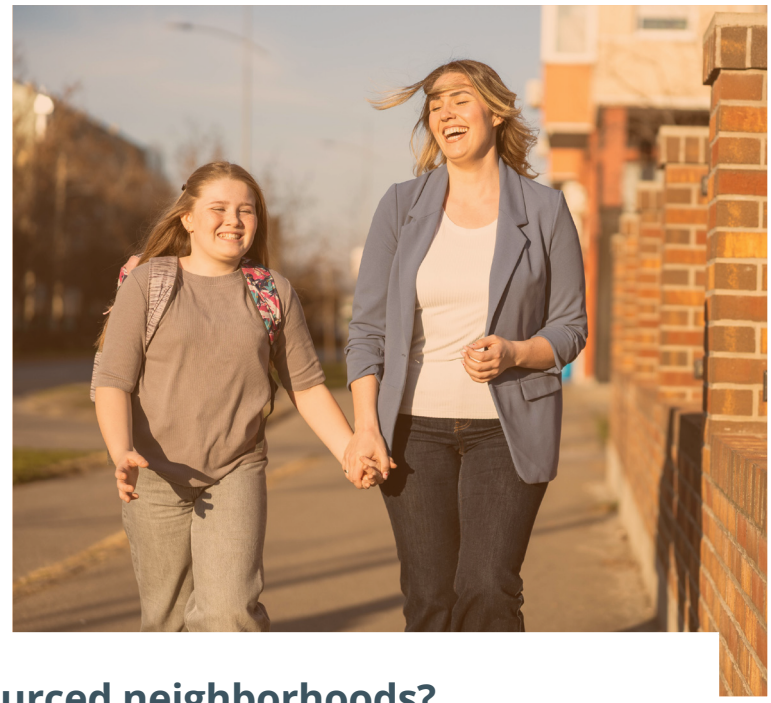
- States can enhance their MTSS and RTI frameworks by shifting from traditional remediation-focused approaches to more effective strategies that emphasize conceptual understanding alongside procedural fluency. By integrating just-in-time supports — often seen in quality tutoring settings — states can accelerate student learning by strategically integrating prior concepts to support mastery of grade-level work in core instruction. (CCSSO, A Nation of Problem-Solvers).
- Learning acceleration approaches, or "just-in-time teaching," have shown to be more effective than traditional approaches to intervention. In recent years, particularly since the start of the pandemic, there has been a movement to integrate tutoring and other just-in-time instruction for students into states' traditional intervention structures. States including Arkansas, Colorado, Delaware, Louisiana, Massachusetts, New Jersey and Ohio have invested in initiatives focused on these supports. (CCSSO, A Nation of Problem-Solvers).
- State leaders can create or revise state guidance on MTSS and RTI frameworks to ensure these structures are flexible enough to allow for just-in-time instruction for students rather than solely identifying or remediating all of a student's unfinished learning. (CCSSO, A Nation of Problem-Solvers).
- State leaders can provide resources for districts to review materials used in supplemental instruction to ensure alignment with the concepts and strategies taught in core instruction. (CCSSO, A Nation of Problem-Solvers).
- State leaders can provide grants for tutoring programs that meet evidence-based standards to accelerate learning. (CCSSO, A Nation of Problem-Solvers).
- State leaders can provide training and guidance to district leaders and professional learning providers on incorporating planning for just-in-time instruction during collaborative planning time. (CCSSO, A Nation of Problem-Solvers).
- State leaders can create vertical progression documents for the field based on state standards to support just-in-time instruction. (CCSSO, A Nation of Problem-Solvers).
- State leaders can train all educators, including paraprofessionals and special educators, in the core curriculum to support supplemental instruction. (CCSSO, A Nation of Problem-Solvers).
- State leaders can construct state guidance on school schedules and routines, allowing weekly collaboration between supplemental educators and classroom teachers. (CCSSO, A Nation of Problem-Solvers).
- Tennessee districts have been incentivized to provide high-dosage, low-ratio tutoring for eligible students through the state's TN All Corps tutoring program. Districts chose to participate through a grant-matching program for content focused on reading and math, wherein the district must provide $800 per tutored student per year while the state contributes $700 per student. TN All Corps required districts to serve students in grades 1-5, and they may choose to serve students in grades 6-8, with maximum tutor-to-student ratios of 1:3 and 1:4, respectively. Students receive two to three 30- to 45-minute sessions per week, and data collection and reporting requirements are consistent with what is required in ESSER. (CCSSO, A Nation of Problem-Solvers).
- In math, Tennessee partnered with a virtual provider — which aligned tutoring content to the core curricula the state has adopted — to provide high-quality curricular resources that were used flexibly in tutoring sessions to support just-in-time access to grade-level content. Tennessee students are progressing toward pre-pandemic proficiency levels on state test results in math. (CCSSO, A Nation of Problem-Solvers).
- Louisiana's Accelerate Math program is designed

to support tutoring implementation to improve student achievement. Accelerate provides guidance and funding for high-impact tutoring and summer learning programs aligned with high-quality curriculum. The acceleration cycle is used as a structure of continuous planning and response to student needs. It includes diagnosing students' unfinished learning of prerequisite content knowledge and skills, planning for timing and content for acceleration, delivering just-in-time, curriculum-aligned acceleration support through qualified tutors and monitoring progress to adjust supports based on student data. (CCSSO, A Nation of Problem-Solvers).

- Tutors delivering instruction in Louisiana's Accelerate Math program meet with students one-on-one or in small groups with others with common needs. Model materials include mini lessons and activities that scaffold the most immediate needs directly connected to the grade-level content students are learning in class. The resources for each grade level include diagnostic assessments, correlation to in-class lessons, Google slide presentations for each tutoring session and exit tickets for each set of tutoring sessions. Each session consists of one hour of virtual instruction twice a week, with additional practice included. (CCSSO, A Nation of Problem-Solvers).
- The provided materials are designed to be adjusted as needed. As a part of Accelerate, Louisiana partnered with Zearn through Louisiana's Math Refresh. This program is used flexibly to complement core math instruction and intervention, tutoring and summer programs. A two-year study comparing students who used Zearn consistently with those who didn't showed increased math scale scores, with the most substantial gains observed in students who completed three or more grade-level lessons per week. Louisiana provided free school accounts to all K-8 public schools in the state. Initially, districts could use local funds at the district level from their state-level General Fund, Title I, COVID relief funds, Consolidated Appropriations Act and Direct Student Services allocations to pay for tutoring. However, tutoring is now supported through legislation. (CCSSO, A Nation of Problem-Solvers).
- In addition, districts received a Strong Start Tutoring allocation on Feb. 1, 2021, to support the launch of Accelerate. Louisiana students are showing progress toward pre-pandemic proficiency on the state math assessment. (CCSSO, A Nation of Problem-Solvers).
- Recent research shows that "just-in-time" support that accelerates student learning by strategically integrating prior concepts to support mastery of grade-level work is more effective than traditional remediation. This type of learning acceleration is most frequently seen in tutoring but can prove valuable in other supplemental learning experiences, such as intervention provided through traditional multi-tiered system of supports (MTSS) or response to intervention (RTI) frameworks. (CCSSO, A Nation of Problem-Solvers).

Childhood Experiences and Neighborhood Conditions

Children who grow up in resource-rich neighborhoods with opportunities to play with math for fun experience healthy development and a positive association with math.



15 Do families live in well-resourced neighborhoods?

Why it matters

Well-resourced neighborhoods: Students and families in lower-income neighborhoods have limited access to resources and opportunities that promote economic mobility. The size of the middle class in an area is associated with levels of upward mobility. Moving to a lower-poverty area before age 13 improves the likelihood of students eventually attending college and earning more as adults. Economic segregation varies by race, with a higher percentage of Black and Latine people experiencing poverty living in low-income communities compared to white people from similar economic backgrounds (Education-to-Workforce Framework). A well-resourced neighborhood may be more likely to offer enrichment opportunities outside of school, such as after-school and summer math programs, STEM clubs and playscapes that integrate mathematical thinking.

Access to affordable housing: A lack of affordable housing leads to material hardships like reduced access to food, clothing, medicine and transportation, while also negatively impacting mental and physical health, such as increased

depression among tenants behind on rent and developmental delays in children living in poor housing conditions. This issue is also linked to higher eviction rates, disproportionately affecting families experiencing poverty, women and people of color (Education-to-Workforce Framework). Families experiencing poverty are more likely than middle-income families to live in substandard housing, which is associated with exposure to lead paint, asbestos, mold, roaches and rodents. These conditions can affect children's cognitive functioning and behavior, and can increase the incidence of asthma, which can cause school absences. (Annie E. Casey Foundation). Increased absences due to housing challenges lead to missed instruction, which over time creates gaps in the curricular building blocks needed to effectively establish foundational math skills Families experiencing poverty also are more likely than middle-income families to move frequently, often causing their children to change schools mid-year.

Access to libraries: Access to libraries provides valuable educational and community resources, particularly in low-income areas where residents may have limited access to books, technology and quiet study spaces. Libraries support literacy development and lifelong learning by offering free reading materials, internet access and educational programs (Neuman & Celano, 2012). Their location within a reasonable walking distance or along accessible transit routes increases their use, especially for families without at-home learning resources. Libraries serve as important community hubs that support education, job readiness and civic engagement (Kranich, 2013). Ensuring that libraries are well-placed and well-funded helps provide equitable access to information and learning opportunities.

Well-resourced neighborhoods and family well-being: A well-resourced neighborhood, in contrast, has affordable housing in safe communities, diversity of income and demographics, access to technology, transportation and other resources that help families thrive. Affordable, stable and safe housing is foundational to individual and family well-being. Children who grow up in safe and stable housing are more likely to enter kindergarten ready to learn, succeed in elementary and middle school and graduate from high school. Adults living in stable housing are more likely to complete postsecondary training and obtain and keep high-quality employment. And individuals with lower incomes living in mixed-income neighborhoods tend to experience better outcomes at all life stages (Results for America).

Access to affordable housing *Key source: Education-to-Workforce Framework*

Indicators

Contributing indicators

- Percentage of residential units that are unoccupied, or vacant, in a given year, disaggregated by rentals and homeownership (US Census Bureau).
- Average age of housing stock, which helps communities isolate potential issues, like exposure to asbestos and/or lead paint and connect people to resources (US Census Bureau, American Community Survey).
- Percentage of children under age 3 living in crowded households (Prenatal to 3 Policy Impact Center).
- Number of times a student changes schools between kindergarten and fourth grade (Rhode Island Kids Count).
- Number of children enrolled in grades K-3 who experience homelessness or are doubled up with family members or friends (Rhode Island Kids Count).
- Number of children under age 6 receiving emergency housing services (Rhode Island Kids Count).

- Student mobility rate (Promise Neighborhoods; The Urban Institute, prepared for U.S. Department Of Education).
- Students experiencing housing instability and changing schools as a result (Data sources: Local SEA, LEA or school records or analysis) (StriveTogether 2021).
- Number of students experiencing housing instability that requires changing schools (StriveTogether 2021).
- Number of students who experience homelessness during the school year (StriveTogether 2021 and Urban Institute).

Systems indicators

- Percentage of families with children under age 6 paying more than 30% of their income for housing (rent or mortgage plus heat and utilities) (Rhode Island Kids Count and StriveTogether 2021).
- Percent of household income spent on rent (StriveTogether 2021).
- Number of affordable and available housing units per 100 households with low, very low, and extremely low incomes. This metric reflects the extent of housing options for households with low incomes. Housing is considered affordable when monthly costs fall at or below 30 percent of a household's income (Urban Institute).
- Location affordability index (StriveTogether 2021).
- Eviction rate (StriveTogether 2021).
- Environmental racism, as measured by air quality index (StriveTogether 2021).
- Environmental racism, as measured by environmental health hazards (StriveTogether 2021).
- Level of public investment in neighborhoods as measured through programs like Opportunity Zones, Community Development Blocks and tax credits (StriveTogether).
- Share of people experiencing poverty who live in high-poverty neighborhoods. A high-poverty neighborhood is where more than 40% of residents are experiencing poverty. This metric reflects the extent of economic segregation in a community (Urban Institute).

Practices and Policies

Practices

- Invest in safe, affordable housing (Alliance for Early Success).
- Balancing resident needs with inspector capacity (Results for America).
- Healthy home environment assessments: Professional home inspections evaluating environmental health risks (Results for America).
- Proactive inspections to help maintain safe and healthy housing. The foundation of many effective programs is a more strategic deployment of a jurisdiction's home inspection capacity. Oftentimes, this includes using data analysis to identify high-risk blocks or neighborhoods and then sending inspectors to walk those areas, conduct visual exterior assessments, speak to residents and schedule proactive inspections (Results for America).
- Raising tenant and landlord awareness about maintaining safe and healthy housing. Many successful programs include a robust education component — often run by inspectors — to help landlords and tenants identify home hazards and other threats to home safety. This can include written materials, videos and public workshops (for instance, walking through a home to demonstrate an inspection). Such efforts also often include information on how to request a home inspection (Results for America).
- Guided play through playscapes, like Play on Purpose sites that encourage children and adults to engage in "guided play" (Results for America).

Policies

- Housing rehabilitation loan and grant programs: Funding in the form of loans and/or grants to income-eligible owner-occupants to assist with repair, rehabilitation and/or reconstruction of homes (Results for America).
- To ensure property owners have the financial capacity to address home hazards, some programs provide income-eligible property owners with grants and/or loans to assist with repair, rehabilitation and/or reconstruction of homes. Funding is often tied to specific forms of home improvement, such insulation, plumbing or mold removal (Results for America).
- Lead paint abatement programs: Programs focused on removing lead-based and contaminated surfaces from homes and other buildings (Results for America).
- Percentage of eligible households receiving federal rental assistance (Education-to-Workforce Framework).
- Ratio of the number of affordable housing units to the number of households with low and very low incomes in an area (by city or county). Housing units are defined as affordable if the monthly costs do not exceed 30% of a household's income. Households with low incomes are defined as those earning below 80% of area median income (AMI), and very low-income households are defined as those earning below 50 percent of AMI (Education-to-Workforce Framework).
- Adopting rent regulation, eviction prevention, just-cause eviction and right-to-counsel policies to protect tenants (Urban Institute).
- Balancing community development with creating opportunities for residents with low incomes to move to more resource-rich communities (Urban Institute).
- Creating affordable homeownership opportunities, including by providing down payment or closing-cost assistance and expanding access to financing, such as through the use of subsidized or shared appreciation (Urban Institute).
- Creating more dedicated affordable housing, including by subsidizing affordable housing development, establishing incentives for developers to create affordable units (e.g., density bonuses) and exploring ways to build affordable housing on publicly-owned land (Urban Institute).
- Creating permanent supportive housing for individuals and families experiencing chronic homelessness (Urban Institute).
- Enacting foreclosure prevention, property tax relief and rehabilitation assistance programs to assist homeowners (Urban Institute).
- Enforcing fair housing laws (Urban Institute).
- Expanding affordable housing in resource-rich neighborhoods (Urban Institute).
- Increasing the overall housing supply, including by reforming zoning and land-use policies, streamlining permitting processes and creating incentives for developers to build new housing (Urban Institute).
- Preserving subsidized and unsubsidized affordable rental housing (Urban Institute).
- Providing rental assistance to residents and incentivizing landlords to rent to tenants receiving assistance (Urban Institute).
- Reforming property taxes and property assessment processes to ensure that they do not disproportionately burden residents with low incomes (Urban Institute).
- Supporting community development in high-poverty neighborhoods, including by addressing vacancy and blight; and investing in schools, transportation and job creation (Urban Institute).
- Supporting permanently affordable housing models, such as community land trusts (Urban Institute).

Indicators

Contributing indicators

- Number and percent of students who have school and home access to broadband internet and a connected computing device (Promise Neighborhoods; The Urban Institute, prepared for U.S. Department Of Education).

Systems indicators

- Access to internet and computer/devices and technical support (StriveTogether 2021).
- Percentage of the community that has access to a desktop or laptop, a smartphone, a tablet or another computer (Data source: American Community Survey) (StriveTogether 2021).
- Percentage of households that have broadband internet subscriptions (Data source: American Community Survey) (StriveTogether 2021).
- Residential fixed broadband deployment (Data source: Federal Communications Commission) (StriveTogether 2021).
- Percentage of individuals who have both (1) access to at least one desktop or laptop computer owned by someone in the home and (2) reliable broadband internet (Education-to-Workforce Framework).
- Share of households with a computer and broadband internet subscription in the home. This metric reflects a community's digital divide by measuring in-home access to a computer and the internet, including DSL, cable modem, cellular data and fiber connections (Urban Institute).
- State has a broadband task force/commission to promote broadband access (National Council of State Legislatures).

Practices and Policies

Practices

- Technology to support learning and assessment in the classroom and online. (Annie E. Casey Foundation)
- Local and state coalitions who advocate for access to broadband with city and state officials and by partnering with telecommunications companies (National Council of State Legislatures).
- Addressing financial barriers to home broadband internet access, including by providing direct cash transfers or subsidies for the costs of broadband service and devices, such as laptops, tablets and phones (Urban Institute).
- Addressing physical barriers to home broadband internet access, such as the lack of appropriate infrastructure or wiring (Urban Institute).
- Creating free, public options for accessing the internet, including by providing Wi-Fi in public, accessible spaces like libraries (Urban Institute).
- Providing digital literacy training for residents, particularly underserved residents, to close the digital divide (Urban Institute).

Policies

- State subsidizes broadband subscriptions for families with limited incomes (FCC).[1]
- Federal Bipartisan Infrastructure Law: Offers broadband infrastructure and digital equity grants (Connected Nation).
- Smart Cities policies and resources.

[1]Federal funding for this program has ended but we chose to include it so that communities see what federal programs can look like.

Indicators

Systems indicators

- Distance to school and average student travel time (Birth to Grade 3 Indicator Framework, 2017).
- Average commute time to work, school or college (Education-to-Workforce Framework).
- Average travel time to school (Data sources: Local SEA, LEA or school records or analysis) (StriveTogether 2021).
- Average travel time to work (Data sources: Center for Neighborhood Technology; American Community Survey) (StriveTogether 2021).
- Percentage of workers who commute by walking and by biking (Data sources: Center for Neighborhood Technology; American Community Survey) (StriveTogether 2021).
- Trips made to work by mass transit (Data sources: Center for Neighborhood Technology; American Community Survey) (StriveTogether 2021).
- Access to mass transit departure and arrival points (Measuring Accessibility).
- Share of income spent on transportation. This metric reflects how much households spend on both public transit and cars (Urban Institute).
- Transit trips index. This metric reflects a community's access to public transportation. It is percentile-ranked nationally based on the number of public transit trips taken annually by an average household earning 80% of the area median income (Urban Institute).
- The Low Transportation Cost Index, from the U.S. Department of Housing and Urban Development (Education-to-Workforce Framework).

Practices and Policies

Practices

- Complete Streets approach to ensure the design of streets balance the needs of different modes of transportation, support local land uses, economies, cultures and natural environments (Smart Growth America).

Policies

- Complete Streets policies (Smart Growth America).
- Availability of public transportation subsidies for students (Data sources: Local SEA, LEA or school records or analysis) (StriveTogether 2021).
- Affordable housing within walking distance from public transportation (Data source: Center for Neighborhood Technology) (StriveTogether 2021).
- Transit connectivity index (Data source: Center for Neighborhood Technology) (StriveTogether 2021).
- Encouraging housing development near transit, including affordable housing and housing for people with disabilities (Urban Institute).
- Expanding transportation options, including public transportation, such as buses and light rails, and active transportation, such as bike lanes and sidewalks (Urban Institute).
- Improving the quality and frequency of public transportation (Urban Institute).
- Improving transportation accessibility for people with mobility challenges, including by creating paratransit systems and ensuring existing transit is accessible to people with disabilities (Urban Institute).
- Reducing barriers to using public transportation, including by providing fare subsidies, making systems easy to navigate (e.g., having clear signage and route maps in multiple languages), and centralizing fares across different modes of transportation (Urban Institute).

Exposure to neighborhood crime

Key source: Education-to-Workforce Framework

Indicators

Contributing indicators

- Number and percentage of students who feel safe at school and traveling to and from school, as measured by a school climate survey (Promise Neighborhoods; The Urban Institute, prepared for U.S. Department Of Education)
- Proportion of children with a parent or guardian who has served time in jail (Data source: Health Resources and Services Administration) (StriveTogether 2021).

Systems indicators

- Rates of reported violent crime and property crime (Data source: Federal Bureau of Investigation) (StriveTogether 2021) (Urban Institute).
- Rate of juvenile arrests by city or county (number of arrests per 100,000 residents) (Education-to-Workforce Framework).
- Rate of juvenile justice arrests (Data source: Federal Bureau of Investigation) (StriveTogether 2021).
- Rate of violent felonies and property felonies by city or county (number of incidents per 100,000 residents) (Education-to-Workforce Framework).
- Creating reentry supports for those recently released from jail or prison (Urban Institute).
- Implementing restorative justice approaches, which can help reduce recidivism (Urban Institute).
- Improving neighborhoods by redeveloping vacant or abandoned properties, installing street lighting and supporting community development activities (Urban Institute).
- Improving residents' financial security, including by strengthening the social safety net and reducing obstacles to accessing public benefits (Urban Institute).
- Preventing gun violence by limiting access to firearms and raising awareness of gun safety best practices (Urban Institute).
- Promoting community-led violence prevention initiatives, which identify residents at highest risk and intervene before conflict occurs (Urban Institute).

Neighborhood economic diversity

Key source: Education-to-Workforce Framework

Indicators

Contributing indicators

- Percentage of children under age 6 living in neighborhoods in which more than 20% of the population lives in poverty (Rhode Island Kids Count).

Systems indicators

- Percentage of city or county residents experiencing poverty who live in a high-poverty neighborhood (defined as a neighborhood in which more than 40% of residents experience poverty) (Education-to-Workforce Framework).
- Percentage of families who have lived in poverty for two generations or more (Brookings Institute).

Neighborhood juvenile arrests

Key source: Education-to-Workforce Framework

Indicators

Contributing indicators

- Rate of juvenile arrests by city or county (number of arrests per 100,000 residents) (Education-to-Workforce)

Practices and Policies

Practices

- Examining juvenile arrest rates by type of offense (for example, drug abuse violation, curfew and loitering, disorderly conduct, etc.) can also help data users better understand community dynamics and inequities in policing (Education-to-Workforce).
- Examine data on post-arrest handling of juvenile cases (For example, users could examine whether youth are referred to juvenile court after arrest or diverted from formal court processing (Education-to-Workforce).
- ImpactTulsa partnered with Tulsa Public Schools to build a data visualization tool for exploring how environmental conditions vary across neighborhoods and their relationships to academic outcomes (Education-to-Workforce).

Neighborhood racial diversity

Key source: Education-to-Workforce Framework

Indicators

Systems indicators

- Neighborhood exposure index, or share of a person's neighbors who are people of other races and ethnicities (Data source: American Community Survey) (StriveTogether 2021).
- Percentage of an individual's neighbors who are members of other racial or ethnic groups, calculated as a Neighborhood Exposure Index (Education-to-Workforce Framework).
- Proportion of community residents who are immigrants (Data source: National Equity Atlas) (StriveTogether 2021).
- Ratio of the share of local elected officials of a racial or ethnic group to the share of residents of the same racial or ethnic group (Data sources: American Community Survey; local elections data) (StriveTogether 2021).
- Share of the voting-eligible population who are registered to vote and share who turn out to vote (Data source: Census) (StriveTogether 2021).
- Index of people's exposure to neighbors of different races and ethnicities. Racially and ethnically diverse neighborhoods are hallmarks of inclusive communities. This metric calculates separately for each racial or ethnic group the average share of that group's neighbors who are members of other racial or ethnic groups (Urban Institute).

Practices and Policies

Policies

- Narrowing racial homeownership gaps, including by creating affordable homeownership opportunities for households of color (Urban Institute).
- Reducing housing discrimination in the private market, including by enacting source-of-income laws and funding fair housing organizations (Urban Institute).
- Reforming zoning policies to allow for more diverse, high-density, mixed-income communities (Urban Institute).

Environmental quality

Indicators

Systems indicators

- Air quality. Carcinogenic, respiratory and neurological toxins in the air can harm people's health. A higher value for this metric indicates better air quality and lower exposure to toxins (Urban Institute).

Practices and Policies

Policies

- Addressing home health hazards, such as lead paint and pipes, to foster safe and healthy home environments (Urban Institute).
- Developing parks and other green spaces to absorb carbon and improve air quality (Urban Institute).
- Improving the quality and frequency of public transportation and encouraging housing development near transit to reduce reliance on personal vehicles (Urban Institute).
- Incentivizing private-sector actors to reduce their carbon footprints, including by leveraging government procurement and contracting procedures (Urban Institute).
- Investing in green infrastructure, such as permeable pavements, that can help mitigate exposure to environmental stressors like extreme heat (Urban Institute).
- Reducing the carbon footprint of all public-sector operations, including by transitioning to clean energy sources, electrifying bus and vehicle fleets, retrofitting city-owned buildings and implementing other energy efficiency measures (Urban Institute).

Just policing

Indicators

Systems indicators

- Juvenile arrests per 100,000 juveniles. High number of arrests among young people, ages 10 to 17, is a strong indicator of elevated criminal legal system involvement and over policing. This metric includes arrests for any crime or status offense (Urban Institute).

Practices and Policies

Policies

- Creating community responder or co-responder programs for nonviolent emergencies, such as mental health or behavioral crises, domestic disputes, traffic safety issues and homelessness (Urban Institute).
- Creating diversion programs and other alternatives to arrest, trial and incarceration (Urban Institute).
- Improving police officer recruitment, retention and training, as well as addressing officer wellness (Urban Institute).
- Minimizing the use of over-policing strategies, including stop-and-frisk, pretextual and non-safety-related traffic stops and "broken windows" policing (Urban Institute).
- Shifting funding from police departments to other local agencies where appropriate, such as funding programs in schools to address truancy

instead of relying on police officers to enforce truancy laws (Urban Institute).

- Shifting toward evidence-based policing, in partnership with communities (Urban Institute).
- Supporting greater police accountability, including by publishing data on police misconduct and use of force, advocating for the reform of qualified immunity and creating civilian oversight boards that operate independently of law enforcement agencies (Urban Institute).

Political participation and representation

Indicators

Systems indicators

- Ratio of the share of local, elected officials of a racial or ethnic group to the share of residents of the same group. Political scientists commonly use this metric to capture the extent to which racial and ethnic groups are represented by their community's elected leaders (Urban Institute).
- Share of the voting-age population who turns out to vote. Voter turnout is a well-established and broadly available reflection of political engagement in a community (Urban Institute).

Practices and Policies

Policies

- Adopting direct democracy practices, such as participatory budgeting, to empower community members and encourage them to participate in local governance (Urban Institute).
- Creating public financing systems for local elections (Urban Institute).
- Reducing barriers to voting, including by automatically registering voters, expanding the number of voting sites and their voting hours and offering additional options, such as mail-in, early and absentee voting (Urban Institute).
- Restoring voting rights to formerly incarcerated people (Urban Institute).
- Scheduling local elections to coincide with state or national elections, which can lead to a more representative electorate (Urban Institute).
- Scheduling local elections to coincide with state or national elections (Urban Institute).
- Strengthening and diversifying the local government workforce, including by investing in hiring, recruitment, training and compensation (Urban Institute).
- Strengthening civics education courses in schools (Urban Institute).
- Supporting labor unions and the right to organize (Urban Institute).
- Switching from at-large to district elections, adopting proportional representation systems and moving to choice voting or cumulative voting systems to make local governments more representative of their constituents (Urban Institute).

16 Do families with children have access to adequate public support?

Why it matters

Childhood experiences:

Birthweight: Babies with low weight at birth are at greater risk than normal-weight babies for neurodevelopmental problems (e.g., cerebral palsy, blindness and other cognitive disabilities), behavioral problems and attention deficit hyperactivity disorder — all of which can interfere with learning and school success (Annie E. Casey Foundation).

Parent's education level: Newborns whose mothers have low levels of education are more likely than newborns of mothers who have higher levels of education to have been exposed to cigarette smoke, alcohol, drugs and folic acid deficiencies, which can cause preterm birth, intrauterine growth delay, and long-lasting effects on the child's cognition and behavior (Annie E. Casey Foundation).

Access to high-quality, early childhood programs: Programs like Head Start and Early Head Start have been shown to improve health outcomes, increase learning and social skills, and close the readiness gap for children experiencing poverty (Advisory Committee on Head Start Research and Evaluation, August 2012).

Adverse childhood experiences (ACEs) are potentially traumatic events, including physical, sexual and emotional abuse; physical and emotional neglect; domestic violence; and growing up in a family where there is mental illness, substance misuse, parental separation or divorce, or an incarcerated household member. Excessive trauma and stress during early childhood "disrupt[s] neurodevelopment and can have lasting effects on brain structure and function." (Campaign for Grade-Level Reading).

Health care access and insurance coverage: Children experiencing poverty receive less, and lower-quality, medical care — and fare less well as a result — than wealthier children who have the same health problems. (Annie E. Casey Foundation). Children experiencing poverty have a higher incidence of health problems that interfere with learning, such as chronic asthma, poor hearing, vision and dental problems, ADHD, frequent headaches, heart conditions, kidney disease, epilepsy, digestive problems and cognitive delays (Annie E. Casey Foundation).

Healthy vision and hearing: Research shows us how prevalent vision and hearing problems are among young children in the U.S., especially those experiencing poverty, and explains how these impairments can lead to emotional and behavioral problems that interfere with learning and to excessive absence from school. Untreated vision problems can produce symptoms similar to ADHD, causing some children with vision problems to be misidentified as having a learning disorder, according to the American Optometric Association. According to the American Speech-Language-Hearing Association, hearing loss "causes delay in the development of receptive and expressive

communication skills (speech and language); the language deficit causes learning problems that result in reduced academic achievement" (Campaign for Grade-Level Reading).

Educators know all too well how students' health conditions can disrupt teaching and interrupt learning. Children who can't see well enough to make out words written at the front of the classroom, can't hear well enough to understand what the teacher is saying and can't forget their tooth pain or hunger long enough to concentrate have a hard time learning in school. Children with asthma will struggle to keep up if frequent attacks keep them out of school. And trauma or stress make meaningful classroom engagement difficult for some children and almost impossible for others (Campaign for Grade-Level Reading).

Food security: Malnourished children have impaired cognitive development, long-term emotional and health problems, decreased educational attainment and decreased productivity. Although children experiencing poverty qualify for free or reduced-price breakfast at school, 10 million eligible kids don't get any, either because of the stigma attached to receiving help or because turbulence in their lives keeps them from getting to school on time (Annie E. Casey Foundation).

Childhood experiences *Key source: Education-to-Workforce Framework*

Indicators

Contributing indicators

- Percent of live births weighing less than 2,500 grams (5.5 pounds). Babies born less than 5.5 pounds are more likely to experience developmental problems than are babies born at higher birthweights. (Data source: National Center for Health Statistics, National Vital Statistics Report.) (Annie E. Casey Foundation)
- Children in households where the household head has graduated high school. (Note: Those who have a GED or equivalent are included as high school graduates.) (Data source: U.S. Census Bureau, American Communities Survey.) (Annie E. Casey Foundation)
- Children who are born healthy. (Annie E. Casey Foundation)
- Children who are healthy, thriving, and developing on track (no untreated health conditions or avoidable developmental delays), from birth through third grade and beyond. (Annie E. Casey Foundation)
- Reduced exposure of children to adverse childhood experiences. (Campaign for Grade-Level Reading)
- Percent of low birth weight babies among women at the lowest income level. (Campaign for Grade-Level Reading)
- Percent of low birth weight babies among women at the highest income level. (Campaign for Grade-Level Reading)
- Number of U.S. children between ages 1 and 5 with lead poisoning. (Campaign for Grade-Level Reading)
- Number of U.S. children living in poverty with asthma. (Campaign for Grade-Level Reading)
- Children from birth to age 3 with substantiated cases of abuse and neglect referred to Part C Early Intervention (based on CAPTA) (Prenatal to 3 Policy Impact Center).
- Percentage of children under age 6 with blood lead levels at or above 10 micrograms per deciliter (Rhode Island Kids Count).
- Maltreatment rate per 1,000 children under age 3 (Prenatal to 3 Policy Impact Center).
- Physical, sexual and emotional abuse in childhood (Head Start ECLKC).
- Emotional and physical neglect in childhood (Head Start ECLKC).
- Children living with a family member with

mental health or substance use disorders (Head Start ECLKC).

- Witnessing domestic violence in childhood (Head Start ECLKC).
- Sudden separation from a loved one in childhood (Head Start ECLKC).
- Childhood poverty (Head Start ECLKC).
- Racism and discrimination in childhood (Head Start ECLKC).
- Violence in the community during childhood (Head Start ECLKC).

Systems indicators

- Rate of substantiated child abuse and neglect among children from birth to age 6 (Rhode Island Kids Count).
- Deaths caused by injury per 100,000 people. These deaths both reflect and cause trauma in a community. They include planned deaths (e.g., homicides or suicides) and unplanned deaths (e.g., from motor vehicle and other accidents) (Urban Institute).

Practices and Policies

Practices

- Direct funding to programs addressing adverse early experiences and sources of toxic stress. (Alliance for Early Success)
- Expand access to voluntary, effective home visiting programs and services for new and expectant parents that model relationship building, engage parents in their child's learning, and refer for additional supports as needed. (Alliance for Early Success)
- Reducing the impact of early childhood experiences renews children's capacity for learning. (Campaign for Grade-Level Reading)
- Lead paint inspection and abatement (Rhode Island Kids Count).
- Percentage of individuals with fewer than three adverse childhood experiences (ACEs) (Education-to-Workforce Framework).
- Lena Early Talk "Pedometer": A tech-enabled device that measures the quality of interactions between children and adults to deepen early language exposure and development (LENA).

Policies

- Creating programs to educate parents and families on children's health, development and care needs (Urban Institute).
- Creating targeted supports for vulnerable groups, including children and young people — particularly those in foster care and those returning from juvenile detention — and survivors of domestic or intimate partner violence (Urban Institute).
- Fostering positive learning environments for students, including by developing programs that prevent bullying, moving away from punitive disciplinary practices and applying other trauma-informed practices (Urban Institute).
- Improving traffic safety by implementing calming measures, building complete streets and creating safer environments for pedestrians and bicyclists (Urban Institute).
- Increasing access to mental health services, including substance use treatment and prevention (Urban Institute).
- Preventing gun violence by limiting access to firearms, keeping guns out of schools and raising awareness of gun safety best practices (Urban Institute).
- Strengthening workplace safety regulations and creating paid sick leave and predictable scheduling laws to enhance worker well-being (Urban Institute).
- The First 1,000 Days on Medicaid: A program under NYC's Medicaid Redesign effort that aims to improve the physical, social and emotional needs of children and their families (NYC Department of Health).

Indicators

Contributing indicators

- Number of food-insecure children in the U.S. (Campaign for Grade-Level Reading)
- Number of children who receive free lunch during the summer. (Campaign for Grade-Level Reading)
- Percentage of eligible units with children under age 18 not receiving SNAP (Prenatal to 3 Policy Impact Center).
- Percentage of households reporting child food insecurity (Prenatal to 3 Policy Impact Center).
- Number and percent of children who consume five or more servings of fruits and vegetables daily (Promise Neighborhoods; The Urban Institute, prepared for U.S. Department Of Education).
- Percentage of eligible individuals receiving WIC benefits (U.S. Department of Agriculture).

Systems indicators

- Percentage of eligible individuals participating in SNAP (Education-to-Workforce Framework).
- Percentage of individuals living in a census tract with low access to healthy food, as defined by the USDA's Food Access Research Atlas (Education-to-Workforce Framework).
- Percentage of individuals with high or marginal food security, as measured by the U.S. Department of Agriculture's (USDA) Food Security Survey Module (Education-to-Workforce Framework).
- Proportion of eligible students participating in the School Breakfast Program (Data source: U.S. Department of Agriculture) (StriveTogether 2021).
- Proportion of households experiencing food insecurity (Data sources: Census, Child Protective Services) (StriveTogether 2021).

Practices and Policies

Practices

- Support health and affordable food options in high-poverty neighborhoods (Alliance for Early Success).
- Increase participation of families, child care providers, schools, and communities in federal nutrition programs (Alliance for Early Success).
- Summer food programs keep kids healthy when school is out (Campaign for Grade-Level Reading).
- Breakfast at school improves attendance and learning (Campaign for Grade-Level Reading).
- Reduced Administrative Burden for SNAP (Prenatal to 3 Policy Impact Center).

Policies

- States expand access to WIC benefits (e.g., increasing income threshold, extending benefits for postpartum people).
- Child and Adult Care Food Program (CACFP): Allows educational programs in eligible low-income areas to serve a free meal and/or snack to students 18 and younger (No Kid Hungry).

Indicators

Contributing indicators

- Fewer children starting school with undetected, undiagnosed and untreated physical ailments (Campaign for Grade-Level Reading).
- Fewer children starting school with developmental delays and disabilities (Campaign for Grade-Level Reading).
- Fewer children starting school with social-emotional and behavioral challenges (Campaign for Grade-Level Reading).
- Fewer children starting school with oral, vision and hearing impairments (Campaign for Grade-Level Reading).
- Percent of children enrolled in the Children's Health Insurance Program (CHIP) (Campaign for Grade-Level Reading).
- Percent of uninsured U.S. children overall and percent of uninsured U.S. children who are living in poverty (Campaign for Grade-Level Reading).
- Percent of children nationally without a medical home. A medical home is a health care setting that patients visit regularly for their primary care needs, building familiarity and consistency with care providers (Campaign for Grade-Level Reading).
- Percent of children receiving universal developmental screening at children's 9-, 18- and 24- or 30-month well child visits and any other time the family or clinician has concerns, per the AAP and the Centers for Disease Control and Prevention recommendation (Campaign for Grade-Level Reading).
- Percent of U.S. children aged 2 - 8 years with at least one mental, behavioral or developmental disability (Campaign for Grade-Level Reading).
- Proportion of low-income children at high risk of developmental delays (Campaign for Grade-Level Reading).
- Percent of children who have had cavities by age 5 (Campaign for Grade-Level Reading).

Practices and Policies

Practices

- Expand outreach to ensure access to affordable, physical, oral, and mental health insurance coverage for children and parents (Alliance for Early Success).
- Simplify enrollment to ensure access to affordable, physical, oral, and mental health insurance coverage for children and parents (Alliance for Early Success).
- Eliminate barriers to retention to ensure access to affordable, physical, oral, and mental health insurance coverage for children and parents (Alliance for Early Success).
- Address health care shortages—both of providers who accept Medicaid/CHIP, and of providers who offer specialized care (e.g., dental care, mental health, developmental specialists) (Alliance for Early Success).
- Promote timely use of prenatal and pediatric health care (Alliance for Early Success).
- Require universal newborn screening for hearing and metabolic disorders, and vision screening between ages one and five (Alliance for Early Success).
- Screen for developmental disabilities and delays according to the schedule recommended by American Academy of Pediatrics (Alliance for Early Success).
- Increase access to comprehensive health (medical) homes that identify and respond to the physical, social, and emotional determinants of health (Alliance for Early Success).
- Prioritize funding for prevention programs,

including those delivered outside of traditional medical settings (Alliance for Early Success).

- Implement health care data systems to track and improve referral and follow-up services (Alliance for Early Success).
- Maximize screening, diagnosis and treatment of maternal depression and early childhood behavioral health issues using new opportunities under the Affordable Care Act (Alliance for Early Success).
- Improve coordination between IDEA Part B and C, primary care, and public health programs (Alliance for Early Success).
- Access to high-quality, affordable, comprehensive health care (including preventative, acute, emergency, and chronic care) for physical, mental, and oral health for all families with infants and young children (Annie E. Casey Foundation).
- Establishment of medical homes and primary care practices that focus broadly on children's healthy development, building on exemplary programs such as Help Me Grow and Reach Out and Read, and drawing from Bright Futures (Annie E. Casey Foundation).
- Communities need a way to identify when children have health risks that will jeopardize their school success, sound the alarm and marshal the attention, support and action required to get them back on track. Developmental surveillance and screening, behavioral assessments and follow-up constitute the frontlines of an early warning and response system for the health determinants of early school success (Campaign for Grade-Level Reading).
- Physical activity helps children pay attention and learn (Campaign for Grade-Level Reading).
- Managing children's asthma helps them reduce absences (Campaign for Grade-Level Reading).
- Regular oral healthcare prevents lost learning time (Campaign for Grade-Level Reading).
- Screenings catch developmental, hearing, vision and lead problems before they interfere with learning (Campaign for Grade-Level Reading).
- Prenatal care supports early brain development (Campaign for Grade-Level Reading).
- Social and emotional development builds curiosity and supports learning (Campaign for Grade-Level Reading).

Policies

- Universal child health insurance. In 1998, an Institute of Medicine committee found that "insurance coverage is the major determinant of whether children have access to health care," and that uninsured children are "most likely to be sick as newborns, less likely to be immunized as preschoolers, less likely to receive medical treatment when they are injured, and less likely to receive treatment for illnesses such as acute or recurrent ear infections, asthma, and tooth decay." Other studies have verified that after enrolling in the Children's Health Insurance Program, children's unmet health needs fall by 50 percent or more and their routine health, dental and asthma care improves in terms of both access and quality. Despite gains made under the Affordable Care Act, however, the United States is still far from ensuring that all children have health insurance (Campaign for Grade-Level Reading).
- Ensure a medical home for every child. A medical home is a health care setting that patients visit regularly for their primary care needs, building familiarity and consistency with care providers. Care typically is provided by a team of practitioners including physicians, medical assistants, nurses, nurse practitioners and care coordinators. The American Academy of Pediatrics (AAP) defines a medical home for infants and children as having well-trained primary care physicians who are known to the child and family, able to develop "a partnership of mutual responsibility and trust," and able to help manage and facilitate all aspects of

pediatric care. Medical homes are especially important for medically underserved children, who often have more "chronic conditions and economic, geographic, and psychosocial factors" that combine to aggravate medical problems (Campaign for Grade-Level Reading).

Family economic stability

Indicators

Contributing indicators

- Children in low-income families (income below 200% of poverty level). (Data source: U.S. Census Bureau, American Community Survey.) (Annie E. Casey Foundation)
- Percentage of eligible units with children under age 18 not receiving SNAP (Desired outcome: Families have access to necessary services through expanded eligibility, reduced administrative burden or programs to identify needs and connect families with services) (Prenatal to 3 Policy Impact Center).
- CalWORKS status: California's work opportunity program that provides temporary financial assistance and employment-focused services to families with children who are minors whose income and property are below state maximum limits for their family size (California Department of Education & WestEd, Cradle-to-Career Data System Public Data Definitions).
- Percentage of children under age 3 without any full-time working parent (Prenatal to 3 Policy Impact Center).
- Medi-Cal status: California's Medicare health care program (California Department of Education & WestEd, Cradle-to-Career Data System Public Data Definitions).
- Proportion of K-12 socioeconomically disadvantaged students (California Department of Education & WestEd, Cradle-to-Career Data System Public Data Definitions).
- Percentage of children under age 3 in poverty (Prenatal to 3 Policy Impact Center).
- Children from birth to age 6 living in families with income below the poverty threshold (Project THRIVE, The National Center for Children in Poverty, Rhode Island Kids Count).
- Children from birth to age 6 living in extreme poverty (i.e., family income at or below 50% of the federal poverty level) (Project Thrive, NCCP).

Systems indicators

- Family income level (California Department of Education & WestEd, Cradle-to-Career Data System Public Data Definitions).
- Household income at 20th, 50th and 80th percentiles. This metric captures the financial resources available to low-, middle-, and high-income households and the extent of income inequality in a community. Larger gaps between values for the three income groups indicate greater inequities (StriveTogether 2021 and Urban Institute).
- People with overdue debt typically have few assets or negative wealth (StriveTogether 2021 and Urban Institute).
- Household income and incarceration for children from low-income households (StriveTogether 2021).
- Income segregation and intergenerational mobility across colleges (StriveTogether 2021).
- Pay on an average job compared with the cost of living. This metric reflects the supply of jobs in a community that pay enough to meet the local cost of a family's basic needs (Urban Institute).
- Ratio of the share of total home values owned

by a racial or ethnic group to the share of households of the same group. This metric shows the degree of racial and ethnic disparity in housing wealth. The larger the difference between the two values, the greater the inequities (Urban Institute).

- Share of adults in the community ages 25 to 54 who are employed. This is a common metric for measuring employment levels among prime-age workers, also known as the employment-to-population ratio (Urban Institute).
- Households that have at least $400 in emergency savings (The Federal Reserve Bank).

Practices and Policies

Practices

- Incentivize economic development that brings living-wage jobs into neighborhoods where lack of opportunity brings all of the problems associated with unemployment and concentrated poverty (Alliance for Early Success).
- Adopt policies that support flexible work schedules for parents (Alliance for Early Success).
- Increase access to public benefits and tax credits that provide income or other supports to help families meet basic needs and maintain stable housing and employment (Alliance for Early Success).
- Support paid family leave and work exemptions that foster nurturing relationships and responsive caregiving, build parental resilience, and provide security for children (Alliance for Early Success).
- Fair work scheduling (Prenatal to 3 Policy Impact Center).

Policies

- Child allowance (Prenatal to 3 Policy Impact Center).
- Income support programs (Rhode Island Kids Count).
- Paid family leave (Prenatal to 3 Policy Impact Center).
- Paid sick leave (Prenatal to 3 Policy Impact Center).
- State earned income tax credit (Prenatal to 3 Policy Impact Center).
- State minimum wage (Prenatal to 3 Policy Impact Center).
- Two-generation programs for parental employment (Prenatal to 3 Policy Impact Center).
- State child tax credits that are fully refundable (IRS).
- Adopting community wealth-building strategies, such as establishing a public bank, supporting cooperatives and worker-owned businesses, implementing progressive procurement policies and supporting community land trusts and other models of collective ownership (Urban Institute).
- Establish baby bonds, publicly-funded child trust accounts designed to address racial/ethnic wealth inequality (Prosperity Now).
- Creating a local living-wage ordinance that requires employers to pay wages higher than the federal minimum wage (Urban Institute).
- Creating programs that allow renters to earn equity through their rent payments and share in the long-term appreciation of their homes (Urban Institute).
- Creating workforce development programs that support workers in reskilling and upskilling, such as public-sector apprenticeships (Urban Institute).
- Creating matched savings accounts for residents with low and moderate wealth (Urban Institute).
- Establishing a local reparations program to make amends for historical harms and address the structural roots of ongoing wealth disparities (Urban Institute).
- Helping families with low and moderate incomes overcome barriers to homeownership, such as by providing down payment assistance (Urban

Institute).

- Helping parents access high-quality and affordable child care (Urban Institute).
- Helping residents access financial services and build credit safely, including by regulating predatory lending practices, such as payday loans (Urban Institute).
- Increasing wages for local government workers (Urban Institute).
- Investing in infrastructure and other amenities (e.g., roads, public transit, parks and schools), which both creates jobs and enhances longer-term employment opportunities for residents (Urban Institute).
- Investing in baby bonds and other child development accounts (Urban Institute).
- Investing in job placement services and supports to help residents find stable jobs, including transitional and reentry support programs (Urban Institute).
- Leveraging public procurement processes to incentivize employers to pay living wages (Urban Institute).
- Partnering with large community-serving institutions, such as universities and hospitals, to funnel capital and resources toward improving local communities (Urban Institute).
- Prioritizing job quality in addition to wages, such as by supporting employee-owned businesses, integrating job-quality requirements in local government contracts and recognizing "high road" employers that pay living wages and provide other elements of high-quality jobs, such as paid leave, workplace flexibility and stable scheduling (Urban Institute).
- Providing local entrepreneurs and small-business owners with the support they need to succeed, including capital and technical assistance (Urban Institute).
- Providing direct cash transfers to residents, such as through guaranteed income programs or local tax credits (Urban Institute).
- Providing financial education and counseling services to residents (Urban Institute).
- Reforming government fines and fees, which disproportionately affect residents with low incomes and wealth (Urban Institute).
- Strengthening and diversifying the local government workforce, including by investing in recruitment, training and retention (Urban Institute).
- Strengthening the social safety net and reducing obstacles to accessing public benefits, such as asset limits (Urban Institute).
- Supporting existing employers, particularly locally-owned businesses, to grow and thrive (Urban Institute).
- Supporting residents in accessing and

Navigating public services

Practices and Policies

Practices

- Reduce barriers to participation in public benefit programs (e.g., TANF, Head Start, child care subsidy, SNAP and WIC, Medicaid/CHIP, and the EITC) with universal on-line applications and aligned eligibility and enrollment policies (Alliance for Early Success).
- Employ navigators, centralize referral resources, and invest in hub strategies that integrate supports for parents and children in settings where families are (Alliance for Early Success).
- Connect education and job training opportunities for parents with access to high quality early learning for their children (Alliance for Early Success).
- Connect learning environments to health and family support networks (Alliance for Early Success).

- Coordinate income support programs to minimize "cliff effects" that occur when a small increase in wages leads to a substantial decrease in benefits (Alliance for Early Success).
- Develop a comprehensive, linked data system to inform planning, document progress, and ultimately improve the health, development, learning, and success of children and their parents (Alliance for Early Success).
- Centralize and track screening, referral, diagnosis, and treatment (Alliance for Early Success).
- Support training for parents, service providers, and policymakers to help them accurately interpret and use data (Alliance for Early Success).
- Invest in networks of parent navigators/ promoters to build social capital and connect families to supports (Alliance for Early Success).
- Ensure programs draw upon the language and culture of families and their communities (Alliance for Early Success).
- Direct supports to the most vulnerable parents: teen parents, foster parents, grandparents raising grandchildren, parents who have experienced abuse and neglect, and parents of children with special needs (Alliance for Early Success).
- Promote family support programs that offer activities and materials while creating opportunities for modeling, peer support, and networking among parents (Alliance for Early Success).
- Change the culture of eligibility determination and case management from a focus on rule compliance, to a focus on adult-, child-, and family outcomes (Alliance for Early Success).
- Revise eligibility and work requirements for low-income families that disrupt continuity of care for children and work against children's developmental and educational needs (Alliance for Early Success).

Other family conditions

Indicators

Contributing indicators

- Percentage of births to mothers with less than a 12th grade education (Rhode Island Kids Count).
- Children from birth to age 6 in out-of-home placement (foster care) that had no more than two placements in a 24-month period (Project Thrive, NCCP).
- Births to teens ages 15-17 per 1,000 girls (Project Thrive, NCCP).
- Childhood Migrant Education Program participant (California Department of Education & WestEd, Cradle-to-Career Data System Public Data Definitions).
- Percentage of children under age 3 not nurtured daily (Prenatal to 3 Policy Impact Center).
- Percentage of children under age 3 not read to daily (Prenatal to 3 Policy Impact Center).
- Children enrolled in multiple elementary schools (California Department of Education & WestEd, Cradle-to-Career Data System Public Data Definitions).
- Percentage of children ages 3 to 5 who were

read to by a family member every day in the past week (Rhode Island Kids Count).

- Percentage of infants and toddlers (ages 4 months to 35 months) who were read to by their caregivers every day in the last week (Rhode Island Kids Count).
- Number and percentage of caregivers that read to or encourage their children to read three or more times a week (from birth to age 5) or who reported their child read to themselves three or more times a week (kindergarten through eighth grade) (Promise Neighborhoods; The Urban Institute, prepared for U.S. Department Of Education).
- Foster youth status (California Department of Education & WestEd, Cradle-to-Career Data System Public Data Definitions).
- Percentage of kindergartners with parents considered at risk for depression (Rhode Island Kids Count).
- Percentage of mothers experiencing depression (of all mothers with young children) (Rhode Island Kids Count).
- Percentage of children under age 3 whose mother reports fair/poor mental health (Prenatal to 3 Policy Impact Center).
- Percentage of children under age 3 whose parent reports they are not coping very well (Prenatal to 3 Policy Impact Center).
- Percentage of children under age 3 whose parent lacks parenting support (Prenatal to 3 Policy Impact Center).

Systems indicators

- Number of births to teens ages 15-17 per 1,000 girls (Rhode Island Kids Count).
- Mothers of children under age 6 who are screened and referred for depression (Project Thrive, NCCP).
- Percentage of early care and education programs with multiple strategies to involve and support parents (Rhode Island Kids Count).

Practices and Policies

Practices

- AVANCE Parent-Child Education Program (PCEP): Nine-month intensive bilingual program for child development (Results for America).
- Triple P Spartanburg (Positive Parenting Program): Free services to help develop parenting skills and understanding of child development (Triple P Spartanburg).
- Hello Family Spartanburg: Parent support and education initiative (Hello Family Spartanburg).
- ParentCorps: Early childhood, family-centered intervention that takes place in schools and Head Start programs (Results for America).
- Evidence-based home visiting programs (Prenatal-to-3 Policy Impact Center).

Policies

- Alliance for Early Success: A 50-state strategy to achieve equitable state early childhood policy (Alliance for Early Success).

17 Do students have access to STEM and math enrichment opportunities to prevent learning loss and to connect to potential STEM careers?

Why it matters

Research supports the importance of "playing math" at home as a means of enhancing children's mathematical understanding and building foundational skills in a relaxed, enjoyable setting. Several studies indicate that informal math experiences outside of school can significantly impact a child's mathematical development.

Building early mathematical concepts: According to a study by *Clements and Sarama* (2009), early math play — such as playing with blocks, sorting objects or engaging in games involving numbers — supports the development of critical early math concepts, including number sense, spatial awareness and pattern recognition. These early experiences provide a foundation for later, more formal mathematical learning (Clements and Sarama, 2009).

Enhancing motivation and engagement: *Ginsburg et al. (2006)* highlight that math-related play at home can help foster a positive attitude towards math. It is less likely to feel intimidating, and children often engage in playful activities that improve problem-solving and critical thinking without the pressure of formal assessment (Ginsburg et al., 2006).

Reinforcing math skills through repetition: When children engage in math-based activities at home, such as through games, puzzles or digital apps, it leads to increased practice and repetition of mathematical concepts in a way that is less stressful and more engaging. This practice helps reinforce skills, making it easier for children to transfer these concepts to school settings (James-Brabham et al, 2024).

Supporting parental involvement: Research also emphasizes the role of parents in math learning. Parental involvement, particularly in non-formal settings like math play, can lead to improved academic achievement. When parents engage with their children in math-related activities, it demonstrates that learning can be fun and integral to everyday life, which boosts children's confidence and persistence in solving math problems (Jeynes, 2005).

Family math engagement

Practices and Policies

Practices

- Five facets of family engagement are associated with children's math learning, including math attitudes and expectations, math activities, math talk, the general home learning environment, and school involvement. (Widening the Lens of Family Math Engagement).
- Parents read books that highlight mathematical themes. Herb Ginsburg and colleagues from Teachers College, Columbia University, stress the

importance of reading books with mathematical themes together. While reading, parents can ask questions that get children to count, identify shapes, and explain their thinking. Early-childhood educators and librarians are good resources to talk to about books and digital media with mathematical content, and many libraries offer story times and playful activities with math content. (Making Math a Family Thing).

- Parents let children wrangle with math questions and derive their own solutions. Laura Overdeck, the founder of Bedtime Math, reminds families that it's sometimes good to let children struggle with math problems. Students of all ages need time to figure out why answers are what they are. Don't just jump right in and give them the solutions. She also reminds parents to be aware of how you talk about math. It's important to avoid saying you hate it. (Making Math a Family Thing).
- Parents use "math talk." Taniesha Woods, co-editor of Mathematics Learning in Early Childhood, stresses that families are perfectly situated to talk about quantity, counting, and shapes anywhere children and families are — at home, in the park, or in the grocery store. For example, when you are eating cookies, count how many you have, talk about their shape, and ask what happens when you break them apart, eat them up, or ask for more. (Making Math a Family Thing).
- Teachers communicate with parents about developmentally appropriate math content and pedagogy. Marlene Kliman, senior scientist at TERC, recommends providing a variety of fun and engaging ways for parents to learn about math content and pedagogy — especially when the teaching of mathematics looks different from the instruction that most adults experienced when they were in school. For example, give children a math-related craft to share with family members or a math game to play with others at home. With smartphones becoming nearly ubiquitous, even in low-income communities, teachers can also text or email parents video snippets of classroom mathematics activities. (Making Math a Family Thing).
- Teachers guide families in using digital and real-world activities with a mathematics focus with their children. The PBS KIDS website offers children and families free digital games, hands-on activities, and video clips with a mathematical focus. Betsy McCarthy from WestEd explains that when early-childhood teachers trained parents on how to use these tools and encouraged families and children to take time to use them together, children's mathematics knowledge and skills improved, and parents' awareness and support of their children's mathematics learning increased. [Read more about WestEd's research into the impact of digital tools on children's mathematical knowledge.] (Making Math a Family Thing).
- Teachers understand how families use mathematics in their everyday lives. Marta Civil and Diane Kinch from TODOS: Mathematics for ALL help teachers understand that mathematics is an activity that exists both in and out of school. They recommend informal get-togethers where groups of families and teachers can discuss the content of math problems and their reasoning behind how they solve them. Teachers can also invite parents into their classrooms and ask family members to share their personal experiences with using math in everyday life. (Making Math a Family Thing).
- Bedtime Math offers families and children fun math stories and problems they can share together. Afterschool instructors and librarians can also find a curriculum for running math clubs. (Making Math a Family Thing).
- DREME TE contains early math resources for prospective and practicing teachers. (Making Math a Family Thing).
- Early Math Collaborative provides a website with a variety of videos and lesson ideas to improve math instruction for young children. (Making Math a Family Thing).
- Integrating Mathematical Thinking into Family Engagement Programs lays out seven practical tips practitioners can use to integrate early math into their own family engagement programs. (Making Math a Family Thing).
- Mixing in Math offers parents, caregivers, afterschool providers, librarians, and teachers resources to mix math into everything they do with children. (Making Math a Family Thing).
- PBS KIDS provides hands-on activities, digital games, and videos with a mathematical focus.

(Making Math a Family Thing).

- Ready Rosie offers videos that show parents and caregivers how to model math in their everyday routines. (Making Math a Family Thing).
- Speakaboos introduces a variety of interactive storybooks with mathematical themes. (Making Math a Family Thing).
- TODOS: Mathematics for ALL features publications on the teaching of mathematics and resources for parents and families. (Making Math a Family Thing).
- Educators help families recognize that math is more than counting. Provide guided activities on other aspects of math and help parents see why they are important. Help parents understand how to engage young children in developmentally-appropriate ways. (Reviewing the Family Math Literature).
- Educators build on parents' high expectations and beliefs about the importance of math: make connections between early math experiences and children's later school success. (Reviewing the Family Math Literature).
- When emphasizing math engagement in everyday, routine activities, educators provide examples of how to do so for children of all ages. Encourage families to find the math in what they are already doing. (Reviewing the Family Math Literature).
- Educators point out math opportunities in play and book reading that parents engage in with children. Identify apps and web-based resources that can give parents ideas for how to talk about math, such as Bedtime Math, and how to select high-quality media. (Reviewing the Family Math Literature).
- Educators develop adult-only events that provide engaging opportunities to try out math activities in a low-pressure, distraction-free setting. Ensure that parents are able to attend by providing separate, simultaneous activities for children. (Reviewing the Family Math Literature).
- Educators connect with other community-based partners to maximize the reach of family math events, drawing on the distinct resources of schools and community settings, such as community centers hosting and promoting events organized by schools. (Reviewing the Family Math Literature).
- Educators implement strategies for parent peer-to-peer outreach, such as parent ambassadors, to broaden school-to-home communication strategies and reach more families. Collaborate with parents and family members to develop culturally responsive and relevant events and resources. (Reviewing the Family Math Literature).
- Researchers include more heterogeneous families in both exploratory studies and intervention studies to expand knowledge beyond highly-educated, middle class White families. This will provide critical information about how to support family math engagement across a wide range of life circumstances and cultural differences. (Reviewing the Family Math Literature).
- Researchers utilize open-ended methodologies to examine children's opportunities to participate in family- or community-centered math activities in addition to child-centered activities. Consider work focusing on particular communities or cultural contexts to focus on developing asset-based models of family engagement and ensure that comparative studies do not frame differences as deficits. (Reviewing the Family Math Literature).
- Researchers build on research indicating that culture and SES have qualitative impacts on parents' school involvement. Consider how context may impact the best ways to reach and connect with families, including examining potential pathways for reaching families outside of school. (Reviewing the Family Math Literature).
- Since expectations and attitudes are some of the most robust predictors of math achievement, research should examine the impact of interventions on these aspects of family math. Approaches should attempt to address math attitudes and beliefs directly, or indirectly through interventions aimed at increasing the quantity or quality of family math engagement.

(Reviewing the Family Math Literature).

- Researchers conduct studies that evaluate the long-term outcomes and sustainability of family math interventions, as well as the feasibility of implementing programs on a large scale. Examine how to design interventions that are flexible in building on the strengths of diverse families. (Reviewing the Family Math Literature).
- Researchers continue to examine the characteristics of family math engagement that are most predictive of children's math learning, and whether these vary across sociocultural contexts. Research has often linked formal math activities—where children's math learning is the focal point of the activity—to math achievement. In order to identify general principles across diverse family contexts, it is critical to examine what features of these activities or family practices during these activities most effectively support children's learning. (Reviewing the Family Math Literature).

Policies

- Expand non-school-based efforts; provide funding to integrate math into community spaces (like museums, libraries, and grocery stores) and connect families with community resources. Engage and partner with individuals already involved in community and connected to families. (Reviewing the Family Math Literature).
- Incorporate family math into early math curricula to support early educators in promoting family engagement by 1) emphasizing early math skills that predict later achievement; and 2) ensuring alignment between the math concepts learned in school and at home. (Reviewing the Family Math Literature).
- Ensure that work is implemented at the local level to reflect family and community context. What are the shared cultural practices or community settings that can be utilized to promote family math? What are the unique needs to consider, such as languages spoken, or types of resources that are limited? How can supports or resources be adapted to fit the cultural contexts and values of families in the area? (Reviewing the Family Math Literature).
- Develop avenues such as online platforms, workshops, or conferences for those involved in family math to share ideas. (Reviewing the Family Math Literature).
- Create initiatives for new resources to be accessible for diverse families. Situate no- or low-cost family math events or installations in underserved communities. Consider opportunities to enlist the support of local organizations or businesses. (Reviewing the Family Math Literature).
- Include family engagement in professional development to help practitioners view parents as partners in education, in order to engage and empower families. (Reviewing the Family Math Literature).

Community resources

Practices and Policies

Practices

- Invest in places that build social capital, such as schools, libraries, community centers, and parks. (Alliance for Early Success)
- Parents find after-school activities for their children that provide literacy enrichment and summer learning activities that protect against summer learning loss (Annie E. Casey Foundation).
- Institutions help parents complete their own education, both as a way to improve families' economic self-sufficiency and because of the positive impact it has on children's school success (Annie E. Casey Foundation).

18 Do students have access to STEM and math-focused summer enrichment programming?

Why it matters

After-school programming: Research shows that students who participate in STEM-focused after-school programs experience significant gains in mathematics and science achievement. A study by Chi, Freeman, & Lee (2020) found that students who engaged in after-school STEM programs demonstrated improved problem-solving skills, mathematical reasoning and overall academic performance compared to their peers who did not participate. After-school programs offer opportunities for parental involvement and community support, reinforcing the importance of STEM learning. The Afterschool Alliance (2021) reported that parental engagement in STEM programs significantly enhances children's motivation and learning outcomes.

Summer enrichment programming: Too many children lose ground during the summer months. Children of all socioeconomic groups make similar achievement gains during the school year (relative to their starting points), but research shows that children experiencing poverty fall behind during the summer by as much as two months of reading achievement — while their middle-income peers make slight gains. (Annie E. Casey Foundation). Summer learning experiences during the early school years also substantially account for higher achievement in terms of placement in a college preparatory track, high school completion and attendance at a four-year college (Annie E. Casey Foundation).

After-school programming

Indicators

Contributing indicators

- Percent of children participating in an afterschool program by race/ethnicity, age-level, income level. (Afterschool Alliance, "America after 3PM").
- Percent of students, particularly from historically marginalized communities, attend math and STEM related after school programming.
- Percentage of children in K-12 alone and unsupervised between 3 and 6 p.m. (Afterschool Alliance, "America after 3PM").
- Percentage unmet demand for afterschool programs (i.e. children not in an afterschool program, but would be enrolled if a program were available). (Afterschool Alliance, "America after 3PM").
- Percent of non-participant children likely to participate in an afterschool program by age,

income level, and race/ethnicity. (Afterschool Alliance, "America after 3PM").

Systems indicators

- Percentage of parents who agree that afterschool programs provide the following benefits: provide children opportunities to be physically active, provide working parents peace of mind knowing that their children are safe and supervised, help working parents keep their jobs, provide children opportunities to gain interest and skills related to STEM, keep kids safe and out of trouble, provide healthy beverages, snacks or meals, provide children opportunities to engage with their peers and reduce unproductive screen time, provide children opportunities to learn life skills, like the ability to communicate and work in teams, provide children opportunities to build confidence, provide children opportunities to learn responsible decision-making, allow kids to build positive relationships with caring adults and mentors, reduced likelihood that youth will use drugs or engage in other risky behaviors, help children become more excited about learning and interested in school, helping them improve their attendance in and attitude toward school, help parents build connections to their child's school day education. (Afterschool Alliance, "America after 3PM").
- Average annual spending on all out-of-school time activities by household income bracket. (Afterschool Alliance, "America after 3PM").
- Percentage of parents who report that their child participates in the following organized after school activity by income bracket: organized team sport, special lessons (like art, music or dance lessons), clubs (like computer coding, leadership and chess), religious activities, volunteering, scouting. (Afterschool Alliance, "America after 3PM").
- Afterschool program's average time meeting per week, days and hours. (Afterschool Alliance, "America after 3PM").
- Afterschool program's average cost per week. (Afterschool Alliance, "America after 3PM").
- Percent of parents who receive government assistance with the cost of afterschool programs, and average amount of weekly assistance. (Afterschool Alliance, "America after 3PM").
- Percentage of parents (disaggregated by income-level) reporting that the following were an important reason for their decision not to enroll their child in an afterschool program: afterschool programs are not available in my community, my child doesn't have a safe way to get to/come home from programs, afterschool programs' hours of operation don't meet my needs, afterschool programs' locations aren't convenient, afterschool programs are too expensive. (Afterschool Alliance, "America after 3PM").
- Afterschool program providers (e.g., public schools, private schools, boys & girls clubs, city or towns, YMCAs). (Afterschool Alliance, "America after 3PM").
- Percentage of parents reporting that they are satisfied with the following in their child's afterschool program: safety of environment, knowledgeable and caring staff, opportunities to build life skills, physical activity opportunities, opportunities for reading or writing, homework or academic help, snacks/meals including healthy options, opportunities to experience the outdoors, STEM learning opportunities, college or career exploration or readiness, programming to reduce risky behaviors, ability to learn responsible decision-making, reading or writing time, time to build life skills, music or arts, parent/family activities, service learning or community service, cultural programming, addressing their child's special needs. (Afterschool Alliance, "America after 3PM").
- Percentage of parents who agree that their child's afterschool program provides the following supports, by grade level of their child in afterschool: allowed parents to keep their job or work more hours, helped parents build

skills through classes and/or workshops, helped parents connect with community resources. (Afterschool Alliance, "America after 3PM").

- Percentage of parents in favor of public funding for afterschool programs. (Afterschool Alliance, "America after 3PM").

Practices and Policies

Practices

- Ensure high-quality programs are accessible for full days, during non-traditional hours, before and after school, and over the summer (Alliance for Early Success).
- Support home-based care providers in enhancing learning opportunities for children in their care (Alliance for Early Success).
- Universal access to, and greater use of, high-quality programs for child care, early learning, school readiness, pre-school, K-3, after-school, and summer learning experiences (Annie E. Casey Foundation).
- Explore parent attitudes toward and perceptions of STEM learning overall and how they may impact demand for afterschool STEM opportunities. In particular, explore how parents in rural and suburban communities view STEM learning and the role STEM learning can play in building their children's interest and skills in STEM fields. (Afterschool Alliance).
- Increase the computer science and technology and engineering programming available in afterschool. Progress has been made in increasing access to technology and engineering in afterschool since the last America After 3PM survey, but it still remains the least common STEM learning activity in afterschool programs, according to parents. Afterschool programs are often cited as an ideal space for technology and engineering programming, due to the flexible environment and frequency of hands-on project-based learning. (Afterschool Alliance).
- Increase partnerships between the larger STEM education community and afterschool programs. Recent federal STEM education strategies and initiatives highlight afterschool and informal STEM learning, but these relationships and partnership opportunities should be expanded further. STEM-rich institutions like colleges and universities, national labs, and science centers and museums hold immense STEM expertise and resources that can be tapped to support afterschool through expanded training and professional development, technical assistance, and in-kind and financial resources. (Afterschool Alliance).
- Improve assessment measures of afterschool STEM learning America After 3PM provides data on the availability of afterschool STEM learning opportunities for children and the demographics of students with access to those opportunities, but assessment tools that measure the quality of the offerings and the outcomes associated with them are necessary to understand if there are further discrepancies based on a student's income, ethnicity, and/or geography. The findings from America After 3PM outline gaps between families with lower incomes and higher incomes related to the frequency of offerings and variety of STEM activities, but do not shed light on how these programs impact participating students. Further studies that assess STEM learning, particularly large-scale longitudinal studies, are needed to better understand how different approaches can lead to differing outcomes related to lifelong engagement with STEM. These large-scale studies can also provide valuable insight into any differences that higher frequency and variety of STEM activities between families with lower or higher incomes may have on outcomes of participants.

Summer programming

Indicators

Contributing indicators

- Percent of students, particularly from historically marginalized communities, who attend math and STEM related summer programming

Systems indicators

- Time on task. The amount of productive time on task is positively linked to student achievement (Harnischfeger and Wiley, 1976; Lomax and Cooley, 1979; Fisher et al., 1980; Karweit and Slavin, 1982; Hawley et al., 1984; Karweit, 1985). The efficacy of summer programs to improve student learning is a function of the amount of exposure students receive to instruction—in terms of both attendance and real classroom instruction. Potential data measure: The classroom observation protocol has a running log of minutes spent on instruction versus non-instruction and categorizes the type of instruction occurring throughout the class. (Rand, Getting to Work on Summer Learning).
- Individualized attention. Individualized attention is linked to achievement gains in summer programs (Cooper et al., 2000). Potential data measure: Observers recorded each instance of a teacher's extended attention (at least three minutes) to an individual student or small group of students (without noting quality of that interaction). (Rand, Getting to Work on Summer Learning).
- Student engagement. Student engagement in tasks leads to greater academic achievement (Skinner, Kindermann and Furrer, 2009). Potential data measure: At ten-minute intervals throughout the sessions, classroom observers counted the number of students who were visually disengaged from the designated classroom activity at that moment. (Rand, Getting to Work on Summer Learning).
- Observation protocols could include a basic measure of instructional quality (whether the lesson objective was stated and followed) and a log of minutes according to type of classroom activity, including active participation by students in discussion, students' use of manipulatives, activity hubs, and students' direct engagement with reading connected texts and writing (as opposed to more rote tasks such as worksheets, list making, and filling in blanks). (Rand, Getting to Work on Summer Learning).
- Results from student satisfaction surveys and parent surveys. Parent surveys could ask about how they heard of the summer learning program; reasons for enrolling their child; satisfaction with aspects of the program such as instruction in English language arts (ELA) and mathematics, enrichment offerings, food, and transportation; any barriers to participation and attendance; and likelihood of enrolling their child next year. (Rand, Getting to Work on Summer Learning).
- Academic Teacher Surveys asking about the quality and pacing of the curricula, student ability, differentiation of instruction, availability of needed materials and supports, professional development, motivatio for teaching during the summer, attitudes toward summer programs, methods of engaging students, interactions with parents, use of data, support from site coordinator and district officials, and enablers and challenges to providing high-quality summer instruction. (Rand, Getting to Work on Summer Learning).
- Enrichment Instructor Surveys asking about training and experience, availability of needed materials and supports, professional development, methods of engaging students, interactions with parents, support from site coordinators and district officials, and relationships with school personnel. (Rand, Getting to Work on Summer Learning).
- To understand costs per student served, express costs on not just a per-enrollee basis, but also on a per-attendee, per-hour basis. (Rand, Getting to Work on Summer Learning).

Practices and Policies

Practices

- Systems design summer learning programs to according to best practices (RAND)
- Academic content that complements curricular standards and is taught by at least one experienced, trained teacher per classroom (Child Trends).
- Academic classes that are limited to 15 students, with at least two adults (one lead teacher and one teaching assistant, for example) (Child Trends).
- Group learning that is complemented with individual support (Child Trends).
- Fun and engaging activities that are used to teach concepts (Child Trends).
- Hands-on activities that are used to teach concepts (Child Trends).
- Concepts that are grounded in a real-world context (Child Trends).
- Identifying effective summer learning programs and approaches and replicating them (Child Trends).
- Extending effective school-year, out-of-school time programs that have academic components through the summer (Child Trends).
- Establishing extended-year or year-round schools that incorporate practices and approaches from effective summer learning programs (Child Trends).
- Universal access to, and greater use of, high-quality programs for child care, early learning, school readiness, pre-school, K-3, after-school, and summer learning experiences (Annie E. Casey Foundation).
- Planning a summer program: Launching a summer program is akin to starting a new school year, but with less time for planning and execution. A good planning process may be the most important characteristic of a strong program: It reduces logistical problems and increases instructional time for students. (1) Start early and be inclusive. Commit to having a summer program by December/January. Include both district and site-level staff in the planning process. Centralize some decision-making. Deliver planning templates to site leaders; (2) Meet regularly and be comprehensive in scope. Conduct regular and productive meetings before the program starts. Plan for enrichment activities as well as academics; (3) Clearly delineate roles. Among program leaders, external partners, and summer site leaders, determine who will plan for what and who will be responsible for what during the summer. (4) Establish firm enrollment deadlines and keep electronic student records. (Rand, Getting to Work on Summer Learning).
- Curriculum and instruction: Summer programs are short and often provide little time for teachers to plan their lessons. To maximize the effectiveness of instruction, teachers must have high-quality curricular materials, matched to student needs and small class sizes. These strategies, which characterized the best curriculum and instruction across districts, are likely to lead to stronger student outcomes. (1) Anchor the program in a commercially available and evidence-based curriculum. (2) Standardize the curriculum across district sites; (3) Include strategies for differentiation in curriculum materials to accommodate at least two ability levels; (4) Structure the program to ensure sufficient time on task; (5) Instruct students in small classes or groups; (6) Provide support to students with special needs. (Rand, Getting to Work on Summer Learning).
- Teacher selection and training: According to the research, teaching quality has the largest school-based impact on student outcomes of any factor. Hiring effective teachers and giving them the support they need are critical steps to maximizing student achievement. (1) Recruit and hire the right teachers. Develop rigorous selection processes to recruit motivated teachers. Take teachers' school-year performance into consideration. Hire teachers with grade-level and subject-matter experience and, if possible, familiarity with the students. Negotiate with teachers' unions, if necessary, to establish a competitive selection process; (2) Give teachers sufficient training and ongoing support. Familiarize teachers with the summer curriculum and how to teach it. Help teachers tailor the curriculum for students with

different aptitudes. Provide ongoing support to implement the curriculum. Include all instructional support staff in academic training sessions. Give teachers time to set up their classrooms in advance. (Rand, Getting to Work on Summer Learning).

- Enrichment activities: All districts included fun and engaging enrichment activities such as the arts, sports, and science exploration to differentiate their programs from traditional summer school and to attract students and promote attendance. Some good practices characterized the most well-organized and engaging activities we observed in the districts. (1) Keep class sizes small and select providers with well-qualified staff who have experience in behavior management. (2) Conduct careful planning if enrichment is supposed to be integrated with academics. (Rand, Getting to Work on Summer Learning).
- Attendance: Research has confirmed the common-sense notion that in order for students to benefit from summer programs, they must attend regularly. In addition to offering enrichment activities, some districts adopted other effective strategies for maintaining good attendance. (1) Set enrollment deadlines; (2) Establish a clear attendance policy; (3) Provide field trips and other incentives for students who attend. (4) Keep in mind it is not necessary to disguise academics to boost attendance. (Rand, Getting to Work on Summer Learning).
- Time on task: The ultimate goal of summer learning programs is to improve academic achievement. Besides providing high-quality instruction and achieving good attendance, a program needs to be structured to provide a sufficient amount of time on academics to improve performance. (1) Operate the program for five to six weeks; (2) Schedule three to four hours a day for academics and focus on academic content during those hours. (Rand, Getting to Work on Summer Learning).
- Program cost and funding: Cost is a key barrier in creating and sustaining summer learning programs. However, districts can better estimate and minimize costs—as well as maximizing value from an investment in summer learning—by following these recommendations. (1) Design the summer program with costs in mind. To control fixed costs, avoid assigning small numbers of students to many sites. Use enrichment providers to help leverage additional funds and provide a full-day program. Hire staff to achieve desired student-to-adult ratios based on projected daily attendance, not the initial number of enrollees. Operate full-day programs for five to six weeks; (2) Put resources into tracking and boosting attendance; (3) Use effective cost-accounting practices. To understand costs per student served, express costs on not just a per-enrollee basis, but also on a per-attendee, per-hour basis. Set up data procedures to enable cost tracking on a per-attendee, per-hour basis. (Rand, Getting to Work on Summer Learning).

Policies

- The Texas Workforce Commission offers grants to support free or low-cost summer STEM camps across Texas. In 2023, over 1,200 middle school students participated in coding and robotics camps through this initiative. Institutions like Stephen F. Austin State University has received up to $100,000 to host STEM camps featuring activities such as drone programming, virtual reality, and biology labs (Texas Workforce Commission).
- CyberSavvy Futures Grant Program: The North Dakota Department of Public Instruction offers this program with $1 million in grants to support summer learning programs focused on artificial intelligence, cybersecurity, and other STEM subjects for K-12 students. Eligible organizations include public school districts, tribal schools, and colleges. The application deadline is May 1, with funds to be spent by the end of September (The Center for Digital Education).
- STEM Summer Academies: Offered by the Oklahoma State Regents for Higher Education (OSRHE), this program supports STEM summer academies (Oklahoma State Regents for Higher Education).

Positive School Environment

Positive school environments foster safety, inclusivity and holistic child development. Schools can intentionally cultivate a strong math identity by helping students build confidence in their ability to engage with and overcome mathematical challenges.

19 Do young learners attend schools with safe, inclusive and supportive environments?

Why it matters

Safe, inclusive and supportive environments: A sense of belonging in school contributes to improved achievement, well-being and health. When young learners feel they belong, they experience higher levels of motivation, engagement and tenacity (Education-to-Workforce Framework). Climate surveys, which measure experiences beyond academic ones, are typically used to understand the extent to which students and educators feel safe, seen and connected. Positive climate survey results are positively associated with stronger academic and behavioral outcomes (StriveTogether 2021). Children have safe, inclusive and supportive learning experiences when their identities are considered, reflected and celebrated in their learning environment. This kind of environment also offers resources that allow their teachers to provide an inclusive environment for children. Children who see themselves in books, in artwork and in characters, and who have teachers who look like them, have more equitable, engaging learning experiences (STEP Forward with Data Framework).

School and workplace racial and ethnic diversity: Greater diversity is shown to reduce intergroup prejudice and improve intelligence and innovation (Education-to-Workforce Framework). Racial

and ethnic diversity is positively associated with children's language development in early learning programs (Education-to-Workforce Framework). Workplaces with a diverse team see better employee interpersonal skills and innovation, better financial performance and less conflict (Education-to-Workforce Framework).

School and workplace economic diversity: The disparity in average school poverty rates between white and Black students is the single most important predictor of differences between their academic achievement (Education-to-Workforce Framework). The relationship between economic segregation and outcomes begins in early childhood, where children's academic achievement and social-emotional development have been linked to the average socioeconomic status of their classroom, regardless of a child's own economic or demographic background (Education-to-Workforce Framework).

School safety: School safety is a core component of a school's climate, which is linked to higher attendance and academic achievement (Education-to-Workforce Framework). Research shows disparities in students' feelings of safety according to their race and ethnicity. For example, one study found that students in schools serving predominantly Black and Latine populations report feeling less safe and having less positive peer interactions than those at schools with predominantly white and Asian populations, on average (Education-to-Workforce Framework). Even within the same schools, Black and Latine students report feeling less safe than their white and Asian peers (Education-to-Workforce Framework).

School and family engagement: School engagement with families provides benefits to students academically and socially, both in short-term school success and long-term outcomes (Education-to-Workforce Framework). Although family engagement is key to students' educational success, not all schools successfully build a culture that welcomes and engages all families, and especially families of color. For example, an analysis of parent survey data in California found that perceptions of how well the school encouraged parental involvement were significantly lower among Indigenous parents compared to other groups (Education-to-Workforce Framework).

School-family engagement
Key source: Education-to-Workforce Framework

Indicators

Contributing indicators

- Mean scores on family surveys, such as the Panorama Family-School Relationships Survey or CORE Districts School Culture & Climate Survey parent assessment of school-community engagement (Education-to-Workforce Framework).

Practices and Policies

Practices

- Invest in family engagement strategies that value parents as experts in their children's development (Alliance for Early Success).
- Set goals and track outcomes in ways that engage families in their children's learning (Alliance for Early Success).
- Co-locate or coordinate programs and services to improve family access (Alliance for Early Success).
- Community schools operate as community hubs, bringing together many partners to offer education, health and social services, and youth and community development for children, young people, parents, and other community members during extended hours and weekends (Annie E. Casey Foundation).

Policies

- States should keep prioritizing legislation that supports authentic school-home-community collaboration to improve children's reading.
- States that currently inform parents about their children's reading performance should consider modeling after states that are trying to foster genuine school-family partnerships around literacy. (Model state: Alaska) (Shanker Institute).
- Legislation in many more states could leverage libraries and other community assets to promote students' reading development. (Model state: Colorado) (Shanker Institute).
- Engaging families in their children's education is known to have a positive effect on their school readiness and later academic outcomes. Engagement strategies that are designed as a core component of an improvement plan and focused on improving educational outcomes for all children are most effective, helping to mobilize families and others in the community to share the responsibility (Shanker Institute).
- Alaska's HB 114 provides an example of giving parents a voice in their children's literacy education. The law requires that each public school in the state annually provides to parents and guardians of K-3 students current information on the importance of literacy and early reading. This includes: (1) culturally responsive intervention strategies and reading intervention services; (2) home reading plans; (3) grade progression standards and policies for the elementary school attended; (4) strategies and resources to help children learn to read; and (5) a list of resources and organizations that specialize in improving adult literacy (Shanker Institute).
- Alaska's law requires establishing a partnership with parents and guardians to support their child's literacy development through intervention services. This entails offering a "list of adult literacy resources and organizations, providing opportunities for parent or guardian participation in training workshops, and encouraging regular parent or guardian-guided home reading activities." (Shanker Institute).
- Alaska's law requires that parents and guardians be an active participant in creating their child's literacy improvement plan. This involves the development of a plan in consultation with the reading teacher, school principal, and other pertinent district staff; receiving reading progress updates each year; and acquiring strategies to use at home to help their children succeed in reading (Shanker Institute).
- Finally, Alaska's law promotes a statewide "parents as teachers" program for the benefit of children who are under 5 years of age. This home-based program includes a curriculum on early language and literacy development along with ongoing coaching to enhance parents' understanding of important child development principles and developmental milestones (Shanker Institute).
- Mississippi's 2013 Literacy-Based Promotion Act requires local school boards to submit quarterly public progress reports to parents on their students' reading progress and publish data on reading performance in a local newspaper (Bellwether).
- Legislators should ensure that parents and teachers have a voice in policy decisions. This could involve their participation in literacy committees or input through surveys or interviews. Laws should embody a spirit of collaboration; excessive prescriptiveness and rigidity, such as outright bans on practices, hinder this and can prove impractical. The emphasis should be on adaptability, respect, and positive interactions with educators and families, who are critical for the success of reading reform. Ultimately, it's parents and teachers, with their direct connection to students, who support everyday learning and bring these reforms to life (Shanker Institute).

Indicators

Contributing indicators

- Percentage of students indicating they feel safe and cared for at their school (National Education Association).
- Number of documented incidents that occurred at the school of: Robbery with a weapon; Robbery without a weapon; Physical attack or fight with a weapon; Physical attack or fight without a weapon; Threat of physical attack with a weapon; Threat of physical attack without a weapon; Rape or attempted rape; Sexual assault (other than rape); Possession of a firearm or explosive device; Shooting (regardless of whether anyone was hurt); Students, faculty, or staff deaths as a result of a homicide (Civil Rights Data Collection, Office for Civil Rights).
- Whether any of the school's students, faculty, or staff died as a result of a homicide committed at the school (Civil Rights Data Collection, Office for Civil Rights).
- Whether there has been at least one incident at the school that involved a shooting (regardless of whether anyone was hurt) (Civil Rights Data Collection, Office for Civil Rights).
- Number of documented incidents of offenses [rape or attempted rape; sexual assault (other than rape)] committed by a student that occurred at the school (Civil Rights Data Collection, Office for Civil Rights).
- Number of documented incidents of offenses [rape or attempted rape; sexual assault (other than rape)] committed by a school staff member that occurred at the school.
- Number of allegations made against a school staff member of offenses [rape or attempted rape; sexual assault (other than rape)] that occurred at the school, which were followed by a resignation or retirement prior to final discipline or termination (Civil Rights Data Collection, Office for Civil Rights).
- Number of allegations made against a school staff member of offenses [rape or attempted rape; sexual assault (other than rape)] that occurred at the school, which were followed by a determination that the school staff member was responsible for the offense (Civil Rights Data Collection, Office for Civil Rights).
- Number of allegations made against a school staff member of offenses [rape or attempted rape; sexual assault (other than rape)] that occurred at the school, which were followed by a determination that the school staff member was not responsible for the offense (Civil Rights Data Collection, Office for Civil Rights).
- Number of allegations made against a school staff member of offenses [rape or attempted rape; sexual assault (other than rape)] that occurred at the school, which had a determination that remained pending (Civil Rights Data Collection, Office for Civil Rights).
- Number of allegations made against a school staff member of offenses [rape or attempted rape; sexual assault (other than rape)] that occurred at the school, which were followed by a duty reassignment prior to final discipline or termination (Civil Rights Data Collection, Office for Civil Rights).
- Number of reported allegations of harassment or bullying of K-12 students on the basis of: sex; sexual orientation; gender identity; race, color, or national origin; disability; religion (Civil Rights Data Collection, Office for Civil Rights).
- Number of reported allegations of harassment or bullying of K-12 students on the basis of perceived religion (disaggregated by atheism/agnosticism; Buddhist; Catholic; Eastern Orthodox; Hindu; Islamic (Muslim); Jehovah's Witness; Jewish; Mormon; multiple religions,

group; other Christian; other religion; Protestant; Sikh) (Civil Rights Data Collection, Office for Civil Rights).

- Number of K-12 students reported as harassed or bullied on the basis of: sex; race, color, or national origin; disability [disaggregated by race, sex (male, female, nonbinary), disabilityIDEA, disability-Section 504 only, EL] (Civil Rights Data Collection, Office for Civil Rights).
- Number of K-12 students disciplined for engaging in harassment or bullying on the basis of: sex; race, color, or national origin; disability [disaggregated by race, sex (male, female, nonbinary), disability-IDEA, disability-Section 504 only, EL] (Civil Rights Data Collection, Office for Civil Rights).

Systems indicators

- Percentage of students reporting high levels of physical, mental and emotional safety in school climate surveys, such as the U.S. Department of Education ED School Climate Surveys (EDSCLS), the Sense of Safety subscale within the CORE Districts school culture and climate survey, or the School Safety subscale within the Panorama Student Survey (Education-to-Workforce Framework).
- Percentage of educators surveyed indicating they feel safe and cared for at their school (National Education Association).
- Percentage of public school employees in each job category who have received in-service training on intervention techniques, such as restorative practices (National Education Association).
- Schools report disaggregated data on incidents of student bullying on a daily or weekly basis (National Education Association).
- Percentage of program sites that ensure the safety and security of children and workforce members, in programs where focal populations make up at least half of the student population (STEP Forward with Data Framework).
- Student-to-counselor ratio and access to school social workers.
- Whether an LEA has a written policy or policies prohibiting harassment or bullying of students on the basis of all of the following: sex; race, color, or national origin; disability (LEA) (Civil Rights Data Collection, Office for Civil Rights).
- Web link to policy or policies prohibiting harassment or bullying of students on the basis of all of the following: sex; race, color, or national origin; disability (LEA) (Civil Rights Data Collection, Office for Civil Rights).
- Whether an LEA has a written policy or policies prohibiting harassment or bullying of students on the basis of: sexual orientation; gender identity; or religion (LEA) (Civil Rights Data Collection, Office for Civil Rights).
- Web link to policy or policies prohibiting harassment or bullying of students on the basis of: sexual orientation; gender identity; or religion (LEA) (Civil Rights Data Collection, Office for Civil Rights).

Practices and Policies

Practices

- Facilities that are safe, healthy, inviting, welcoming, and conducive to teaching and learning (Annie E. Casey Foundation).
- Districts educate all school personnel on intervention techniques in incidents of student bullying and harassment, such as restorative practices and Positive Behavioral Intervention and Supports (PBIS) (National Education Association).

Policies

- Districts allocate resources toward interventions around student safety issues (e.g., LGBTQ+ bullying and harassment) (National Education Association).

Indicators

Contributing indicators

- Percentage of students in K-12 reporting belonging in school, as measured by surveys such as the Sense of Belonging subscale of the CORE Districts school culture and climate survey, the Classroom Belonging subscale of the Panorama Student Survey, or the Elevate survey's Affirming Identities and Classroom Community scales (Education-to-Workforce Framework).
- Percentage of students experiencing mechanical versus physical constraint and seclusion (Data source: Civil Rights Data Collection) (StriveTogether 2021).
- Percentage of students experiencing school-related arrests (Data source: Civil Rights Data Collection) (StriveTogether 2021).
- Percentage of students receiving in-school or out-of-school suspensions (Data source: Civil Rights Data Collection) (StriveTogether 2021).
- Sense of belonging and connection to school community (Data sources: Youth Risk Behavior Survey; local school climate surveys) (StriveTogether 2021).
- Student perceptions of their school's inclusion of their history, culture and racial identity (Data sources: Local school climate surveys) (StriveTogether 2021).

Systems indicators

- Percentage of teachers who have received professional development in culturally-responsive pedagogy (National Education Association).
- Percentage of teachers who have received professional learning time in equity and racial and social justice (National Education Association).
- Percentage of teachers who have received professional learning time in implicit bias (National Education Association).
- Percentage of teachers who have received professional learning time in trauma-related practices (National Education Association).
- Measurement of bullying, harassment and discrimination (Data sources: Youth Risk Behavior Survey; local school climate surveys) (StriveTogether 2021).
- Schools annually report on school climate and student engagement (National Education Association).
- Schools have data-driven, site-based school climate and student engagement plans (National Education Association).
- Percentage of programs where classrooms demonstrate equitable socio-cultural interactions (STEP Forward with Data Framework).
- Percentage of system-level funding that is allocated to equity-focused activities targeted to children, families and/or workforce members from focal populations (STEP Forward with Data Framework).
- Social and Emotional Bridging: Teacher creates a positive classroom environment that deconstructs social boundaries between teacher and students. Teacher shares their humanity (e.g., opinions, likes, stories, personal details) and seeks to relate to students in ways that recognize students' humanity (i.e., seeing them as whole people, not just as students). Teacher and students share emotions and experiences that help each other become "seen" and "known." (Matthews et al., Belonging-Centered Instruction).
- Communal Orientation: Teacher promotes a "we're in this together" orientation with their students. Teacher supports a climate of

communalism over individualism across the social dynamics within the classroom. Teacher maintains a vested interest in the academic and social growth of the group, and in relying on one another to achieve that growth. (Matthews et al., Belonging-Centered Instruction).

- Empathetic Awareness and Support: Teacher is conscious of individual students' strengths, emotions, physical wellbeing, and resource needs. Teacher supports individual students' emotional and psychological health, and demonstrates that individual students matter in the life of the classroom. Teacher emphasizes students' value regardless of mathematical ability. (Matthews et al., Belonging-Centered Instruction).
- Safety to Be Wrong: Teacher creates a space where students do not feel stigmatized for wrongness or needing support. Teacher disarms and normalizes wrongness. Students have the opportunity to break the pattern of judging their mathematical belongingness simply based on correctness. Mastery and effort are celebrated over performance and talent. (Matthews et al., Belonging-Centered Instruction).
- Decentering Teacher Authority: Teacher indicates that students' mathematical methods/ ideas have real value (worth). Teacher positions students as knowledgeable authorities in mathematics. Students have a sense that their intellectual contributions matter in the life of this classroom. (Matthews et al., Belonging-Centered Instruction).
- Mathematics to Know Myself & My World: Teacher provides opportunities to use mathematics to support student agency, empower cultural identity, understand the world, and critique their social world. (Matthews et al., Belonging-Centered Instruction).
- High Standards & Rigorous Support: Teacher communicates high standards for students while also providing support to help students achieve these standards. Teacher implicitly or explicitly communicates that they expect consistent mathematical effort and high-level performance. However, beyond high standards and support, the teacher cultivates the belief within students that they can fulfill the high expectations by instilling confidence and/ or sharing strategy. (Matthews et al., Belonging-Centered Instruction).

Practices and Policies

Practices

- Districts dedicate professional learning time to culturally-responsive pedagogy (National Education Association).
- Districts dedicate professional learning time to equity and racial and social justice (National Education Association).
- Districts dedicate professional learning time to implicit bias (National Education Association).
- Districts dedicate professional learning time to trauma-informed practices (National Education Association).
- Equity does not mean equal. Equity is not just about treating all students equally, but rather about recognizing and addressing the unique needs and strengths of each individual student. This means acknowledging that students have different learning styles, abilities, and backgrounds, and adapting our teaching practices to meet these differences (National Council of Teachers of Mathematics).
- Focus on the individual. Learning students' names is only the first step in developing a relationship with those individuals. The more teachers understand and respect the individual's background and strengths, the more they understand their needs (National Council of Teachers of Mathematics).
- Create a safe and inclusive learning environment. Creating a safe and inclusive learning environment is crucial for promoting equity and diversity. Teachers can start with classroom decor, organization, and set-up.

Ensure that classroom displays include positive messages and representations of the different cultural backgrounds of your students. Consider adding posters that suggest a "safe space" to make students feel welcome and valued (National Council of Teachers of Mathematics).

- Address biases and cultivate an equitable classroom. It is essential for educators to acknowledge and address their own biases, recognizing the impact they can have on students. Teachers should take proactive steps to develop cultural competence and create a learning environment that values diversity and promotes equity. Incorporate a range of instructional strategies, such as manipulatives, visuals, projects, and technology, to meet the diverse needs and strengths of your students (National Council of Teachers of Mathematics).

Policies

- Districts allocate funds to advance educators' awareness of implicit bias (National Education Association).
- Districts allocate funds to advance educators' competence in culturally-responsive pedagogy (National Education Association).
- Districts allocate funds to advance educators' understanding of equity and racial and social justice (National Education Association).
- Districts allocate funds to advance educators' understanding of trauma-informed practices (National Education Association).
- Districts allocate resources to a workforce wellness and safety program, ensuring educators of color and LGBTQ+ educators feel safe and cared for in their schools (National Education Association).
- State develops a policy that requires annual reporting by school on school climate and student engagement (National Education Association).
- Fostering positive learning environments for students, including by reducing class sizes, developing programs that prevent bullying, moving away from punitive disciplinary practices and applying other trauma-informed practices (Urban Institute).

School and workplace racial and ethnic diversity

Key source: Education-to-Workforce Framework

Indicators

Contributing indicators

- Student body composition by race and ethnicity (Education-to-Workforce Framework).
- Student body composition by race and ethnicity. Student and employee demographics are reported regularly in administrative data systems. Unlike postsecondary institutions and employers, however, pre-K and K– 12 institutions have less direct control over the demographics of their populations. Thus, this indicator should be used to identify policy solutions to address ongoing segregation rather than penalize institutions. (Education-to-Workforce Framework)

Systems indicators

- Student body composition by income (Education-to-Workforce Framework).
- Share of students attending high-poverty schools, by race or ethnicity (Urban Institute).

Practices and Policies

Practices

- Use of research and data tools to understand school and workplace socioeconomic diversity to understand equity issues and trends (National Equity Atlas).

Policies

- Creating more equitable school attendance boundaries (Urban Institute).
- Developing centralized school lottery application systems that prioritize school diversity (Urban Institute).
- Ending school and neighborhood segregation, including by expanding affordable housing in resource-rich neighborhoods and reforming zoning policies to allow for more diverse, high-density, mixed-income communities (Urban Institute).
- Implementing more equitable school funding policies and advocating for reforms to state and federal funding (Urban Institute).

Class size and environment

Practices and Policies

Practices

- In schools with many students who are off track to graduate, the WWC recommends creating small, personalized learning communities. By grouping students into small communities of no more than a few hundred students, teachers and other school staff can be better equipped to implement other interventions, including providing students who are off track with intensive, individualized support. The WWC notes that in small, personalized communities, staff can check in with students more frequently, pay closer attention to their needs, and form stronger and more meaningful relationships with them. As the relationships between students, teachers, and other school staff grow, students may develop a greater sense of belonging in the school community, thus helping them stay engaged in school. (EW Framework).

Community engagement

Practices and Policies

Practices

- Community Math Nights build the capacity of educators and community members to learn, plan, collaborate and take action toward transforming practices and student learning in mathematics classrooms. These sessions actively engage participants as learners – developing common understandings of innovative instructional practices that support student learning in today's classroom. Math Night sessions generate informed, independent decision-making and parent knowledge of how to help their child with math. These sessions also build support for teachers and students as current practices in mathematics classrooms are being advanced. (Mathematics Education Collaborative).
- Community Walks: Learning from Stakeholders Outside of the School Community. Preparing preservice and beginning K-8 mathematics teachers to understand their students and surrounding communities requires active participation in community events and investment in relationships with parents and families as major stakeholders in the success of their students' education. Shande King and others at the Association of Mathematics Teacher Educators (AMTE) propose that an understanding of the community and a promotion of activism toward change values social justice-oriented mathematics lessons that help students view mathematics as a tool to understand inequities and social problems in the world. (King et al., Learning from and with the Community).

- Service Learning: Empowering Students with Social Justice Mathematics. With an eye specifically on preservice and beginning teachers, Shande King and others at the Association of Mathematics Teacher Educators (AMTE) propose this model for service-learning experiences within the framework of an undergraduate teacher preparation program and experiences that promote growth in preservice teachers' practices in the classroom. By volunteering at family and community events, especially ones that promote positive mathematics learning beyond the classroom such as family mathematics or STEM nights and after-school mathematics clubs, preservice teachers see the value in promotion of positive mathematics learning for both students and parents, particularly for students in underrepresented and marginalized populations. By actively engaging students in mathematics learning that is personal and relevant in their own communities, preservice and practicing mathematics teachers alike promote student adoption of agency of their own mathematics learning (Buenrostro & Radinsky, 2019). (King et al., Learning from and with the Community).
- Book Study Community: Learning with the School Community. Research has shown that book clubs are valuable resources for teachers and preservice teachers to have a more relaxed and social environment for engaging with other teachers who, by structure of the book club, are on an equal level (Mensah, 2009). (King et al., Learning from and with the Community).

20 Do young learners attend schools that support their social, emotional and physical development and well-being?

Why it matters

Social-emotional skills: Social-emotional skills are just as essential as cognitive skills for school success. These skills include the ability to manage emotions, follow directions, take turns, share, take responsibility, work independently and cooperatively, and stick with a task; motivation; enjoyment of learning; and the executive function — an ability to control oneself, make plans, learn rules, act appropriately and think in abstract terms (Annie E. Casey Foundation).

Schools can be a critical place to access support for students' physical, mental and social-emotional health. For example, three out of four students who ever access mental health services do so through their school (Education-to-Workforce Framework). Schools that provide access to nurses, school psychologists and social workers tend to see improved learning outcomes, school climate and student well-being (Education-to-Workforce Framework).

Children experiencing poverty who are rated relatively high on social skills in kindergarten and first grade tend to have better literacy skills than children with low social skills ratings, a trend

that continues into third grade (Annie E. Casey Foundation).

Access to health, mental health and social supports: Regular well-child visits provide an opportunity for health professionals to monitor children's physical and behavioral health and development, provide age-appropriate guidance to parents and screen for maternal depression (Rhode Island Kids Count). Well-child visits screen children for common concerns in early childhood, including lead poisoning, hearing and vision problems, behavior problems and delayed speech and language development (Rhode Island Kids Count). Timely, age-appropriate immunizations usually indicate that a child has access to regular medical care. Vaccines are cost-effective tools that prevent children from developing severe diseases (Rhode Island Kids Count).

Social-emotional skills *Key source: Education-to-Workforce Framework*

Indicators

Contributing indicators

- Percentage of students in K-12 reporting a high level of social awareness on surveys such as the CORE Districts SEL Survey social awareness scale, or percentage of students meeting benchmarks on teacher ratings of social skills drawn from Elliott and Gresham's Social Skills Rating Scale (Education-to-Workforce Framework).
- Percentage of youth in K-12 with mental or emotional health needs as identified by a universal screening tool. For a list of mental health screening tools that may be appropriate for school-based use, see the following guide from the National Center on Safe Supportive Learning Environments: "Mental Health Screening Tools for Grades K-12" (Education-to-Workforce Framework).

Practices and Policies

Practices

- Encourage play to help develop social, emotional, and executive function skills. (Alliance for Early Success)
- Respect diverse perspectives and model active listening. Imagine a classroom where every student is empowered to reach their full potential. As educators, you hold the key to unlocking this kind of learning environment. By creating engaging, thought-provoking lessons and fostering a culture of inclusivity, empathy, and mutual respect, you can encourage students to connect with their peers and with you. Respect diverse perspectives and model active listening to promote thoughtful, respectful discourse and participation. Embrace a growth mindset where students feel comfortable taking risks, asking questions, and learning from their mistakes. (National Council of Teachers of Mathematics).

Social capital *Key source: Education-to-Workforce Framework*

Indicators

Contributing indicators

- Percentage of students or individuals reporting a high level of social capital on surveys such as the Social Capital Assessment + Learning for Equity (SCALE) Social Capital, Network Diversity, and Network Strength scales (Education-to-Workforce Framework).
- The EW Framework recommends consulting guidance by the Christensen Institute that describes emerging practices for measuring students' social capital using a four-dimensional framework based on quantity of relationships,

quality of relationships, structure of networks, and ability to mobilize relationships (Education-to-Workforce Framework).

- A student has strong developmental relationships, that is, close connections through which young people discover who they are, gain abilities to shape their own lives, and learn how to interact with and contribute to the world around them. A developmental relationship is distinct from more generalized notions of positive relationships in that it is defined by the combination of five interconnected elements: express care, challenge growth, provide support, share power, and expand possibilities. (Search Institute, Social Capital Assessment).
- A student has access to the resources provided by developmental relationships. Resources can include things such as financial or material help, information, skill-building opportunities, guidance, and values and norms. The following social capital measure focuses on three types of resources: access to useful information, new connections, and skill-building opportunities. (Search Institute, Social Capital Assessment).
- Students have a web or network of developmentally-rich relationships that can provide access to valuable resources. There are several indicators that have been used to understand the quality of an individual's social network, such as network structure, size, diversity, and strength. (Search Institute, Social Capital Assessment).
- Students have people in their network who are from different cultures, racial and ethnic backgrounds, economic backgrounds, and have different skills. (Search Institute, Social Capital Assessment).
- Students have people in their network they can go to for help, trust, and feel close to, as well as people who they feel less close to (i.e., weaker tie) but who may be influential in helping them access their goals or who may connect them to others. (Search Institute, Social Capital Assessment).
- Catalysts to Mobilize Relationships and Resources: The degree to which an individual has different relationships that help build their self-awareness, confidence, relationships-building skills, and possible selves. (Search Institute, Social Capital Assessment).
- Self-Initiated Social Capital: The degree to which an individual actively builds relationships and uses the relationships and the resources they have to reach their goals. (Search Institute, Social Capital Assessment).
- Relationship-Building Skills: The degree to which an individual is able to build positive relationships with others. (Search Institute, Social Capital Assessment).
- Networking Skills: The degree to which an individual purposefully uses relationships within their social network to reach their goals. (Search Institute, Social Capital Assessment).
- Personal Identity: The degree to which an individual has a clear sense of their personal identity (Search Institute, Social Capital Assessment).
- Racial and Ethnic Identity: The degree to which an individual has a clear sense of their racial and ethnic background and what this identity means to them. (Search Institute, Social Capital Assessment).
- Sense of Purpose: The degree to which an individual has a clear sense of their life's purpose. (Search Institute, Social Capital Assessment).
- Self-Efficacy for Reaching Life Goals: The degree to which an individual feels they can successfully reach their life goals. (Search Institute, Social Capital Assessment).
- Progress Towards Education or Career Goals: The degree to which an individual reports making progress towards their education or career goals. (Leveraging Social Capital to Broaden Participation in STEM).
- Commitment to Paying It-Forward: The degree

to which an individual engages in behaviors that demonstrate a commitment to paying-it-forward to others. (Leveraging Social Capital to Broaden Participation in STEM).

- Collective Efficacy to Change Systems: The degree to which an individual feels that they can work with their program or organization to change employment and education systems. (Leveraging Social Capital to Broaden Participation in STEM).
- Occupational Identity: The degree to which an individual has a clear sense of their occupational identity. (Leveraging Social Capital to Broaden Participation in STEM).
- Job-Seeking Skills: The degree to which an individual engages in behaviors that may lead to securing employment. (Leveraging Social Capital to Broaden Participation in STEM).

Systems indicators

- To measure concentration of social capital at a systems level, users could consider an index adapted from researchers Anil Rupasingha and Stephan Goetz. Their index includes: the number of all associations per 10,000 population, including religious organizations, civic and social associations, political organizations, professional organizations, labor organizations, bowling centers, physical fitness facilities, public golf courses, and sports clubs. The measure also includes commercial and nonprofit associations drawn from Census Bureau County Business Patterns data. It also includes

  The percentage of voters who participated in a presidential, state, or county election (Education-to-Workforce Framework).

- The county-level census response rate in the person's county (Education-to-Workforce Framework).
- The number of charitable, nonprofit organizations with an office in the county (Education-to-Workforce Framework).
- Cohesiveness: The degree to which a person's social networks are fragmented into cliques. (Leveraging Social Capital to Broaden Participation in STEM).
- Economic connectedness: The degree to which low-income and high-income people are friends with each other. Studies have shown that children who grow up in communities with more economic connectedness (cross-class interaction) are much more likely to rise up out of poverty. (Leveraging Social Capital to Broaden Participation in STEM).
- Civic engagement: Rates of volunteering and participation in community organizations. (Leveraging Social Capital to Broaden Participation in STEM).
- Program Support for Social Capital Development: The degree to which an individual reports receiving forms of support as a result of participating in a program that is believed to promote social capital (e.g., skill building, increasing network size). (Leveraging Social Capital to Broaden Participation in STEM).
- Sense of Program/School Community: The degree to which an individual feels a sense of community within their program, school, or organization. (Leveraging Social Capital to Broaden Participation in STEM).
- Psychological Safety: The degree to which an individual feels their program or organization provides a safe space for them to express who they are as an individual. (Leveraging Social Capital to Broaden Participation in STEM).
- Volunteer Support: The degree to which an individual perceives that volunteers in their program or organization have provided them with social capital support (e.g., useful information, new connections). (Leveraging Social Capital to Broaden Participation in STEM).
- Seeking Volunteer Support: The degree to which an individual actively seeks social capital support from volunteers within their program or an organization (e.g., asks for information,

guidance, and other forms of instrumental support). (Leveraging Social Capital to Broaden Participation in STEM).

- Seeking Teacher/Professor Support: The degree to which an individual actively seeks social capital support from teachers, professors, and other campus staff (e.g., asks for information, guidance, and other forms of instrumental support). (Leveraging Social Capital to Broaden Participation in STEM).

Practices and Policies

Practices

- Students' social capital in STEM education (derived from families, peers, teachers, and professional networks) demonstrably promotes their STEM educational outcomes and career paths. Inclusive STEM schools, mentoring, and after-school programs are some promising approaches that can enhance STEM social capital and outcomes of underrepresented students, particularly women, Blacks/Hispanics/Native Americans, youth with low socioeconomic status, and persons with disabilities. (Leveraging Social Capital to Broaden Participation in STEM).
- In out-of-school settings, offering after-school or summer programs, such as robotics team or science summer camp, can foster peer networks and pair students with STEM mentors. These out-of-school time programs are practical social capital building strategies that can reach a large number of students across the country, especially in rural communities. (Leveraging Social Capital to Broaden Participation in STEM).
- Schools and nonprofit organizations can help cultivate social capital among young people through educational and non-educational programming (Education-to-Workforce Framework).

Policies

- Interventions such as zoning and affordable housing policies aimed at integrating neighborhoods and college admissions reforms to boost diversity on campuses can increase cross-class interaction substantially and are likely to be very valuable. (Opportunity Insights, Social Capital and Economic Mobility).
- Friending bias (i.e. the tendency for people to befriend people similar to them) can be influenced by policy changes as well. While more work needs to be done to identify what types of interventions reduce friending bias, there are a number of programs being piloted around the country that warrant further study: efforts to reduce the size of groups in which students interact and limit the divisions created by tracking in schools, changes in architecture and urban planning to foster greater interaction, and the creation of new domains for interaction via programs that seek to break down class barriers. (Opportunity Insights, Social Capital and Economic Mobility).
- Providing relevant bridging social capital may make other programs that seek to increase economic mobility more effective. For example, recent programs that have had large impacts in helping families move to higher-opportunity neighborhoods or obtain higher-paying jobs provide bridging social capital and outperform traditional programs that focus solely on economic resources or skills. These results suggest that prioritizing the provision of adequate social support so people can take advantage of available economic resources may greatly amplify the impacts of existing programs to reduce intergenerational poverty. (Opportunity Insights, Social Capital and Economic Mobility).
- Policy initiatives and programs aimed at enhancing opportunities for students to connect and engage with more interest-sharing peers and professionals in STEM fields could help them develop extended social networks that can support their educational and career pathways in STEM. ISTEMSs represent one of the latest comprehensive schoolwide reform models that

offer opportunities for students, particularly underrepresented groups, to participate in a STEM-specialized learning environment with interest-sharing peers. (Leveraging Social Capital to Broaden Participation in STEM).

- Policymakers and educators can develop and expand programs that promote STEM-oriented interactions among peers and parental involvement in STEM education both at home and at school. Creating and supporting STEM-focused clubs or study groups, in and out of school, is one approach. (Leveraging Social Capital to Broaden Participation in STEM).
- Policymakers and educators can introduce STEM-related materials or activities to the existing well-established student organizations such as Girl Scout STEM Programs and Young Men's Christian Association (YMCA) STEM Programs. (Leveraging Social Capital to Broaden Participation in STEM).
- To promote parental engagement in STEM, they must have expanded access to STEM learning resources and activities, especially for those parents without a college degree and those who are not working in STEM fields. Equally important is providing training and professional development in STEM for educators and social service providers, such as public librarians or museum staff, whose tasks involve engaging parents in their children's learning activities. (Leveraging Social Capital to Broaden Participation in STEM).
- Policy initiatives can create and facilitate well-designed mentoring programs that pair students (in particular women, under-represented minorities, low-SES students, and people with disabilities) with STEM educators or professionals who are knowledgeable and passionate about supporting students' educational and career development. Training and supporting those STEM educators or professionals in providing mentorship can help them be effective mentors for their mentees. Also helpful is partnering schools with industry organizations to offer internships for students to shadow professionals in real-world STEM settings. (Leveraging Social Capital to Broaden Participation in STEM).

Access to health, mental health and social supports *Key source: Education-to-Workforce Framework*

Indicators

Contributing indicators

- Ratio of number of students to number of health, mental health, and social services full-time equivalent (FTE) staff (for example, school nurses, psychologists, and social workers) (Education-to-Workforce Framework).
- The U.S. Department of Education's National Teacher and Principal Survey collects data on the number of FTE nurses, psychologists, and social workers among a sample of schools (Education-to-Workforce Framework).
- Percentage of eligible students enrolled in free and reduced-price school breakfast and lunch programs (National Education Association).
- Percentage of eligible students enrolled in free and reduced-price school breakfast and lunch programs (National Education Association)..
- Percentage of youth with mental or emotional health needs as identified by a universal screening tool. For a list of mental health screening tools that may be appropriate for school-based use, see the following guide from the National Center on Safe Supportive Learning Environments: "Mental Health Screening Tools for Grades K–12" (Education-to-Workforce Framework).
- Proportion of youth experiencing poor mental

health (Data Source: Youth Risk Behavior Surveillance System) (StriveTogether 2021).

Systems indicators

- Child care centers that have access to ongoing health or mental health consultation (Project Thrive, NCCP).
- Eligible schools are enrolled in free and reduced-price school breakfast and lunch programs (National Education Association).
- Ratio of number of students to number of health, mental health and social services full-time equivalent (FTE) staff (for example, school nurses, psychologists and social workers) (Education-to-Workforce Framework).
- Number and type of in-school health workers (National Education Association).
- Percentage of specialized instructional support personnel (SISP) surveyed indicating satisfaction with time dedicated toward collaboration (National Education Association).
- Percentage of programs offering health, mental health and social services, or staff or consultants providing infant and early childhood mental health consultation (IECMHC) services (Education-to-Workforce Framework).
- Proportion of schools with behavioral/mental health services and on-site staff (StriveTogether 2021).
- Percentage of programs offering health, mental health and social services in-house, including staff or consultants providing infant and early childhood mental health consultation (IECMHC) services (STEP Forward with Data Framework).

Practices and Policies

Practices

- Invest in strategies that address the behavioral and mental health of children and the adults who care for them. (Alliance for Early Success)
- Districts provide adequate resources for student-to-specialized instructional support personnel (SISP) to collaborate with teachers, education support professionals (ESPs), parents and students. (National Education Association).
- Districts provide student-to-specialized instructional support personnel (SISP) with adequate time to collaborate with teachers and education support professionals (ESPs) (National Education Association).
- Pediatricians use developmental milestone assessments, like the Ages & Stages Questionnaires (ASQ), during regular well visits.
- School-based supports for child health and well-being, such as physicals, vaccinations, dental and vision care, therapy and other mental health services (Results for America).

Policies

- Providing access to health care (Rhode Island Kids Count).
- Districts require a favorable student-to-specialized instructional support personnel (SISP) ratio (Optimal ratios include: school counselors – 250:1; school nurses – 750:1; school psychologists – 500-700:1; school social workers – 250:1) (National Education Association).
- State and/or district pays for school-based health workforce, including nurses and counselors (National Education Association).
- State requires that all school-age children are appropriately immunized before entering school (National Education Association).

Physical development and well-being

Key source: Education-to-Workforce Framework

Indicators

Contributing indicators

- Percentage of students meeting benchmarks on self-rated surveys of physical health, such as the California Healthy Kids Survey Physical Health & Nutrition module (Education-to-Workforce Framework).
- The EW Framework recommends measuring physical development and well-being using self-reports on surveys. Although physical fitness tests and activity trackers are viable alternatives to self-reports, survey data may be more feasible to collect at scale while mitigating potential concerns about shaming and privacy. As one example, California administers both a survey and a physical fitness test to K–12 students. However, it recently eliminated the Body Composition component of the test amid concerns about its value and risk for unintended consequences and is reassessing whether to continue with the test at all (Education-to-Workforce Framework).

Practices and Policies

Policies

- Since 2003, every school district in California has been required to administer the California Healthy Kids Survey (CHKS) at least once every two years and make the results publicly available. CHKS is an anonymous, confidential survey for students in grades 5 and above designed to help school communities identify students' needs. It is based on a strengths-based framework drawn from resilience and youth development research. CHKS covers several dimensions of school climate and student well-being, including physical and mental well-being and safety. Although there is a core survey that must be administered, school districts can select supplementary modules for more in-depth questions on different topics or add a custom module to measure other topics relevant to their community.

Communication skills

Key source: Education-to-Workforce Framework

Indicators

Contributing indicators

- K–12: Percentage of students demonstrating proficiency on assessments such as the College and Career Readiness Assessment, an assessment for grades 6–12 that measures critical thinking, problem solving, and written communications (Education-to-Workforce Framework).

Higher-order thinking skills

Key source: Education-to-Workforce Framework

Indicators

Contributing indicators

- Remembering: Students recognize or recall knowledge from memory. Remembering is when memory is used to produce or retrieve definitions, facts, or lists, or to recite previously learned information. (Anderson and Krathwohl, Bloom's Taxonomy Revised).
- Understanding: Students construct meaning from different types of functions be they written or graphic messages or activities like interpreting, exemplifying, classifying, summarizing, inferring, comparing, or explaining. (Anderson and Krathwohl, Bloom's Taxonomy Revised).
- Applying: Students carry out or use a procedure through executing or implementing. Applying

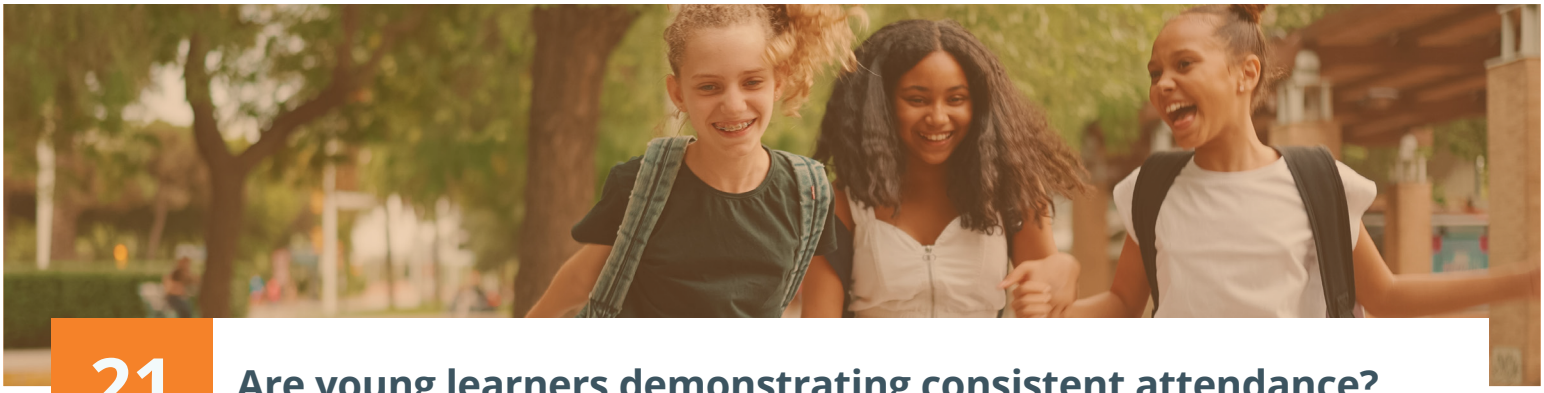
relates to or refers to situations where learned material is used through products like models, presentations, interviews or simulations. (Anderson and Krathwohl, Bloom's Taxonomy Revised).

- Analyzing: Students break materials or concepts into parts, determine how the parts relate to one another or how they interrelate, or how the parts relate to an overall structure or purpose. Mental actions included in this function are differentiating, organizing, and attributing, as well as being able to distinguish between the components or parts. When one is analyzing, he/she can illustrate this mental function by creating spreadsheets, surveys, charts, or diagrams, or graphic representations. (Anderson and Krathwohl, Bloom's Taxonomy Revised).
- Evaluating: Students make judgments based on criteria and standards through checking and critiquing. Critiques, recommendations, and reports are some of the products that can be created to demonstrate the processes of evaluation. In the newer taxonomy, evaluating comes before creating as it is often a necessary part of the precursory behavior before one creates something. (Anderson and Krathwohl, Bloom's Taxonomy Revised).
- Creating: Students put elements together to form a coherent or functional whole; reorganizing elements into a new pattern or structure through generating, planning, or producing. Creating requires students to put parts together in a new way, or synthesize parts into something new and different creating a new form or product. This process is the most difficult mental function in the new taxonomy. (Anderson and Krathwohl, Bloom's Taxonomy Revised).

Practices and Policies

Practices

- Fermi questions encourage multiple approaches, emphasize process rather than product, and promote non-traditional problem-solving strategies. Fermi questions are unexpected questions about the natural world whose answers are rough quantitative estimations. When asking Fermi questions, it's essential to use examples that reflect the experiences and backgrounds of students from different cultures and communities. This can help create a sense of relevance and connection to the math and can also help to promote diversity and inclusivity in the classroom. For example, instead of asking "How many drops of water are in Lake Erie?", you could ask "How many gallons of water does a family in a drought-affected area need to conserve each month?" or "How many pounds of food does a refugee family need to collect each month to survive?" By using examples that reflect the diverse experiences and backgrounds of your students, you can help to create a more inclusive and supportive learning environment. (National Council of Teachers of Mathematics).
- Teachers use a variety of question types to gauge students' understanding. When gauging students' learning in math class, it's essential to ask a variety of questions that encourage critical thinking, communication, and reflection. Open-ended questions can help you understand students' thought processes and identify areas where they may need additional support. Probing questions can uncover students' thought patterns and help you diagnose misconceptions. Higher-order thinking questions can assess students' ability to apply mathematical concepts to real-life scenarios and make connections to broader mathematical ideas. Self-reflection questions can help students identify their own strengths and weaknesses and develop a growth mindset. Modeling and visualizing questions can encourage students to think creatively and develop their spatial reasoning skills. Finally, discussion and connection questions can foster a sense of community and help students see the relevance of math to their everyday lives. By mixing up the types of questions you ask, you can get a more comprehensive picture of your students' understanding and provide targeted support to help them deepen their learning. (National Council of Teachers of Mathematics).



21 Are young learners demonstrating consistent attendance?

Why it matters

Regular attendance in middle school sets the foundation for academic success, strong relationships and positive habits that carry into high school and beyond. Students who attend school consistently are more likely to stay on track in core subjects like math, participate in enriching activities and build strong connections with peers and teachers. Helping students feel seen, supported and connected to school is key to keeping them coming back every day — and building a path toward long-term success.

Consistent attendance: Chronic absence matters because succeeding in school requires being in school; a child who isn't present isn't acquiring what he or she needs to know to succeed there. Chronic absence in kindergarten is associated with lower academic performance in first grade. For children experiencing poverty, chronic early absence predicts the lowest levels of educational achievement at the end of fifth grade (Annie E. Casey Foundation).

Chronic early absence can signal problems within the school or community or a parent's unawareness that regular attendance matters. It also may be caused by major family stressors, such as a parent's physical or mental health condition, family violence, substance abuse, or child abuse or neglect (Annie E. Casey Foundation).

Absenteeism: Research demonstrates a strong relationship between absenteeism and learning outcomes, and higher rates of absenteeism for disadvantaged students can widen achievement gaps (Birth to Grade 3 Indicator Framework). Absenteeism is a big challenge for young learners, with at least 10% of kindergarten and first graders nationwide chronically absent from school, with students living in poverty four times more likely to be chronically absent (New America). Research also clearly shows that as absences increase, test scores decrease, and they do so more rapidly for mathematics than for ELA (PACE).

Consistent attendance *Key source: Education-to-Workforce Framework*

Indicators

Contributing indicators

- Absentee rates by grade level disaggregated by gender, race, ethnicity, disability status, language status, and economic status. (Council of the Great City Schools).
- Average daily attendance. (National Center for Education Statistics).
- K-12 chronic absenteeism (California Department of Education & WestEd, Cradle-to-Career Data System Public Data Definitions).

- K-12 days of attendance (California Department of Education & WestEd, Cradle-to-Career Data System Public Data Definitions).
- K-12 days of expected attendance (California Department of Education & WestEd, Cradle-to-Career Data System Public Data Definitions).
- Percentage of students who are present for more than 90% of their enrolled days, excluding students enrolled for fewer than 90 days (Education-to-Workforce Framework).
- Percentage of students with less than 10 absences in a school year (or less than 5 percent of the school year) (National Education Association).
- Proportion of K-12 chronically absent students (California Department of Education & WestEd, Cradle-to-Career Data System Public Data Definitions).
- Middle grade attendance and GPA provide the best indication of how students will perform in high school classes. These are better indicators than test scores or background characteristics, such as race and neighborhood poverty level, for identifying which students are at risk of failing ninth-grade classes or earning low grades in high school. (5 Key Findings for Middle Grades).
- Students who are chronically absent or receiving Fs in the middle grades are at very high risk of being offtrack for graduation in ninth grade, and eventually dropping out of school. These students are already in need of intervention during the middle grades, before they end up failing in high school. Many other students end up off-track in high school, but cannot be identified as at high risk until after they make the transition to high school. (5 Key Findings for Middle Grades).
- Improving grades and attendance in the middle grades can have a large pay-off for high school success; even more so than improving test scores. Students who improve their attendance or grades from fifth through eighth grade have better on-track rates, higher grades, and higher test scores in high school than students who start out with the same achievement in fifth grade but do not improve during the middle grades. Modest improvements in attendance or grades from fifth through eighth grade are associated with substantial differences in high school outcomes. (5 Key Findings for Middle Grades).

Practices and Policies

Practices

- Prepare children for entry into school through high-quality early care and education experiences, characterized by well-trained staff; low student/staff ratios; safe facilities; and culturally, linguistically, and developmentally appropriate curricula (Annie E. Casey Foundation).
- Ensure access to preventative health care, especially as children enter school. This may include not only expanding enrollment in children's health insurance, but also providing children with immunizations and comprehensive screenings (vision, dental, hearing, and developmental delays) (Annie E. Casey Foundation).
- Offer a high-quality education that responds to the diverse learning styles and needs of students. When the educational experience engages children's interest and meets their learning needs, families are much more likely to feel that going to school is worthwhile (Annie E. Casey Foundation).
- Implement early warning systems to identify problems, such as chronic absence, to allow for timely intervention (Alliance for Early Success).
- Engage families of all backgrounds in their children's education. Attendance improves when schools create a wide variety of opportunities for families from all backgrounds to support their child's learning (Annie E. Casey Foundation).
- Educate parents about the importance of attendance (Annie E. Casey Foundation).
- Encourage families to help each other attend school (Annie E. Casey Foundation).
- Offer incentives for excellent attendance to all children, such as materials (pencils or tows), acknowledgement in class or at morning assembly, extra recess time, opportunities to dress casually if uniforms are required (Annie E. Casey Foundation).
- Conduct early outreach to families with poor

attendance and, if appropriate, case management to address social, medical, economic, and academic needs (Annie E. Casey Foundation).

- Coordinate public-agency and, if needed, legal response for families in crisis (Annie E. Casey Foundation).
- Learner Engagement and Attendance Program (LEAP): A home visiting program that identifies and partners with families to improve student attendance and family engagement (Connecticut Department of Education).
- School employs a tiered approach to improving attendance by promoting positive conditions for learning (Attendance Works).
- Creating a culture of attendance by taking a positive, not punitive, approach to absenteeism that is centered on belonging and engagement, and helping everyone to understand why daily attendance matters in pre-K through 12th grade (Attendance Works).

Policies

- States establish standards for accountability, adopt regulations and provide guidance that sets expectations for school districts and schools to achieve (Attendance Works).
- States ensure consistent and comparable data across schools and districts by specifying how attendance concepts are defined and offering guidance on how to collect accurate data (Attendance Works).
- The U.S. Department of Education collects and reports chronic absence data. States must track chronic absenteeism as a school quality indicator, along with more traditional academic measures for accountability in the Every Student Succeeds Act of 2015 (ESSA) (Attendance Works).
- In November 2023, South Dakota offered grants for districts to spend on efforts to reduce chronic absenteeism. Money from the grants will fund transportation; mentoring and tutoring programs; student, family, and community engagement activities. (South Dakota DOE).
- Administrators in the 200-student Leola district in South Dakota began investing in Positive Behavioral Interventions and Supports, or PBIS, as chronic absenteeism grew during the pandemic. PBIS involves identifying students at high risk of failing or dropping out and developing systems to support them. With a nearly $200,000 grant from the state, the district hired a full-time employee who works with students on credit recovery and develops programming to help reduce absenteeism. The grant also helped pay for three staff members to participate in a "check and connect" mentoring program that pairs adults with students to help them return to regularly attending school. (EdWeek, Why Chronic Absenteeism is a Budget Problem).
- Sarah Lenhoff, an associate professor of educational leadership and policy studies at Wayne State University, argues against tying school funding to Average Daily Attendance. Punishing districts where students are chronically absent only makes the problem more likely to recur, Lenhoff says. Instead, she'd prefer to see states require districts to allocate a certain funding amount toward evidence-based programs that address chronic absenteeism. (EdWeek, Why Chronic Absenteeism is a Budget Problem).
- Ericka Weathers, an assistant professor of education policy at the University of Pennsylvania, argues against state policies that aim to discourage chronic absenteeism but that might end up exacerbating it. For example, some states have truancy laws that require that students be suspended or that parents go to court or even jail if their children don't show up to school. Taking children away from school, or taking away the option for parents to take their children to school, could end up costing the district in future years. "If money's taken away because kids are absent, it's leaving less money to tackle the problems in a more restorative, preventative, and less reactive approach," Weathers said. (EdWeek, Why Chronic Absenteeism is a Budget Problem).

22 Are there young learners who disproportionately experience exclusionary discipline?

Why it matters

Discipline practices: Research documents persistent disparities in exclusionary discipline — that is, disciplinary actions that remove students from their educational setting, such as an in- or out-of-school suspension — along race, socioeconomic background and disability status (Education-to-Workforce Framework). Research also suggests that high rates of suspension and expulsion reduces students' opportunity to learn, increases likelihood of dropping out or becoming disengaged from school and disproportionately affects Black and Latine students as well as students receiving special education (Birth to Grade 3 Indicator Framework). School practices play a key role in determining students' disciplinary outcomes. Different approaches to discipline, such as restorative justice and positive behavioral interventions and supports (PBIS), may be related to improvements in school culture and climate (Education-to-Workforce Framework).

Equitable discipline practices *Key source: Education-to-Workforce Framework*

Indicators

Contributing indicators

- Differences in the rates at which students from key demographic subgroups ever experience different forms of school discipline (office referrals, suspensions, expulsions, restraint, and exclusion) relative to those students' representation in their school population as a whole (Education-to-Workforce Framework).
- Disproportionalities along the lines of key demographic characteristics in the level of school discipline experienced (for example, number of days suspended) (Education-to-Workforce Framework).
- Percentage of students subjected to disciplinary action in the past year (National Education Association).
- Students (K-12) who received one or more in-school suspension: Number of students without disabilities who received one or more in-school suspension [disaggregated by race, sex (male, female, nonbinary), EL] (Civil Rights Data Collection, Office for Civil Rights).
- Students (K-12) who received one or more in-school suspension: Number of students with disabilities who received one or more in-school suspension [disaggregated by race, sex (male, female, nonbinary), disability-Section 504 only, EL] (Civil Rights Data Collection, Office for Civil Rights).
- Students who received one out-of-school suspension: Number of K-12 students without disabilities who received one out-of-school suspension [disaggregated by race, sex (male,

female, nonbinary), EL] (Civil Rights Data Collection, Office for Civil Rights).

- Students who received one out-of-school suspension: Number of K-12 students with disabilities who received one out-of-school suspension [disaggregated by race, sex (male, female, nonbinary), disability-Section 504 only, EL] (Civil Rights Data Collection, Office for Civil Rights).
- Students who received more than one out-of-school suspension: Number of K-12 students without disabilities who received more than one out-of-school suspension [disaggregated by race, sex (male, female, nonbinary), EL] (Civil Rights Data Collection, Office for Civil Rights).
- Students who received more than one out-of-school suspension: Number of K-12 students with disabilities who received more than one out-of-school suspension [disaggregated by race, sex (male, female, nonbinary), disability-Section 504 only, EL] (Civil Rights Data Collection, Office for Civil Rights).
- Students (K-12) who were expelled (with educational services; without educational services; because of zero-tolerance policies) (Civil Rights Data Collection, Office for Civil Rights).
- Number of students without disabilities who were expelled (with educational services; without educational services; because of zero-tolerance policies) [disaggregated by race, sex (male, female, nonbinary), EL] (Civil Rights Data Collection, Office for Civil Rights).
- Number of students with disabilities who were expelled (with educational services; without educational services; because of zero-tolerance policies) [disaggregated by race, sex (male, female, nonbinary), disability-Section 504 only, EL] (Civil Rights Data Collection, Office for Civil Rights).
- Students (K-12) who were transferred for disciplinary reasons to alternative school
- Number of students without disabilities who were transferred for disciplinary reasons to alternative school [disaggregated by race, sex (male, female, nonbinary), EL] (Civil Rights Data Collection, Office for Civil Rights).
- Number of students with disabilities who were transferred for disciplinary reasons to alternative school [disaggregated by race, sex (male, female, nonbinary), disability-Section 504 only, EL]. (Civil Rights Data Collection, Office for Civil Rights).
- Students who received corporal punishment (Civil Rights Data Collection, Office for Civil Rights).
- Number of K-12 students without disabilities who received corporal punishment [disaggregated by race, sex (male, female, nonbinary), EL] (Civil Rights Data Collection, Office for Civil Rights).
- Number of K-12 students with disabilities who received corporal punishment [disaggregated by race, sex (male, female, nonbinary), disability-Section 504 only, EL] (Civil Rights Data Collection, Office for Civil Rights).
- Number of instances of corporal punishment that K-12 students received (disaggregated by students without disabilities, students with disabilities) (Civil Rights Data Collection, Office for Civil Rights).
- Number of instances of out-of-school suspensions that K-12 students received (disaggregated by students without disabilities, students with disabilities-IDEA, students with disabilitiesSection 504 only) (Civil Rights Data Collection, Office for Civil Rights).
- Number of school days missed by K-12 students who received out-of-school suspensions [disaggregated by race, sex (male, female, nonbinary), disability-IDEA, disability-Section 504 only, EL] (Civil Rights Data Collection, Office for Civil Rights).
- Students (K-12) who were referred to law enforcement agency or official:
- Number of students without disabilities who were referred to law enforcement agency or official [disaggregated by race, sex (male, female, nonbinary), EL] (Civil Rights Data Collection, Office for Civil Rights).
- Number of students with disabilities who were referred to law enforcement agency or official [disaggregated by race, sex (male, female, nonbinary), disability-Section 504 only, EL] (Civil Rights Data Collection, Office for Civil Rights).
- Number of instances of referrals to law

enforcement that K-12 students received (disaggregated by students without disabilities, students with disabilities-IDEA, students with disabilities-Section 504 only) (Civil Rights Data Collection, Office for Civil Rights).

- Students (K-12) who were arrested for school-related activity (Civil Rights Data Collection, Office for Civil Rights).
- Number of students without disabilities who were arrested for school-related activity [disaggregated by race, sex (male, female, nonbinary), EL] (Civil Rights Data Collection, Office for Civil Rights).
- Number of students with disabilities who were arrested for school-related activity [disaggregated by race, sex (male, female, nonbinary), disability-Section 504 only, EL] (Civil Rights Data Collection, Office for Civil Rights).
- Number of instances of school-related arrests that K-12 students received (disaggregated by students without disabilities, students with disabilities-IDEA, students with disabilities-Section 504 only) (Civil Rights Data Collection, Office for Civil Rights).
- Students (K-12) subjected to mechanical restraint:
  o Number of non-IDEA students subjected to mechanical restraint [disaggregated by race, sex (male, female, nonbinary), disability-Section 504 only, EL] (Civil Rights Data Collection, Office for Civil Rights).
- Number of students with disabilities (IDEA) subjected to mechanical restraint [disaggregated by race, sex (male, female, nonbinary), EL] (Civil Rights Data Collection, Office for Civil Rights).
- Students (K-12) subjected to physical restraint (Civil Rights Data Collection, Office for Civil Rights).
- Number of non-IDEA students subjected to physical restraint [disaggregated by race, sex (male, female, nonbinary), disability-Section 504 only, EL] (Civil Rights Data Collection, Office for Civil Rights).
- Number of students with disabilities (IDEA) subjected to physical restraint [disaggregated by race, sex (male, female, nonbinary), EL] (Civil Rights Data Collection, Office for Civil Rights).
- Students (K-12) subjected to seclusion (Civil Rights Data Collection, Office for Civil Rights).
- Number of non-IDEA students subjected to seclusion [disaggregated by race, sex (male, female, nonbinary), disability-Section 504 only, EL] (Civil Rights Data Collection, Office for Civil Rights).
- Number of students with disabilities (IDEA) subjected to seclusion [disaggregated by race, sex (male, female, nonbinary), EL] (Civil Rights Data Collection, Office for Civil Rights).
- Number of instances of mechanical restraint, physical restraint, seclusion (disaggregated by students without disabilities, students with disabilities-IDEA, students with disabilities-Section 504 only) (Civil Rights Data Collection, Office for Civil Rights).

Systems indicators

- Suspension rates disaggregated by gender, race, ethnicity, disability status, language status, and economic status. (Council of the Great City Schools).
- Instructional days missed per 100 students due to suspensions disaggregated by gender, race, ethnicity, disability status, language status, and economic status. (Council of the Great City Schools).
- Differences in the rates at which students from key demographic subgroups ever experience different forms of school discipline (office referrals, suspensions, expulsions, restraint and exclusion) relative to those students' representation in their school population as a whole (Education-to-Workforce Framework).
- Disproportionalities along the lines of key demographic characteristics in the level of school discipline experienced (for example, number of days suspended) (Education-to-Workforce Framework).
- K-12 institution suspension rate (California Department of Education & WestEd, Cradle-to-Career Data System Public Data Definitions).
- Schools collect and publicly report demographic data recording behavior and behavioral interventions leading to disciplinary exclusion from school (National Education Association).

- Behavioral reasons for discipline (Birth to Grade 3 Indicator Framework).
- Discipline equity gaps by student subgroups (Birth to Grade 3 Indicator Framework).
- Percent of total instructional time missed (Birth to Grade 3 Indicator Framework).
- Suspension, expulsion and overall exclusionary discipline rates and numbers of students impacted (Birth to Grade 3 Indicator Framework).

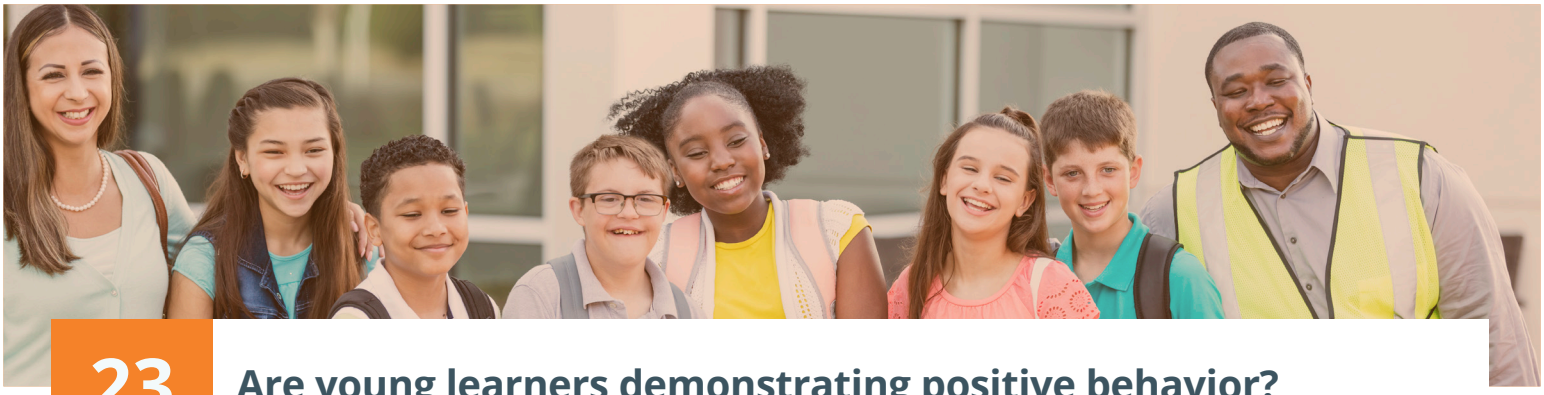
Practices and Policies

Practices

- Schools offer alternatives to traditional behavioral interventions, such as restorative practices (National Education Association).
- Schools use Positive Behavior Intervention Supports (PBIS) (Results for America).
- The Incredible Years: A series of early intervention programs for children ages 3-9 aimed to reduce the prevalence of behavioral and conduct issues (Results for America).
- Invest in public health strategies to create safe schools (Center for Policing Equity).
- My Brother's Keeper, a national program reducing exclusionary discipline and promoting equity for young men of color (My Brother's Keeper Alliance).

Policies

- Districts allocate resources toward restorative practices (National Education Association).
- State policy requires schools to collect and publicly report demographic data recording behavior and behavioral interventions leading to disciplinary exclusion from school. Disciplinary actions include in-school/out-of-school suspensions, expulsions, arrests and referrals to law enforcement (National Education Association).
- Policies support the integration of behavioral health services in schools to address underlying issues before they result in disciplinary actions.



23 Are young learners demonstrating positive behavior?

Why it matters

Positive behavior: Young learner school experience is more positive and productive when they have a sense of personal well-being established through stable, caring relationships in their early lives. Emotional health and social competence enable children to participate in learning and form good relationships with teachers and peers (Rhode Island Kids Count). Success in school depends not only on academic skills, but also on the learning styles, habits and attitudes with which students approach learning (Rhode Island Kids Count). Student behavior, along with attendance and course grades, are strong predictors of a student's educational outcomes and is used as an Early Warning Flag to identify students who are at risk of not achieving essential educational outcomes like high school graduation (On Track for Success).

Indicators

Contributing indicators

- Percentage of children who do not experience any of the following: in-school suspensions, out-of-school suspensions, disciplinary use of restraint and seclusion, or expulsions. Although the absence of exclusionary discipline is not a perfect measure of positive behavior, the EW Framework recommends using the proposed metric as the most feasible proxy given the widespread availability of discipline data and their value in predicting future academic outcomes. As a system condition, the EW Framework also recommends monitoring disproportionality in suspensions and other disciplinary actions to address bias (Education-to-Workforce Framework).
- Percentage of children who often or very often exhibit positive social behaviors when interacting with their peers (Rhode Island Kids Count).
- Percentage of students who can function appropriately in group learning activities, participating actively, taking turns, following directions and working cooperatively. (Rhode Island Kids Count).
- Percentage of children who do not experience any of the following: in-school suspensions, out-of-school suspensions, disciplinary use of restraint and seclusion, or expulsions (Education-to-Workforce Framework).

Policies and Practices

Practices

- Positive Behavioral Interventions and Supports (PBIS) Research-based strategies for promoting positive behavior through school-wide interventions (PBIS).
- Restorative Justice in Schools: strategies for non-punitive discipline and fostering a positive school climate (National Association of Community and Restorative Justice).
- National Center on Safe Supportive Learning Environments offers research and tools on school climate, student behavior, and emotional well-being (NCSSLE).
- Explicit and integrated social-emotional skill building for students (CASEL).

Appendix

Design principles

Based on interviews with network members and conversations with StriveTogether staff, the following design principles were used to guide the writing of this playbook.

- Expand depth and breadth: Expand on existing framework by including indicators from multiple domains.
- Universal navigation: The playbook will be a tool for all audiences, Cradle to Career Network members, their communities and any organization working to improve cradle-to-career outcomes. Organize the playbook in an accessible way, using flags/tags and including detailed research in the appendix.
- Honor local context: Organizations work closely with their communities to identify and pursue solutions that they believe will work. We will create the playbook as a way to enhance the hyper-local process communities use. This means referencing the community-centered planning processes, which starts by consulting the community and letting community voices lead the planning process. The playbook will likely be part of the second or third step, but not necessarily the first.
- Speak the language: Align to StriveTogether language, not jargon.
- Make the playbook language easy to understand.
- Create consistent language by resolving similar concepts using different terminology. By aligning other frameworks behind the E-W framework, we can "crosswalk" and translate concepts into a common language.
- Clear sourcing: Cite all sources so that readers can dig deeper in areas of interest.
- Highlight and center various source frameworks within the playbook, not just in the appendix.
- Provide an annotated bibliography.

Bibliography

A. Frameworks incorporated

Organization	Publication	Source	Description
Afterschool Alliance	America After 3PM: Demand Grows, Opportunity Shrinks	Link	Reports on the state of afterschool programs in the U.S., highlighting demand and access issues.
Albert Shanker Institute	Reading Reform: A Systems-Level View	Link	Discusses systemic approaches to reading reform, emphasizing the importance of coherent policies and practices.
Anderson and Krathwohl	Revised Bloom's Taxonomy	Link	This framework updates Bloom's Taxonomy to better classify educational goals, objectives, and standards.
Annie E. Casey Foundation (AECF)	Early Warning Full Report (2010)	Link	Highlights the connection between early reading proficiency and future academic success, with policy recommendations.
Attendance Works	"3 Tiers of Intervention"	Link	Attendance Works outlines a multi-tiered approach to address chronic absenteeism in schools.
California Cradle-to-Career Data System	Cradle-to-Career Data Point Definitions	Link	Defines key data points used in California's Cradle-to-Career data system to track educational and workforce outcomes.
Californians Together	The State of English Learners	Link	Analyzes the status and progress of English Learner students in California, highlighting challenges and recommendations.
CCSSO	A Nation of Problem Solvers	Link	Offers a roadmap for state leaders to improve math achievement through policy and practice reforms.
Child Trends	System Transformation for Equitable Preschools: A Step Forward Data Framework	Link	Proposes a data framework to guide the transformation of preschool systems toward greater equity.

Organization	Publication	Source	Description
Child Trends	"Summer Learning: Research, Policies, and Programs"	**Link**	Examines the effectiveness of summer learning programs in mitigating academic achievement gaps among students.
CoreStandards.org	Math Standards 2023	**Link**	Provides the updated Common Core State Standards for mathematics instruction.
Council of Chief State School Officers (CCSSO)	Birth to Grade 3 Indicator Framework	**Link**	Provides indicators to support early learning from birth through third grade, promoting alignment and continuity.
Early Childhood Learning & Knowledge Center (ECLKC)	Trauma and Adverse Childhood Experiences	**Link**	Discusses the impact of trauma and adverse childhood experiences on child development and learning.
Early Success	Birth Through Third Grade Learning and Development Framework	**Link**	Outlines a comprehensive framework for learning and development from birth through third grade to support early childhood education.
Education to Workforce	E-W Indicator Framework	**Link**	Presents a framework of indicators to support the alignment of education and workforce outcomes across states.
Education to Workforce	Homepage	**Link**	Organization focused on aligning educational systems with workforce needs to ensure economic mobility.
Education to Workforce	(Duplicate of E-W Indicator Framework)	**Link**	Framework for aligning education with career and economic outcomes.
Education to Workforce Indicator Framework	Neighborhood Juvenile Arrests Indicator	**Link**	Presents data on juvenile arrests as an indicator of community well-being and its impact on education-to-workforce pathways.
EdWeek	Algebra 1 is a Turning Point	**Link**	Discusses strategies to support students transitioning into Algebra 1, a key milestone in secondary education.
ERIC (Education Resources Information Center)	Middle School Mathematics Study	**Link**	A comprehensive report on effective math teaching strategies and learning environments in secondary education.
ERIC (Education Resources Information Center)	Developing Effective Fractions Instruction for Kindergarten through 8th Grade	**Link**	Offers guidance on effective instructional practices for teaching fractions to students from kindergarten through eighth grade.
Harvard Graduate School of Education	Making Math a Family Thing	**Link**	Explores ways to engage families in children's mathematics learning to improve outcomes.
Institute of Education Sciences (IES)	Strategies to Engage Students and Transform Middle School Math	**Link**	Shares evidence-based strategies to engage middle school students and enhance their math experiences.

Organization	Publication	Source	Description
Institute of Education Sciences (IES)	Middle School Math Infographic	**Link**	Visual summary highlighting findings and strategies for improving middle school math.
Institute of Education Sciences (IES)	Assisting Students Struggling with Mathematics: Response to Intervention (RTI) for Elementary and Middle Schools	**Link**	Provides strategies for implementing RTI to help students struggling with mathematics in elementary and middle schools.
Institute of Education Sciences (IES)	Teaching Strategies for Improving Algebra Knowledge in Middle and High School Students	**Link**	Recommends evidence-based strategies to enhance algebra instruction for middle and high school students.
Institute of Education Sciences (IES)	Assisting Students Struggling with Mathematics: Response to Intervention (RTI) for Elementary and Middle Schools	**Link**	Offers strategies for implementing RTI to support students struggling with mathematics.
Institute of Education Sciences (IES)	Improving Mathematical Problem Solving in Grades 4 Through 8	**Link**	Provides recommendations for enhancing problem-solving skills in mathematics for students in grades 4 through 8.
Instruction Partners	Essential Practices in Early Literacy	**Link**	Identifies key instructional practices essential for developing early literacy skills among young learners.
Just Equations	Math Misplacement: A Chronic Condition	**Link**	Examines how math placement policies often misplace students and recommends more comprehensive solutions.
Mathematica	Menu of Measures – Math (March 2022)	**Link**	Offers a curated list of metrics to evaluate math learning and progress in educational settings.
Mathematics Assessment Project	TRU Math Observation Guide	**Link**	Provides an observation guide based on the Teaching for Robust Understanding (TRU) framework to assess mathematics instruction.
National Association for Family, School, and Community Engagement (NAFSCE)	Family Math White Paper	**Link**	Discusses the importance of family engagement in mathematics education and offers strategies for implementation.
National Center for Children in Poverty (NCCP)	Improving the Odds for Young Children	**Link**	Provides strategies to enhance outcomes for young children, focusing on health, education, and family support.

Organization	Publication	Source	Description
National Council of Teachers of Mathematics (NCTM)	"Supporting Each and Every Student: Equity and Diversity"	**Link**	Offers strategies for educators to promote equity and embrace diversity in mathematics education.
National Council of Teachers of Mathematics (NCTM)	Asking Questions and Promoting Discourse	**Link**	Encourages teachers to use strategic questioning to stimulate mathematical thinking and student discussion.
National Council on Teacher Quality (NCTQ)	Teacher Prep Review: Strengthening Elementary Reading Instruction	**Link**	Evaluates teacher preparation programs on their effectiveness in preparing teachers for elementary reading instruction.
National Council on Teacher Quality (NCTQ)	Teacher Prep Review: Preparation for Teaching Elementary Mathematics	**Link**	Assesses teacher preparation programs on their effectiveness in preparing teachers for elementary mathematics instruction.
National Education Association (NEA)	GPS Indicators Framework	**Link**	Presents a set of indicators aimed at guiding education systems toward equity and excellence.
National Science Foundation (NSF)	"Broadening Participation in STEM"	**Link**	Discusses strategies to increase diversity and inclusion in STEM fields through educational initiatives.
Prenatal-to-3 Policy Impact Center	2022 Perinatal Telehealth Services	**Link**	Examines the role and effectiveness of telehealth services in perinatal care.
RAND Corporation	Making Summer Count: How Summer Programs Can Boost Children's Learning	**Link**	Examines the effectiveness of summer learning programs in improving educational outcomes for children.
Results for America	Safe and Healthy Housing	**Link**	Highlights strategies and policies to ensure safe and healthy housing as a foundation for improved outcomes.
Rhode Island KIDS COUNT	Getting Ready: Findings from the National School Readiness Indicators Initiative	**Link**	Reports on findings related to school readiness indicators and their implications for early childhood education.
SCALE	"Ref-406 SCALE Measures User Guide"	**Link**	Provides instructions for implementing SCALE's assessment tools to measure student learning outcomes.
StriveTogether	A Guide to Racial and Ethnic Equity Systems Indicators	**Link**	Offers a framework for measuring racial and ethnic equity within education systems.
Student Experience Network	"Research Snapshot: Matthews (2021)"	**Link**	Highlights findings on student engagement and the impact of supportive relationships in educational settings.
U.S. Department of Education	Civil Rights Data Collection (CRDC)	**Link**	Provides comprehensive data on key education and civil rights issues in U.S. public schools.

Organization	Publication	Source	Description
Urban Institute	Upward Mobility: A Framework for Policy and Action	**Link**	Presents a framework to promote upward mobility through policy interventions and community actions.
Urban Institute	Promise Neighborhoods	**Link**	Describes the Promise Neighborhoods initiative aimed at improving educational and developmental outcomes in distressed communities.
UTeach Program, University of Texas at Austin	UTOP Instruments: User Manuals and Samples	**Link**	Provides user manuals and sample instruments for the UTeach Observation Protocol (UTOP) to assess teaching practices.
What Works Clearinghouse (WWC) / IES	Practice Guide (2007)	**Link**	A guide with research-based practices for improving math instruction for middle school students.

B. Organizations or programs referenced

Organization	Publication	Source	Description
Attendance Works	Absences Add Up	**Link**	Attendance Works partners with schools, districts, states, communities and organizations to ensure that chronic absence is recognized as a serious issue that can be addressed through proactive, supportive strategies.
Bedtime Math	Bedtime Math	**Link**	An initiative providing daily math problems for children to solve with their families.
CalSCHLS	CalSCHLS	**Link**	An organization providing surveys and data to improve school climate and student well-being.
Center for Early Learning Success	Early Success	**Link**	An organization focused on improving early learning outcomes through policy and practice.
Center for Policing Equity	Redesigning Public Safety for K-12 Schools	**Link**	The Center for Policing Equity's (CPE's) North Star is protecting, empowering, and supporting vulnerable communities—particularly Black and Brown communities—to redesign their public safety systems.
Erikson Institute	Early Math Collaborative	**Link**	An initiative aimed at improving math teaching and learning in early childhood education.

Organization	Publication	Source	Description
Federal Communications Commission	Affordable Connectivity Program	**Link**	This FCC program provides discounts on internet services and devices to help low-income households access affordable broadband.
Hello Family Spartanburg	Parent Support & Education Resources	**Link**	A collection of resources to support parents and caregivers in early childhood education.
Hope Center for Children	Triple P – Positive Parenting Program	**Link**	A parenting program aimed at preventing and treating behavioral and emotional problems in children.
Instruction Partners	Instruction Partners Website	**Link**	An organization offering support and resources to improve instructional practices and student outcomes.
LENA	Technology	**Link**	An overview of LENA's technology solutions aimed at improving early language development.
MCEL Leaders	About Us	**Link**	Information about MCEL Leaders, an organization focused on educational leadership.
My Brother's Keeper Alliance	My Brother's Keeper	**Link**	A national program reducing exclusionary discipline and promoting equity for young men of color.
NACRJ (National Association for Community and Restorative Justice)	NACRJ Main Website	**Link**	A hub for promoting community and restorative justice practices through research, policy, and advocacy.
National Association of Community and Restorative Justice	National Association of Community and Restorative Justice	**Link**	Restorative Justice in Schools: strategies for non-punitive discipline and fostering a positive school climate
National Association of State Boards of Education (NASBE)	NASBE Website	**Link**	An organization providing resources and support for state boards of education to advance equity and excellence in education.
National Center on Safe and Supportive Learning Environments	National Center on Safe and Supportive Learning Environments	**Link**	The National Center on Safe Supportive Learning Environments (NCSSLE) helps schools, districts, and institutions create safe, supportive, and engaging learning environments that promote student success. It offers research, tools, and technical assistance to address issues like school climate, mental health, and substance misuse. The center aims to improve conditions for learning and ensure all students thrive academically and socially.
New York State Department of Health	First 1,000 Days on Medicaid	**Link**	An initiative focusing on enhancing health and development outcomes for children in their first 1,000 days.

Organization	Publication	Source	Description
No Kid Hungry	Afterschool Meals Program	**Link**	Resources and best practices for implementing afterschool meal programs to combat child hunger.
Obama Foundation	My Brother's Keeper Alliance	**Link**	An initiative aimed at addressing opportunity gaps faced by young men of color.
PBS Kids	PBS Kids	**Link**	A platform offering educational games and videos for children.
Prosperity Now	"Baby Bonds"	**Link**	An initiative promoting the creation of baby bonds to address wealth inequality.
ReadyRosie	ReadyRosie	**Link**	A tool providing short videos modeling everyday interactions to support early learning.
Results for America	AVANCE Parent-Child Education Program (PCEP)	**Link**	A program designed to support early childhood development and parental engagement in education.
Results for America	ParentCorps	**Link**	An evidence-based program integrating social-emotional learning into early childhood education.
Speakaboos	Math Stories	**Link**	An interactive platform offering math-related stories for children.
Stanford University	PreK-Math-TE	**Link**	A project focused on improving early mathematics teaching and learning.
Tennessee Department of Education	TN ALL Corps	**Link**	An initiative aimed at providing high-dosage tutoring to students across Tennessee.
TERC	TERC	**Link**	An organization dedicated to improving mathematics and science education through research and development.
The Center for Black Educator Development	The Center for Black Educator Development	**Link**	An organization dedicated to recruiting, training, and retaining Black educators.
The Center on Positive Behavioral Interventions and Supports (PBIS)	Positive Behavioral Interventions and Supports	**Link**	The Center on Positive Behavioral Interventions and Supports (PBIS) supports schools, districts, and states in implementing a multi-tiered framework to improve social, emotional, and academic outcomes for all students. It provides evidence-based practices, training, and resources to help create positive school climates and reduce disciplinary disparities.
The National Equity Atlas	The National Equity Atlas	**Link**	The National Equity Atlas is America's most detailed report card on racial and economic equity, equipping leaders and policymakers with actionable data and strategies to advance racial equity and shared prosperity. The Atlas is produced by PolicyLink and the USC Equity Research Institute (ERI).

Organization	Publication	Source	Description
TODOS: Mathematics for All	TODOS: Mathematics for All	Link	An organization advocating for equity and excellence in mathematics education for all students.
USDA Food and Nutrition Service	About WIC Works	Link	Information about the WIC Works Resource System, supporting the Special Supplemental Nutrition Program for Women, Infants, and Children.
WestEd	WestEd	Link	A nonprofit organization focused on educational research and development.

C. Background research

Organization	Publication	Source	Description
Administration for Children and Families (ACF)	Evaluation Final Report	Link	A final evaluation report from ACF; specific details require access to the document.
Afterschool Alliance	STEM Executive Summary	Link	A summary highlighting the impact and importance of STEM programs in afterschool settings.
Afterschool Alliance	STEM Report 2021	Link	A comprehensive report detailing the state of STEM education in afterschool programs as of 2021.
Alabama State Department of Education	OMI 202338 ANA v1.0	Link	A document outlining Alabama's initiatives to improve math instruction and student outcomes.
Annenberg Institute at Brown University	Dispelling the Myths: What the Research Says About Teacher Professional Learning	Link	A study challenging common misconceptions about teacher professional development and offering evidence-based insights.
Annenberg Institute at Brown University	Teacher Professional Learning: The Landscape in 2024	Link	A working paper analyzing current trends and challenges in teacher professional development.
Association for Middle Level Education (AMLE)	Putting Middle Grades Students on the Graduation Path	Link	Addresses strategies to improve middle school education and student engagement.
Association of Mathematics Teacher Educators (AMTE)	Learning and Community: Improving Mathematical Performance Through Social Action	Link	An article discussing how social action can enhance mathematical performance and community engagement.
Bellwether Education Partners	On the Same Page	Link	A publication exploring strategies for aligning educational stakeholders to improve student outcomes.

Organization	Publication	Source	Description
Big Ideas Learning	What is Accelerated Learning and What are the Benefits?	**Link**	An article discussing the concept and advantages of accelerated learning in education.
Brookings Institution	Advanced Math in Eighth Grade	**Link**	Discusses the benefits and challenges of offering advanced math courses to eighth-grade students.
Brookings Institution	Choosing Blindly: Instructional Materials, Teacher Effectiveness, and the Common Core	**Link**	An article discussing the relationship between instructional materials, teacher effectiveness, and the Common Core standards.
Brookings Institution	Policies That Reduce Intergenerational Poverty	**Link**	An article analyzing policies effective in breaking the cycle of intergenerational poverty.
Bryant, Diane Pedrotty et al.	Early Numeracy Intervention Program for First-Grade Students with Mathematics Difficulties	**Link**	The purpose of this study was to determine the effects of an early numeracy preventative Tier 2 intervention on the mathematics performance of first-grade students with mathematics difficulties.
Buenrostro, Patricia M. and Radinsky, Josh	Looking at My (Real) World through Mathematics: Memories and Imaginaries of Math and Science Learning	**Link**	This study examines the ways one Latinx immigrant learner constructed the values and purposes of his earlier math and science learning experiences, as an adult hoping to pursue a career in science.
California Community Colleges Chancellor's Office	Equitable Placement	**Link**	An initiative to promote fair and effective placement practices in California's community colleges.
California Legislative Information	Senate Bill No. 359	**Link**	Legislation aimed at ensuring fair and accurate math placement for students in California public schools.
California School Climate, Health, and Learning Survey (CalSCHLS)	Middle School Physical Health Report 2024-2025	**Link**	A report detailing the physical health status of middle school students in California.
California School Dashboard	California School Dashboard	**Link**	An online tool providing information on how local educational agencies and schools are meeting the needs of California's diverse student population.
Campaign for Grade-Level Reading	Toward Bigger Outcomes	**Link**	A report discussing strategies to achieve significant improvements in early literacy outcomes.
Center for Education Market Dynamics (CEMD)	Reflecting on Integrated Math	**Link**	CEMD discusses the challenges and adoption of integrated math curricula in the U.S. education system.
Center for Policing Equity	School Safety Brief	**Link**	A brief discussing approaches to ensuring safety within school environments.
Center for Strategic Data and Impact	Tennessee Data Series	**Link**	A data series report focusing on educational metrics in Tennessee.

Organization	Publication	Source	Description
Center for Strategic Data and Impact	Louisiana Data Series	**Link**	A data series report focusing on educational metrics in Louisiana.
Chalkbeat	State Test Scores Data: Math, Reading, Pandemic-Era Learning Loss	**Link**	An article analyzing state test scores and the impact of the pandemic on student learning in math and reading.
Charania, Mahnaz and Julia Freeland Fisher	The Missing Metrics: Emerging practices for measuring students' relationships and networks	**Link**	Drawing on emerging practices, this paper offers a framework for measuring social capital grounded in both research and practice.
Children's Funding Project	Voter-Approved Children's Funds	**Link**	A resource detailing funds approved by voters to support children's services and programs.
Civic Enterprises and The Everyone Graduates Center at Johns Hopkins University	On Track For Success: The Use of Early Warning Indicator and Intervention Systems to Build a Grad Nation	**Link**	Early Warning Indicator and Intervention Systems (EWS) are an evolving strategic response to one of our nation's most pressing challenges: enabling all students to stay on track to graduate from high school ready for college and career.
Collaborative for Academic, Social, and Emotional Learning (CASEL)	CASEL Homepage	**Link**	Provides frameworks and tools to implement high-quality social and emotional learning (SEL) in education.
Common Core State Standards Initiative	Key Shifts in Mathematics	**Link**	Outlines significant changes in math education standards to enhance student understanding.
Complete College America	Remedial Education's Role in Perpetuating Achievement Gaps	**Link**	The publication critiques remedial education practices and their impact on student achievement disparities.
Connected Nation	Economics Can Help State Broadband Leaders Rise to the Challenge of Universal Internet Access	**Link**	An article discussing how economic principles can assist in achieving universal internet access.
Connecticut State Department of Education	Learner Engagement and Attendance Program (LEAP)	**Link**	An initiative aimed at improving student engagement and reducing chronic absenteeism.
Council of Chief State School Officers	Instructional Materials Professional Development Impact Update	**Link**	An update on the impact of professional development related to instructional materials.
Early Intervention Collaborative	A guide on early intervention strategies	**Link**	A comprehensive resource outlining strategies for early intervention to support student learning and development.

Organization	Publication	Source	Description
Eason, Sarah H. et al.	Widening the lens of family math engagement: A conceptual framework and systematic review	Link	Building on prior models, this study identifies five facets of family engagement associated with children's math learning, including math attitudes and expectations, math activities, math talk, the general home learning environment, and school involvement.
EdReports	Sample Instructional Vision Statements	Link	A resource providing examples of instructional vision statements to guide curriculum adoption and implementation.
EdReports	2020 State of the Market: The Use of Aligned Materials	Link	A report analyzing the adoption and use of standards-aligned instructional materials across the United States.
EdReports	New Study into Teachers' Use of Aligned K–12 Curriculum	Link	Research examining how teachers utilize standards-aligned curricula in their classrooms.
EdReports	Selecting for Quality: 6 Key Adoption Steps	Link	A step-by-step guide to assist educators in selecting and implementing high-quality instructional materials.
EdReports	Why Materials Matter	Link	An article emphasizing the significance of high-quality instructional materials in education.
EdSurge	Why Do High-Quality Instructional Materials Matter?	Link	An article exploring the impact of high-quality instructional materials on teaching and learning.
EdTrust	What are Automatic Enrollment (Opt-Out) Policies?	Link	Automatic enrollment in advanced coursework policies, also called "opt-out" policies, are a potent policy lever to extend access to rigorous and potentially college-credit bearing courses for underserved students.
Education Next	Solving America's Math Problem	Link	An analysis of the challenges in U.S. math education and potential solutions to improve student achievement.
Education Next	A Double Dose of Algebra	Link	A study showing that providing students with two periods of algebra instruction can significantly enhance their math performance.
Education to Workforce	Small Personalized Learning Communities	Link	Evidence-based practices highlighting the benefits of small, personalized learning environments.
Education Week	7 States Now Require Math Support for Struggling Students. Here's What's in the New Laws	Link	Details new legislation in seven states mandating additional math support for students facing challenges.
Education Week	Why Chronic Absenteeism Is a Budget Problem Too	Link	An article discussing the financial implications of chronic absenteeism in schools.

Organization	Publication	Source	Description
Federal Communications Commission (FCC)	Affordable Connectivity Program	**Link**	A program providing discounts on broadband service for eligible households.
Federal Reserve	Shedding Light on Unexpected Expenses	**Link**	Data visualization exploring how unexpected expenses impact American households.
Forrest, Bradley et al.	A Model for Community Partnerships in Mathematics	**Link**	This article describes a partnership involving a college and its surrounding public high schools in order to offer a model for transforming professional development initiatives into collaborative, reciprocal community engagement opportunities.
Fuchs, Douglas and Lynn S. Fuchs	Introduction to Response to Intervention: What, why, and how valid is it?	**Link**	This article explains important features of RTI, why it has been promoted as a substitute for IQ-achievement discrepancy, and what remains to be understood before it may be seen as a valid means of LD identification.
Fuchs, Lynn S. et al.	Extending Responsiveness to Intervention to Mathematics at First and Third Grades	**Link**	This article describes two ongoing programs of research on RTI in the area of mathematics: one on a comprehensive mathematics curriculum at first grade and the other focused on word problems at third grade.
Georgetown University CEW	STEM: Science, Technology, Engineering, and Mathematics	**Link**	The report highlights the importance of STEM education in preparing students for the modern workforce.
Gersten, Russell et al.	Assisting Students Struggling with Mathematics: Response to Intervention (RtI) for Elementary and Middle Schools	**Link**	This guide provides eight specific recommendations intended to help teachers, principals, and school administrators use Response to Intervention (RtI) to identify students who need assistance in mathematics and to address the needs of these students through focused interventions.
Government Technology	North Dakota Offers $1M in Grants for AI STEM Summer Camps	**Link**	An article discussing North Dakota's initiative to fund AI-focused STEM summer camps.
Harvard Center for Education Policy Research	Long-Term Outcomes of Educational Interventions	**Link**	Examines the sustained effects of educational programs on student achievement and life outcomes.
Harvard Center for Education Policy Research	Effective Classroom Practices	**Link**	A study examining effective classroom practices and their impact on student learning outcomes.
Institute of Education Sciences	WWC Practice Guide: Mathematics Intervention	**Link**	A practice guide providing evidence-based recommendations for mathematics interventions.

Organization	Publication	Source	Description
Institute of Education Sciences (IES)	Developing Effective Fractions Instruction for K-8	**Link**	This practice guide offers evidence-based strategies for teaching fractions to K-8 students.
Institute of Education Sciences (IES)	Engagement and Achievement Through Computational Thinking	**Link**	A project by REL Midwest aiming to enhance student engagement and achievement through integrating computational thinking into classroom instruction.
Institute of Education Sciences (IES)	RTI Math Practice Guide	**Link**	A practice guide providing evidence-based recommendations for Response to Intervention in mathematics.
Instruction Partners	Scaling Elementary Math Success in Nebraska	**Link**	A case study detailing efforts to improve elementary math instruction and student achievement in Nebraska.
Instruction Partners	2021–22 Math Instructional Practice Guide	**Link**	A guide offering best practices for math instruction to enhance student understanding and achievement.
Internal Revenue Service (IRS)	Refundable tax credits	**Link**	The IRS provides information on refundable tax credits, which allow eligible taxpayers to receive money back even if they owe no taxes.
Internal Revenue Service (IRS)	Refundable Tax Credits	**Link**	Information on various refundable tax credits available to individuals.
James□Brabham, Ella et al.	Do home mathematical activities relate to early mathematical skills? A systematic review and meta□analysis	**Link**	This study explores the relation between frequency of home mathematical activities and mathematical skills in children aged 7 years and under.
Jeynes, William H.	A Meta-Analysis of the Relation of Parental Involvement to Urban Elementary School Student Academic Achievement	**Link**	This meta-analysis examines the relationship between parental involvement and the academic achievement of urban elementary school children. Results indicate a significant relationship between parental involvement overall and academic achievement.
Jo Boaler	Mathematical Mindsets	**Link**	Advocates for growth mindset approaches to transform students' attitudes and performance in math.
Just Equations	New Math Policies Pay Off for Cal State Students and It's About Time	**Link**	An article discussing the positive outcomes of recent math policy reforms in the California State University system.
Learning Forward	Aligned Standards Keep Students, Teachers, and Leaders Moving in the Same Direction	**Link**	An article emphasizing the importance of aligned educational standards for coherent teaching and learning.

Organization	Publication	Source	Description
Learning Policy Institute	CRDC Course Access Report	**Link**	Analysis of Civil Rights Data Collection (CRDC) data focusing on disparities in course access among student groups.
Learning Trajectories	Learning Trajectories Document	**Link**	A framework outlining developmental progressions in early mathematics learning.
Los Angeles Times	Cal State's Remedial Education Reforms	**Link**	News coverage on the California State University's efforts to eliminate non-credit remedial courses and improve student success.
Louisiana Department of Education	Louisiana Content Leaders	**Link**	A professional development program aimed at building local capacity to support high-quality curriculum implementation.
Louisiana Department of Education	Accelerate Math	**Link**	A program designed to support math acceleration strategies in Louisiana schools.
Mathematica	Integrating Mathematical Thinking into Family Engagement Programs	**Link**	A publication discussing strategies for incorporating math thinking into family engagement initiatives.
Mathematics Education Collaborative (MEC)	Number Talks	**Link**	An instructional strategy designed to improve students' mental math and communication skills through brief, daily exercises.
Mathematics Education Collaborative (MEC)	Model Components	**Link**	An outline of key components essential for effective mathematics education.
Mensah, Felicia Moore	Confronting assumptions, biases, and stereotypes in preservice teachers' conceptualizations of science teaching through the use of book club	**Link**	This study focuses on the structure and theoretical foundations of the book club for promoting multicultural understandings in science teacher education.
Mississippi Department of Education	Adopted Materials	**Link**	A list of instructional materials adopted by the Mississippi Department of Education.
National Academies Press	Mathematics Learning in Early Childhood: Paths Toward Excellence and Equity	**Link**	A comprehensive report on early childhood mathematics education and strategies for improvement.
National Bureau of Economic Research (NBER)	The Effect of High School Curriculum on Earnings	**Link**	Analyzes how high school coursework influences students' future earnings.
National Bureau of Economic Research (NBER)	Intensive Math Instruction and Educational Attainment: Long- Run Impacts of Double- Dose Algebra	**Link**	Study of an intensive math instruction policy that assigned low- skilled ninth graders to an algebra course that doubled instructional time, altered peer composition and emphasized problem solving skills.

Organization	Publication	Source	Description
National Center for Education Statistics (NCES)	The Nation's Report Card (NAEP)	**Link**	Provides a comprehensive assessment of student achievement in various subjects across the U.S.
National Center for Education Statistics (NCES)	National Teacher and Principal Survey (NTPS)	**Link**	A survey providing data on the characteristics and experiences of teachers and principals.
National Center for Education Statistics (NCES)	Digest of Education Statistics 2022: Table 203.80	**Link**	A statistical table providing data on student absenteeism and related metrics.
National Comprehensive Center for Teacher Quality	Key Issue: Identifying How Highly Effective Leaders Support Teachers	**Link**	This paper presents strategies for supporting highly effective teachers. A list of resources that provide helpful information about implementing these strategies is presented.
National Conference of State Legislatures (NCSL)	State Broadband Task Forces, Commissions, or Authorities	**Link**	An overview of state-level entities focused on broadband expansion and policy.
National Council of Supervisors of Mathematics (NCSM)	Position Paper 19	**Link**	Discusses leadership strategies to improve mathematics education and student learning outcomes.
National Council of Teachers of Mathematics (NCTM)	Algebra: Not If but When	**Link**	An article discussing the importance of timely algebra instruction and its role in students' mathematical development.
National Council of Teachers of Mathematics (NCTM)	Using Formative Assessment Effectively	**Link**	Discusses strategies for implementing formative assessments to inform instruction and support student learning.
National Council of Teachers of Mathematics (NCTM)	Procedural Fluency in Mathematics	**Link**	Emphasizes the importance of developing procedural fluency alongside conceptual understanding in math.
National Council of Teachers of Mathematics (NCTM)	Principles to Actions: Ensuring Mathematical Success for All	**Link**	Provides guidance on effective teaching practices to promote mathematical success for all students.
National Council of Teachers of Mathematics (NCTM)	2018 Annual Meeting and Exposition: Washington, DC	**Link**	Conference focusing on advancing mathematics education through professional development and collaboration.
National Council of Teachers of Mathematics (NCTM)	The Intersection of Culture and Mathematics	**Link**	A position statement emphasizing the importance of cultural relevance in mathematics education.

Organization	Publication	Source	Description
National Council on Teacher Quality (NCTQ)	Professional Development That Delivers: Discovering the Keys to Better Math and Science Outcomes	**Link**	A report identifying effective professional development practices that lead to improved math and science teaching outcomes.
National Council on Teacher Quality (NCTQ)	Driven by Data: Using Licensure Tests to Build a Strong, Diverse Teacher Workforce	**Link**	An analysis of how licensure tests can be utilized to strengthen and diversify the teacher workforce.
National Equity Atlas	Research Resources	**Link**	A collection of research resources focused on equity in various sectors, including education.
NCEE Study Snapshot	Focusing on teachers' mathematical knowledge	**Link**	This study examined the implementation and impact of a 93-hour PD program that focused on deepening teachers' general math knowledge but also covered some math knowledge relevant to teaching.
Nebraska Department of Education	Nebraska Instructional Materials Matter	**Link**	A resource hub promoting the selection and use of high-quality instructional materials in Nebraska schools.
Nebraska Department of Education	Nebraska Instructional Materials Selection Process	**Link**	Guidelines and processes for selecting effective instructional materials in Nebraska.
Neuman, Susan B. and Donna C. Celano	Giving Our Children a Fighting Chance	**Link**	A book exploring strategies to improve educational outcomes for children.
New America	Absence	**Link**	An article discussing the implications of student absenteeism on educational outcomes.
New England College	Middle School Students' Mathematics Attitude Profiles	**Link**	The study explores how middle school students' attitudes toward math develop and affect their learning experiences.
New Meridian Corporation	Through-Year Assessment is Gaining Momentum in Montana	**Link**	A report on Montana's adoption of through-year assessment models to better track student progress.
No Kid Hungry, Center for Best Practices	Afterschool Meals	**Link**	An overview of after school meal programs that aim to reduce food insecurity and support child nutrition in low-income communities.
North Carolina Department of Public Instruction	North Carolina Teacher Compensation Models and Advanced Teaching Roles	**Link**	A strategic plan proposal to support Thomasville County Schools (North Carolina) in achieving academic excellence, workforce diversity, operational unity, and student/community pride.
North Carolina Teacher Working Conditions Survey	North Carolina Teacher Working Conditions Survey	**Link**	A survey collecting data on teacher working conditions to inform policy and practice in North Carolina.

Organization	Publication	Source	Description
Oklahoma State Regents for Higher Education	OSRHE Grants	**Link**	Information on grants provided by the Oklahoma State Regents for Higher Education to support various educational initiatives.
Opportunity Insights	Social Capital Non-Tech Paper	**Link**	A research paper exploring the role of social capital in economic mobility.
Panorama Education	Panorama Student Survey	**Link**	A survey tool designed to capture student perceptions on various aspects of their educational experience, including school climate and engagement.
PDF4PRO	Mathematical Teaching Strategies: Pathways to Critical Thinking	**Link**	Explores teaching methods that foster critical thinking through mathematics instruction.
Policy Analysis for California Education (PACE)	Effects of Absenteeism on Academic and Social-Emotional Outcomes	**Link**	A publication analyzing how absenteeism affects students' academic performance and social-emotional development.
Positive Behavioral Interventions and Supports (PBIS)	PBIS	**Link**	A framework for assisting school personnel in adopting and organizing
Powell, Sarah R. et al.	A Systematic Review of Mathematics Interventions for Middle–School Students Experiencing Mathematics Difficulty	**Link**	This study explores mathematics interventions for middle school (Grades 6, 7, and 8) implemented with students who experienced difficulty in the area of mathematics, including students with an identified learning disability in mathematics.
Prenatal-to-3 Policy Impact Center	2022 Evidence-Based Home Visiting Programs	**Link**	A clearinghouse of evidence-based home visiting programs supporting early childhood development.
Proceedings of the National Academy of Sciences (PNAS)	A study on the impact of mindset interventions on academic achievement	**Link**	Research demonstrating that brief mindset interventions can lead to long-term improvements in student academic performance.
Public Policy Institute of California (PPIC)	Exploring Math Pathways Under Common Core	**Link**	Examines the implementation of math pathways in California schools under the Common Core standards.
Public Policy Institute of California (PPIC)	Math Placement in California's Public Schools	**Link**	An examination of math placement policies in California schools and their implications for student success.
Public Policy Institute of California (PPIC)	A New Era of Student Access at California's Community Colleges	**Link**	A report analyzing the impact of placement reforms on student access and success in California community colleges.
PubMed	The Effect of Teacher-Child Race/Ethnicity Matching and Classroom Diversity on Children's Socioemotional and Academic Skills	**Link**	This study examined effects of matching on teacher-reported child outcomes in a racially/ethnically diverse sample of teachers and children, and classroom diversity moderation using multilevel models.

Organization	Publication	Source	Description
RAND Corporation	A research report on educational interventions	**Link**	A study evaluating the effectiveness of specific educational interventions on student learning outcomes.
RAND Corporation	A Systematic Review of the Research on Principal Professional Learning	**Link**	A review analyzing the effectiveness of professional learning programs for school principals.
RAND Corporation	A Systematic Review of the Research on Principal Professional Learning (PDF)	**Link**	A comprehensive review analyzing the effectiveness of professional learning programs for school principals.
RAND Corporation	Supporting Principals to Improve Instruction: A Review of Research	**Link**	A report examining how principals can be supported to enhance instructional quality in schools.
RAND Corporation	Improving Mathematics Proficiency for All Students	**Link**	A monograph discussing strategies to enhance math proficiency among diverse student populations.
Rennie Center	Curriculum Matters: Identifying High-Quality Instructional Materials	**Link**	An article discussing the importance of selecting high-quality instructional materials to improve student outcomes.
Research in Educational Policy and Management (REPAM)	An article on educational policy and management	**Link**	A scholarly article discussing recent findings in educational policy and management.
ResearchGate	Math Out of School: Families' Math Game Playing at Home	**Link**	A study examining how families engage in math-related games outside of school settings.
Results for America	Early Childhood Workforce Strategies	**Link**	A catalog of strategies aimed at strengthening the early childhood workforce.
Results for America	Catalog of Strategies	**Link**	A catalog providing evidence-based strategies for improving outcomes in various sectors, including education.
Results for America	Housing & Community Development	**Link**	A catalog of evidence-based strategies for housing and community development.
Results for America	Healthy Home Environment Assessments	**Link**	Programs aimed at assessing and improving the healthiness of home environments.
Results for America	Encouraging Guided Play Through Playscapes: Dayton, OH	**Link**	A case study on promoting guided play through playscapes in Dayton, Ohio.
Results for America	Housing Rehabilitation Grant and Loan Programs	**Link**	Programs providing financial assistance for housing rehabilitation.
Results for America	Lead Paint Abatement Programs	**Link**	Initiatives aimed at removing lead paint hazards from homes.

Organization	Publication	Source	Description
Results for America	School-Based Supports	**Link**	Strategies and programs designed to provide support within school settings to enhance student outcomes.
Results for America	School Climate	**Link**	Strategies and programs focused on improving the overall climate within schools.
Results for America	The Incredible Years	**Link**	A program designed to address behavioral issues and promote positive development in children.
Rhode Island Department of Education	High-Quality Curriculum Materials: Mathematics	**Link**	Resources and guidance on selecting high-quality mathematics curriculum materials in Rhode Island.
Richard P. Toney	The Effect of Growth Mindset Strategies on Perseverance and Engagement in Middle School Math Classrooms	**Link**	Examines how implementing growth mindset strategies influences student perseverance and engagement in math.
Rupasingha, Anil and Stephan J. Goetz	Social and political forces as determinants of poverty: A spatial analysis	**Link**	This study contributes to basic knowledge of the structural determinants of poverty in the US by analyzing an expanded set of determinants of poverty, namely factors related to economic, social, and political influence using spatial data analysis techniques.
Saenz, Marisa B. et al.	A Comparative Study of High School Students' Math Achievement and Attitudes: Do Math Teacher Qualifications Matter?	**Link**	Using nationally representative High School Longitudinal Study of 2009 data, this quantitative study examined how math teacher qualifications affect U. S. 9th graders' math achievement and attitudes.
Safe Supportive Learning	Information and Tools to Promote Student Mental Health	**Link**	Resources aimed at supporting student mental health and creating safe learning environments.
Safe Supportive Learning	Safe Supportive Learning Environment Resources	**Link**	Offers evidence-based resources to help schools create safe and supportive learning environments.
Samara, Julie et al.	Professional development in early mathematics	**Link**	A study evaluating the effects of a research-based model for scaling up educational interventions on teachers' practices in preschool mathematics.
Search Institute	Social Capital Assessment and Learning for Equity (SCALE) Measures	**Link**	Resources and tools for assessing and enhancing social capital to promote equity.
Silicon Valley Community Foundation	Math Misplacement: A Leak in the STEM Pipeline	**Link**	A report highlighting how incorrect math placement can hinder students' progress in STEM fields.

Organization	Publication	Source	Description
Smart Growth America	National Complete Streets Coalition	**Link**	A program advocating for the development of complete streets that accommodate all users.
Smart Growth America	Policy Atlas	**Link**	A resource mapping complete streets policies across the United States.
South Dakota Department of Education	TeachSD Story	**Link**	An article highlighting educational stories and initiatives in South Dakota.
Southern Regional Education Board	Mississippi Instructional Materials	**Link**	Information on instructional materials and resources in Mississippi.
SpringerOpen	STEM Education Journal Article	**Link**	A scholarly article discussing advancements and research in STEM education.
StandardsWork	Curriculum Research Report	**Link**	A report presenting research findings on curriculum effectiveness.
Stanford Graduate School of Education	Study: When Teachers Think Differently About Themselves as Math Learners, Students Benefit	**Link**	Research indicating that when teachers view themselves as math learners, it positively impacts student learning outcomes.
State Science & Technology Institute (SSTI)	Measuring Accessibility	**Link**	A report on methodologies for assessing accessibility in transportation and infrastructure.
StriveTogether	Cradle to Career Outcomes Data Guides: Middle Grade Math	**Link**	A guide providing data indicators and strategies to improve middle grade math outcomes within a cradle-to-career framework.
Taylor, Joseph A. et al.	Professional Learning in the Learning Profession	**Link**	A report analyzing the state of professional learning for educators and its impact on teaching effectiveness.
Tennessee Department of Education	Required Tutoring for 2023-24	**Link**	Guidelines outlining mandatory tutoring requirements for the 2023-24 academic year in Tennessee.
Tennessee Department of Education	Updated RTI2 Manual	**Link**	An updated manual providing guidance on Response to Instruction and Intervention (RTI2) in Tennessee.
Tennessee State Board of Education	Educator Vacancy Report 2023-24	**Link**	A report detailing educator vacancies in Tennessee for the 2023-24 academic year.
Texas Education Agency	Teacher Incentive Allotment	**Link**	The Teacher Incentive Allotment (TIA) elevates the education profession by providing districts with systems and funding to recruit promising new teachers, retain their best teachers, and incentivize teachers to work in high-needs schools and difficult to staff positions.

Organization	Publication	Source	Description
Texas Workforce Commission	TWC Grants Enable Middle School Students to Attend STEM Summer Camps	**Link**	An announcement about grants provided to support middle school students' participation in STEM summer camps.
The 74 Million	Study: Math Scores Matter More for Adult Earnings	**Link**	Review of an Urban Institute report that underscores the need for better math instruction starting in the early grades.
The Aspen Institute	Practice What You Teach: Connecting Curriculum and Professional Learning in Schools	**Link**	A report emphasizing the alignment of curriculum and professional development to improve teaching practices.
The Century Foundation	Ensuring Equitable Access to Dual Language Immersion Programs: Supporting English Learners' Emerging Bilingualism	**Link**	A report discussing strategies to provide equitable access to dual language immersion programs for English learners.
The Education Trust	Inequities in Advanced Coursework	**Link**	Analyzes disparities in access to advanced coursework among different student demographics.
The Education Trust	Educators of Color Make the Case for Teacher Diversity	**Link**	A report highlighting the perspectives of educators of color on the importance of teacher diversity.
The Education Trust–West	Recruiting and Retaining Educators of Color	**Link**	A report discussing strategies to recruit and retain educators of color in the education system.
TNTP	So All Students Thrive	**Link**	A publication focusing on strategies to ensure all students have access to effective teaching and learning opportunities.
TNTP	Accelerate, Don't Remediate	**Link**	A report advocating for acceleration strategies over remediation to address learning gaps.
Tripod Education Partners	Guide to Tripod's 7Cs Framework	**Link**	A toolkit outlining the 7Cs framework for effective teaching, aimed at improving instructional practices through student feedback.
U.S. Census Bureau	Quarterly Residential Vacancies and Homeownership, Fourth Quarter 2024	**Link**	This Census Bureau resource provides up-to-date statistics on housing vacancies and homeownership trends in the U.S.
U.S. Census Bureau	Housing Vacancies and Homeownership	**Link**	Current data on housing vacancies and homeownership rates in the United States.
U.S. Census Bureau	Why We Ask Each Question: Year Built	**Link**	An explanation of the importance of collecting data on the year housing units were built.

Organization	Publication	Source	Description
U.S. Department of Education (2008)	The Final Report of the National Mathematics Advisory Panel	**Link**	A landmark report published by the U.S. Department of Education, tasked with identifying the most effective ways of improving mathematics education, particularly in K–8. The Panel was formed in 2006 by President George W. Bush as part of the American Competitiveness Initiative.
U.S. Department of Homeland Security	Smart Cities	**Link**	An initiative focusing on integrating smart technologies into urban infrastructure.
U.S. Federal Reserve	Report on the Economic Well-Being of U.S. Households	**Link**	This resource analyzes how unexpected expenses impact household financial stability and economic decision-making.
UChicago Impact	5Essentials	**Link**	A research-based system assessing five key components of school effectiveness to drive improvement efforts.
University of California, San Diego	The Effect of High School Courses on Earnings	**Link**	Investigates how specific high school courses impact students' future earnings potential.
University of Chicago Consortium on School Research	5 Key Findings	**Link**	A summary of key findings from research on educational practices and student outcomes.
University of Memphis	Factors Impacting Advanced Math Course-Taking: A Multilevel Modeling Analysis of the HSLS:09	**Link**	Analyzes various factors that affect high school students' enrollment in advanced math courses.
University of Michigan	Effects of Teachers' Mathematical Knowledge for Teaching on Student Achievement	**Link**	A study examining the relationship between teachers' mathematical knowledge and student achievement in mathematics.
Visible Learning	Collective Teacher Efficacy (CTE) According to John Hattie	**Link**	An article highlighting the significant impact of collective teacher efficacy on student achievement, as identified by John Hattie's research.
WestEd	PBS Kids Learning Math with Curious George	**Link**	A resource exploring how the Curious George series supports math learning in young children.
Zearn	Efficacy Research: Zearn Impact in Louisiana	**Link**	A study evaluating the impact of Zearn's math program in Louisiana.

StriveTogether®

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StriveTogether is a national network of community partnerships that join together neighbors, including youth and families, nonprofits, businesses, schools and more, to work toward a future where youth can thrive in their communities. Cradle to Career Network members change the way their communities work together by building connections, sharing resources and using data to put more young people on a path to economic mobility. Our work helps young people meet seven key life milestones so that they have the opportunities they need to reach their goals, and, ultimately, thrive.

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