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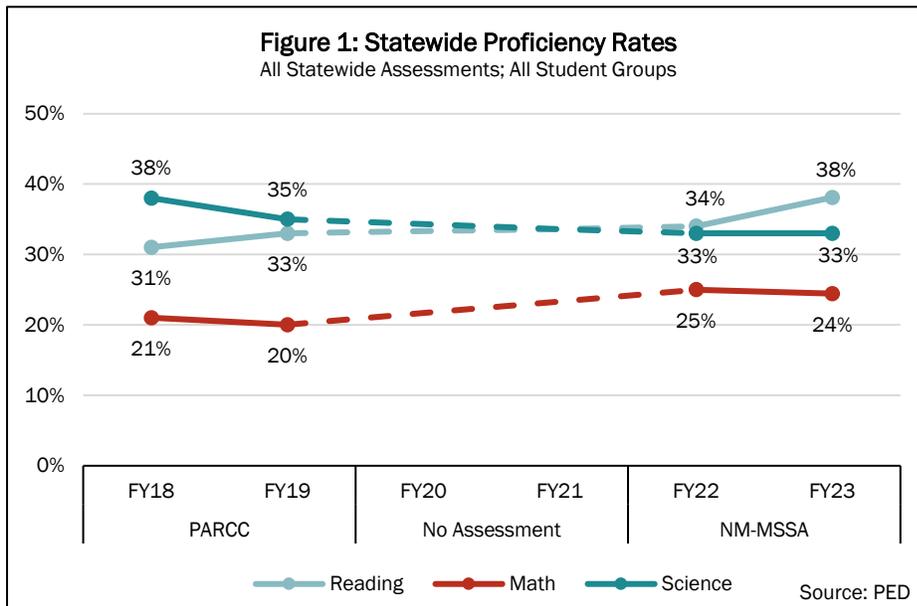
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Solving the Math Puzzle: State Policy for Student Success

One in four students are proficient in math in New Mexico, with even lower proficiency rates for students from economically disadvantaged backgrounds, English learners, and students with disabilities. In the consolidated *Martinez-Yazzie* lawsuit, the judge pointed to low proficiency rates in math overall, as well as the persistent achievement gaps between student groups, as part of the evidence the state violated students' fundamental rights.

As shown by **Figure 1: Statewide Proficiency Rates**, more than five years later, work remains to improve overall student achievement and eliminate achievement gaps among student groups in mathematics in New Mexico.



This brief is part of LESC's two year study of mathematics. LESC began its study of math in New Mexico in November 2022 with a [review](#) of historical math achievement and initiatives designed to set the state up for success. Last year, LESC heard two panel presentations with the following accompanying staff briefs:

- [Modernizing and Engaging Secondary Students in Mathematics](#) in July 2023; and
- [Fostering Mathematics Success in Elementary Grades](#) in September 2023.

Key Takeaways

Only one in four students are proficient in math in New Mexico.

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While there is substantial research on effective math teaching practices, there is not yet consensus on a "science of math" that mirrors the established science of reading.

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State policy levers to improve math education tend to focus on improving the quality of instruction, aligning state systems for a cohesive approach, or providing for assessment and intervention tactics to support students.

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LESC staff have worked with stakeholder partners to identify effective structures for teacher training and student interventions to increase student proficiency in mathematics.

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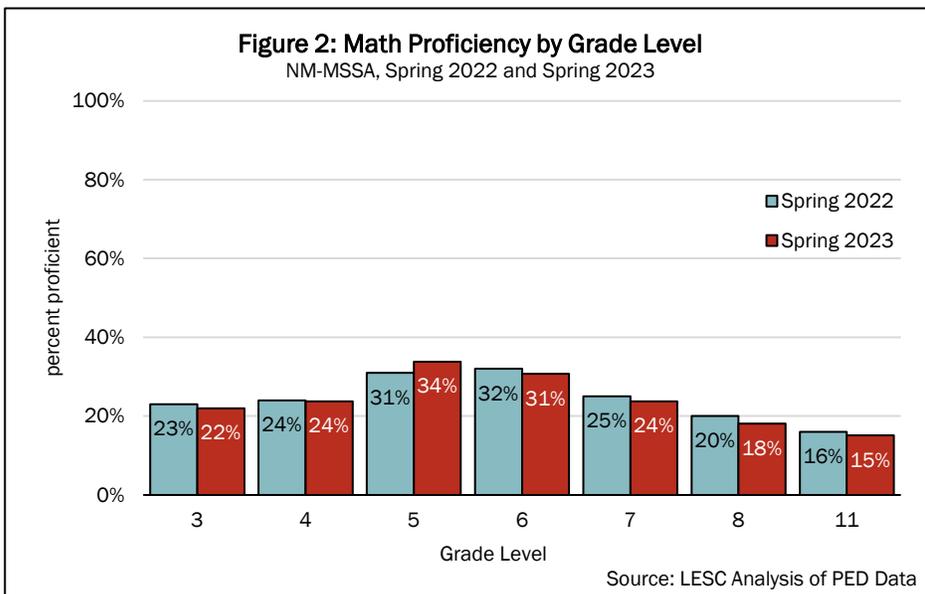
This brief will review the landscape of math education nationally, display current math achievement in New Mexico, propose a framework to outline actionable policy interventions to improve student achievement in mathematics, and highlight state policy options for members to consider in advance of the 2025 legislative session.

Landscape of Math Education

There has been concern for many years about how students across the United States (U.S.) are performing in math both nationally and internationally. [Results](#) from the 2022 Program for International Assessment (PISA), an international exam that measures reading, mathematics, and science literacy of 15-year-olds, [found](#) reading and science results in the U.S. held steady between 2018 and 2022, while mathematics achievement decreased in the same time period. In math, the U.S. scored 26th among the 81 countries that participated in PISA in 2022. For comparison, the U.S. ranked sixth in reading skills and 10th in science skills in 2022. While the U.S. did decrease in mathematics skills, the U.S. overall ranking rose because other countries also face declines in performance, in part due to global learning loss because of the Covid-19 pandemic.

As students in the U.S. have consistently fallen behind on international assessments, there has been deliberate conversation about what can be done at all levels of policy (federal, state, and local) to improve mathematics outcomes. The state policy conversation has largely been centered around options to support math instruction that mirror the type of approaches implemented regarding literacy. What has complicated this, however, is a lack of universal consensus on a “science of math” that is analogous to established science of reading approaches.

However, there is a substantial body of research supporting effective mathematics teaching and learning (for example, the [National Council of Teachers of Mathematics’ Principles to Actions](#)). How math is learned and taught requires a complex interaction of core numeracy skills, mastery of concepts in a linear and sequential way, and interventions to address deficits that recognize the inherent complexity in teaching math. At the same time, math is inherently inquiry-based.



Math Achievement Landscape

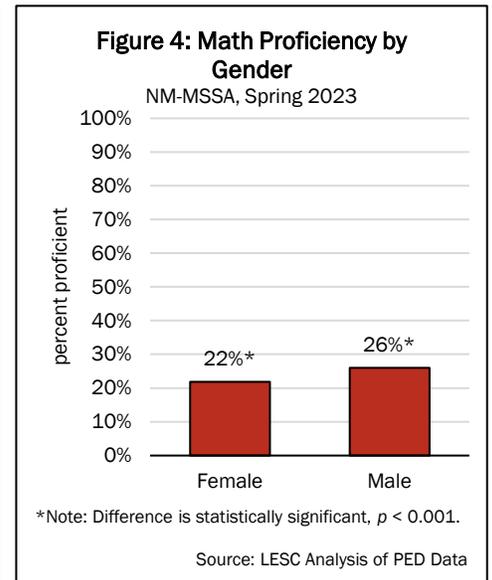
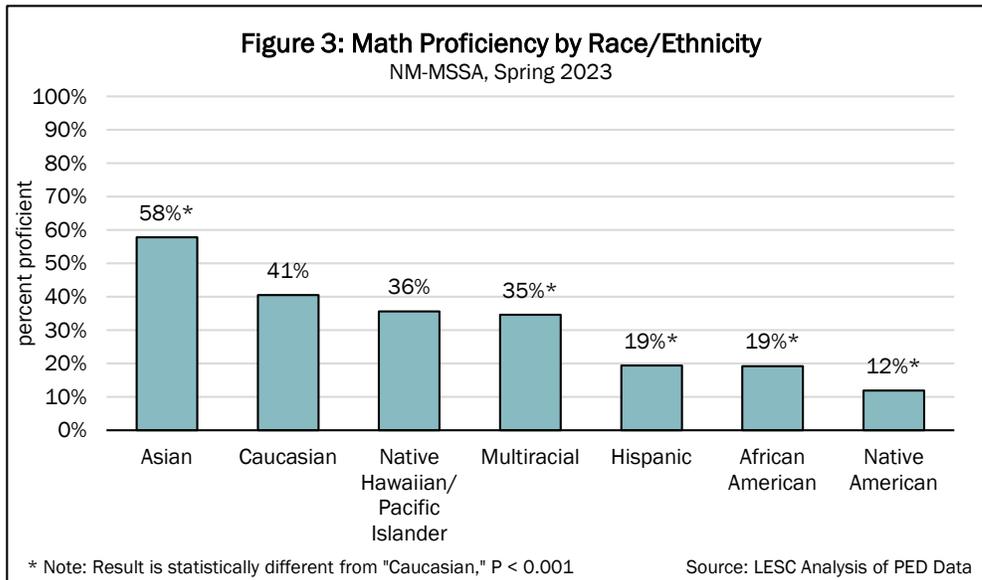
Math achievement in New Mexico often falls below national averages. New Mexico’s statewide summative assessments include the New Mexico Measures of Student Success & Achievement (NM-MSSA) for grades three through eight and the SAT for grade 11. As shown in **Figure 1: Statewide Proficiency Rates**, assessment results from spring 2023 across all student groups and grades, suggest 24 percent of students demonstrate proficiency in

math. While only a quarter of students demonstrate proficiency, there are still meaningful



differences among students by grade levels and demographics. **Figure 2: Math Proficiency by Grade Level**, shown on the previous page, demonstrates how math achievement actually rises through fifth grade in New Mexico then begins to decrease across middle and high school grades until it reaches a low 15 percent in grade 11.

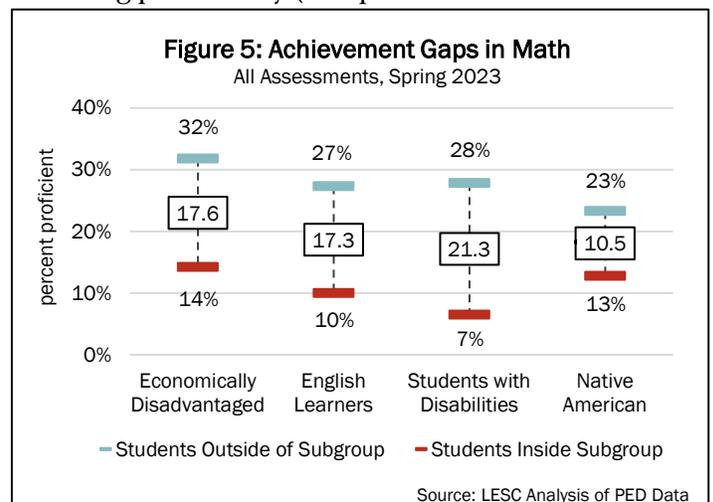
There are also differences in math achievement by additional demographics, notably race and gender, as shown in **Figure 3: Math Proficiency by Race/Ethnicity** and **Figure 4: Math Proficiency by Gender**.



Additional, significant achievement gaps in math also remain. **Figure 5: Achievement Gaps in Math** illustrates these achievement gaps with 2023 assessment results indicating 14 percent of students from economically disadvantaged families demonstrating proficiency (compared with 32 percent for students who are not economically disadvantaged), 10 percent of English learners demonstrating proficiency (compared with 27 percent for students who are not English learners), 7 percent of students with disabilities demonstrating proficiency (compared with 28 percent for students who do not have a disability), and 13 percent of Native American students demonstrating proficiency (compared with 23 percent for non-Native American students).

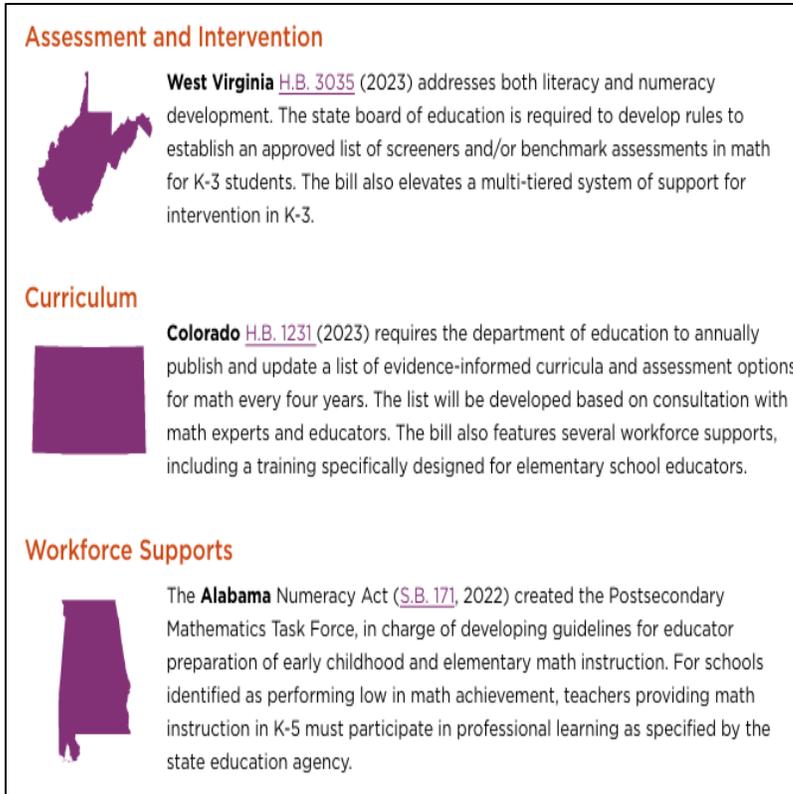
State Policy Options

State legislative policy can a factor in mathematics success by allocating funding and resources, ensuring well-developed methods to approve instructional materials, directing professional learning and development expected of educators, and providing mechanisms to drive interventions and supports. Primary levers of state policy tend to focus on improving the quality of instruction (for example, reviewing teacher preparation standards or requiring professional learning of current educators), aligning state systems



for a cohesive approach (for example, ensuring funding is used for high quality instructional materials), or providing for assessment and intervention tactics to support students (for example, creating/funding tutoring programs or creating methods to identify students in need).

Figure 6: Sample State Policy Options



Source: Education Commission of the States Policy Outline

A [policy outline](#) focused on early math achievement published by the Education Commission of the States, a national nonprofit that tracks and researches educational policy, found state actions have largely centered on three topics:

1. **Assessment and intervention;**
2. **Curriculum; and**
3. **Workforce supports.**

Figure 6: Sample State Policy Options shows examples of state policy actions in West Virginia, Colorado, and Alabama related to math supports. In addition to these examples, a state policy scan from the Education Commission of the States indicates eight states—Alabama, Arkansas, Colorado, Florida, Kentucky, Tennessee, Virginia, and West Virginia—have enacted legislation related to math instruction and supports between 2022 and 2024. State policy has taken many forms, with some states directing additional study, some establishing required supports for early numeracy, some directing screening and interventions, and others requiring

reporting to legislative bodies, among other state options.

Arkansas passed Senate Bill 294 in 2023 which requires monitoring and intervention plans for third through eighth grade students who fall below grade level in math, as well as requiring its state education secretary to engage with stakeholders with expertise in early numeracy.

Florida passed House Bill 7039 during its 2023 legislative session, requiring supports for students in grades kindergarten through fourth grade who show “deficiency in mathematics or dyscalculia,” including parent notification and school district monitoring. Florida also requires its department of education to provide lists of approved math interventions, programs, curricula, and supplemental materials and requires its department of education to provide legislative recommendations regarding teacher preparation and math professional development.

Virginia passed House Bill 938 in 2022 requiring its board of education to convene a group of stakeholders to advise its General Assembly on ways to promote excellence in math instruction.

LESC staff will continue to monitor outcomes in these states and provide additional policy options that could be considered by LESL members.

Proposed Framework for New Mexico

Throughout the interim, LESL staff have worked with stakeholder partners to identify the following potential policy interventions to increase teacher effectiveness and student learning in mathematics.

Proposed Areas of Focus for New Mexico

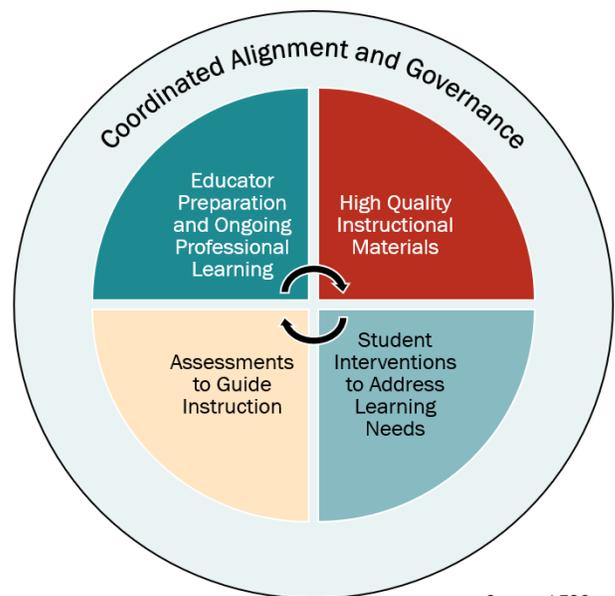
Educator Preparation and Professional Learning:

Teachers play a fundamental role in building and cementing math skills for students, however, many elementary teachers do not feel confident in their own basic math skills, the National Council on Teacher Quality (NCTQ) [reports](#). Given that mathematics knowledge is highly cumulative, if students struggle with foundational math skills in the early grades, they are more likely to struggle later on. Because of this, ensuring elementary teachers' own competence in math is a critical route to improving student outcomes in mathematics.

Teacher preparation programs must dedicate sufficient time to both building teachers' foundational math skills as well as pedagogical knowledge. In New Mexico, traditional undergraduate teacher preparation programs require six hours of mathematics content and three hours of mathematics methods for pre-service teachers, however, there is no requirement for alternative licensure programs to require mathematics content nor mathematics methods. Additionally, mathematics method courses may not be aligned with national standards and best practices. This means many new teachers in New Mexico enter the classroom without the foundational math skills or professional knowledge and practices needed to ensure all students succeed in math.

Professional learning is an important lever to improve teacher practice and ensure instructional practices are research-based. Mathematics education has shifted in the past 25 years, based on [research](#) that shows students best learn mathematics as a result of actively solving problems as opposed to strict procedural "sit and get" instruction. Many math teachers in New Mexico are still teaching mathematics in the same way they learned math in school, and instructional shifts could be required to engage all students in deep mathematics learning as detailed in the [New Mexico Math Framework](#).

PED is in the process of developing math micro-credentials in partnership with New Mexico State University's (NMSU's) Mathematically Connected Communities (MC²) and feedback from teacher leaders. PED reports these micro-credentials will build math content knowledge for kindergarten through fifth grade educators and assure a positive K-12 math trajectory for students. Moreover, they will be aligned with research from the National Council of Teachers of Mathematics. The micro-credential courses will be a



Source: LESL

series of four courses to be completed in one year. PED has announced a statewide rollout planned for August 2024, and has noted that a legislative lever would increase success.

High Quality Instructional Materials. [Research](#) show high quality instructional materials (HQIM) boost student achievement and reduce variability in the quality of instruction, and are low-cost, high return educational investments. HQIM are researched to align with how students must learn concepts in a layered fashion and are aligned with brain development in the learning sciences. They are written with clear purpose, effective lesson structure, and pacing to provide flexibility for teachers to best support learning for all students, encouraging inquiry and curiosity. HQIM provide a variety of relevant assessments to support and guide teachers with professional tools to evaluate student comprehension.

In New Mexico, selection of instructional materials is a local decision, but staff at PED vet core instructional materials on a six year cycle, releasing an adoption list that school districts and charter schools can use as a guide when selecting instructional materials—though they do not have to. PED’s Instructional Materials Bureau convenes a working group of educators every summer and they review submitted instructional materials in a specific content area for alignment with state standards and assess the rigor of the curriculum using a rubric.

Kindergarten through 12th grade (K-12) math reviews were last conducted in 2019, and the next review is scheduled for 2025. While some school districts and charter schools follow the state adoption cycle when purchasing instructional materials, some do not. While all schools are allocated funding for instructional materials through the state equalization guarantee, money does not have to be spent on high quality materials.

Student Interventions. Evidence-based student interventions are an effective way to address learning gaps or misconceptions, as well as to build student understanding. Tiered interventions based on data-informed student needs can take place at a specific time during the course of a regular school day, through out-of-school time programs, or during the summer. New Mexico’s [multi-layered system of supports \(MLSS\)](#) provides a holistic intervention framework to guide educators to intervene quickly when students need extra supports, and also supports implementation of high-dosage tutoring opportunities that meet individual student needs.

There are many out-of-school time and nonprofit organizations that provide student intervention services, often in concert with teacher professional learning. One strong model, MC², a research-based organization funded by PED and housed NMSU, provides math summer camps for K-12 students in addition to professional learning for teachers and administrators. This allows teachers and administrators to watch and learn from master teachers and consider how to implement the shift to problem-based mathematics teaching and learning in their own classrooms and schools. **Appendix 1: New Mexico Math and STEM Support Organizations**, provides an overview of organizations statewide that provide professional learning opportunities to support teacher and student learning.

Assessment. Statewide assessment systems are a powerful lever for influencing what is taught in schools by signaling what the state or district believes is important. As mentioned earlier in this brief, New Mexico begins testing students in mathematics in third grade using its statewide summative assessment system (NM-MSSA). It is the state’s responsibility to ensure state assessments are aligned with standards in a way that sets out

expectations for math instruction, and according to PED, NM-MSSA is [aligned](#) with the common core state standards for math. However, annual statewide assessment results do not allow teachers to adjust their instruction to meet the needs of particular students; a comprehensive system of assessment is needed to drive instruction.

Teachers use formative assessments to gauge daily progress of students and interim assessments to measure weekly, unit, or quarterly learning; more systematic formative assessments could be used to better guide and direct classroom instruction.

Legislative Recommendations

Since the inclusion of math in LESC's work plan in 2023, LESC staff have met with stakeholder partners to identify effective structures for teacher training and student interventions to increase student proficiency in mathematics. The New Mexico Partnership for Math and Science Education (NMPMSE), a nonprofit that works to promote coherence and quality of STEM education, is one of these stakeholder partners.

NMPMSE began drafting policy and funding recommendations to transform math education in New Mexico in August 2023, and then began an intentional process of collaboration and stakeholder feedback in January 2024. NMPMSE is still in the process of incorporating feedback and refining their recommendations to develop the structures and systems needed to improve mathematics outcomes in New Mexico.

Aside from elevating NMPMSE's Math Priority Areas to Transform Math Education in New Mexico, LESC staff focused on the best way for the Legislature to structure and fund teacher supports and student interventions immediately, based on what research says matters for learning.

At this time, LESC staff recommend the Legislature focus on the unique role it plays in allocating resources and setting a vision for math success.

Teacher Training

- **The Legislature could consider requiring professional learning for teachers, addressing both content and pedagogical skills** given not all pre-service teachers in New Mexico have access to the math content or methods courses they need.
- **The Legislature could provide corresponding funding for math professional learning.** One example that could immediately benefit from funding are the micro-credential courses developed and implemented by PED to foster continuous improvement among math educators in New Mexico.

Student Interventions

- **The Legislature could consider funding targeted math interventions for students,** both over the summer and during the school year, in an effort to increase student achievement and address learning gaps.