

NEW MEXICO

Public Education Department

The State of New Mexico
New Mexico Public Education Department

Teaching, Learning, and Innovation
Division of Curriculum and Instruction

Math and Science Annual Report **Issued 2024**

Michelle Lujan Grisham
Governor of New Mexico

Mariana Padilla
Secretary-Designate of Public Education

Amanda DeBell
Deputy Secretary of Teaching, Learning, and Innovation

Jacqueline Costales, Ed.D.
Division Director of Curriculum and Instruction

Required Notice

Any reference in this guide to any person, or organization, or activities, products, or services related to such person or organization, or any linkages from this guide to the web site of another party, do not constitute or imply the endorsement, recommendation or favoring of the New Mexico Public Education Department (PED).

Copyright Notice

This report is copyright free, so no permission is needed to cite or reproduce it for non-profit purposes. If material from it is included in another non-profit publication, cite as follows:

New Mexico Public Education Department. (2024). *Math & Science Annual Report*, NM. Santa Fe: PED

Notes

- This report is available on the [Math and Science Bureau webpage](#).
- This document is intended to be Americans with Disabilities Act (ADA) compliant in its entirety. Should a reader encounter any difficulties in accessing the document, please contact the PED to assist in accessing information.

Acknowledgments

The Secretary of Public Education is grateful to the following individuals for their contributions to this report:

New Mexico Public Education Department Math and Science Bureau

Shafiq Chaudhary,
Director

Patricia Gharrity,
Assistant Director

Lisa Sanchez,
Science Specialist

The Math and Science Advisory Council

Angela Alderete, Co-Chair,
Secondary Science Educator,
Albuquerque Public Schools

Paulo A. Oemig, Ph.D., Co-Chair,
Director, New Mexico Space Grant Consortium,
NM NASA EPSCoR, New Mexico State University

Kim Ayres,
Secondary Computer Science Educator,
The ASK Academy (until August 2024)

Nathaniel Evans,
Middle School Math Educator, Dean of Students,
Taos Municipal Charter School

Kelsey Garner,
Geology Exploration Manager,
Armstrong Energy Corporation

Tamara Gaudet,
Instructional Support Specialist K–12,
Albuquerque Public Schools

Cari Hushman,
Associate Dean of Research and Distance Ed.,
College of Education and Human Sciences
University of New Mexico (UNM)

Mónica Martínez Archuleta, Ed.D.,
K–12 STEM Outreach Specialist,
Los Alamos National Laboratory

Allison Nannemann, Ph.D.,
Assistant Professor, Dept of Special Education,
UNM

Greg Rael,
Secondary Math Educator,
Taos Municipal Schools,

Heather Summers, MA, NBCT,
Senior Program Director for STEM,
Project ECHO

Stephanie Thompson,
Engineer,
Raytheon Technologies

Kersti Tyson, Ph.D.,
Director of Research and Evaluation,
Los Alamos National Laboratory Foundation

Table of Contents

Acknowledgments.....	2
Table of Contents.....	3
Executive Summary.....	4
Introduction.....	11
Mathematics.....	14
Science.....	24
Computer Science.....	29
Outdoor Learning.....	30
STEM Activities.....	32
Appendix.....	39

Executive Summary

The Math and Science Advisory Council (MSAC) provides valuable guidance to the New Mexico Public Education Department (PED) and the Legislature to ensure that all students have equitable access to high-quality mathematics and science education. Our mission extends to promoting equitable, relevant, and high-quality computer science and outdoor learning opportunities for K–12 students.

Aligned with the 2022 PED Comprehensive Strategic Plan, the MSAC sets its priorities around the four strategic pillars of the strategic plan as guiding principles: educator ecosystem, whole child and culturally responsive education, profiles and pathways, and asset-based supports and opportunities. In this report, we emphasize several key recommendations. First, we advocate for robust professional learning opportunities in math, science, computer science, and outdoor education. Additionally, we propose the implementation of an endorsement for an Elementary Science Specialist. These measures ensure that every student benefits from well-prepared, well-supported, and effective educators.

Recognizing the significance of local communities in shaping our children's educational experiences, the MSAC underscores the importance of culturally and linguistically responsive education. We encourage professional learning focusing on local phenomena, critical and creative thinking, and meaningful connections between educators, students, and community resources such as museums and nonprofits. By contextualizing learning and making it place-based, we aim to foster a sense of belonging within the learning community for all students.

Furthermore, we reiterate our support for science and mathematics graduation requirements. We endorse that all students complete at least three high school science credits aligned with the New Mexico STEM Ready! Science Standards, including two years of lab science. Additionally, we advocate for all students to complete four high school mathematics credits that fully address the Common Core State Standards for Mathematics. We recommend that Algebra II remain an option for students across all districts in the state.

In our commitment to fostering holistic and inclusive learning environments, the Math and Science Advisory Council emphasizes the importance of culturally responsive education. We recognize that honoring the local communities where our children live is essential. To achieve this, we recommend that professional learning opportunities focus on local phenomena, critical thinking, and meaningful connections between educators, students, and community resources such as museums and nonprofits.

Activities of the Math and Science Advisory Council (MSAC) in SY2023–24

The MSAC held quarterly meetings throughout the year and invited the public to attend.

- August 25, 2023
- October 20, 2024
- March 8, 2024
- May 31, 2024

MSAC members participated in the steering committee supporting the development of a state-wide vision of high-quality science instruction to bring coherence to science education in New Mexico.

MSAC member Tamara Gaudet presented to the Legislative Education Study Committee (LESC) in September 2023 to discuss elementary mathematics education initiatives and re-iterate the MSAC critical issues in mathematics.

Members of the MSAC engaged with the VISIONS working group to set the vision for the equitable math pathways and outline items such as course frameworks and expectations.

Activities of the Public Education Department Math and Science Bureau (MSB) in SY2023–24

The MSB Mission & Vision

We build collaborative communities that support equitable access and opportunities for all, honoring the rich cultural heritage of New Mexico and putting our students first.

As a STEM, computer science, and outdoor learning education champion, the Math and Science Bureau (MSB) has tirelessly promoted a brighter future for our students. The Legislature's continued investment in STEM education and American Recovery Plan Elementary and Secondary School Emergency Relief (ESSER) funding allowed the Bureau to offer grants, professional learning courses, convene stakeholder working groups and highlight outstanding educators. These opportunities continue to empower educators and communities to inspire and guide our students. Through the MSB's collaborations with institutions of higher education, sister agencies, sister bureaus, and other organizations, they are building a solid foundation for STEM education in K–12 local educational agencies (LEAs) and communities.

The MSB was honored to provide testimony at LESC meetings in July and September 2024. This testimony focused on the mathematics work being done by the PED in New Mexico as the LESC began its study of mathematics. Staff also presented to the [Board of Science Education \(BOSE\) K-12 STEM Education and Workforce Development in Rural Areas committee meeting](#), discussing the policies and constraints states navigate to support STEM education and workforce development in rural areas and the differences observed within tribal systems.

The MSB is taking bold steps to empower communities and build capacity in the K–12 educational system. The highlighted activities below are examples of this work:

- **Leveraging Communities' Expertise:** The Re-Envisioning High School Math Pathways VISIONS and PATHWAYS groups continued to develop recommendations for flexible high school math pathways to replace traditional Geometry and Algebra II. The group released its recommendations to the public in early 2024 to gather community voices. In parallel, through the NM LaunchYears Initiative, the MSB developed a state team with members of higher educational institutions to support cross systems conversations.

In collaboration with the Instructional Materials Bureau, the MSB has made significant strides in promoting high-quality science instructional materials. Science and math content experts supported the development of content criteria for revising rubrics as a guide to selecting these materials. Recognizing the need for a common vision in the science community, a steering committee encompassing PED staff, informal science organizations, the MSAC and industry sponsors was created to guide this work.

- [New Mexico Instructional Scope](#) (NMIS): Educator working groups updated the NMIS for Math and Science. The educator working group updated the NMIS for Grade 3–8 Science and Grade 5–8 Math. Both the NMIS for Math and Science updates included stronger alignment to a Multi-Layered System of Supports (MLSS), Universal Design for Learning (UDL), and Culturally and Linguistically Responsive Instruction (CLRI). Science included more

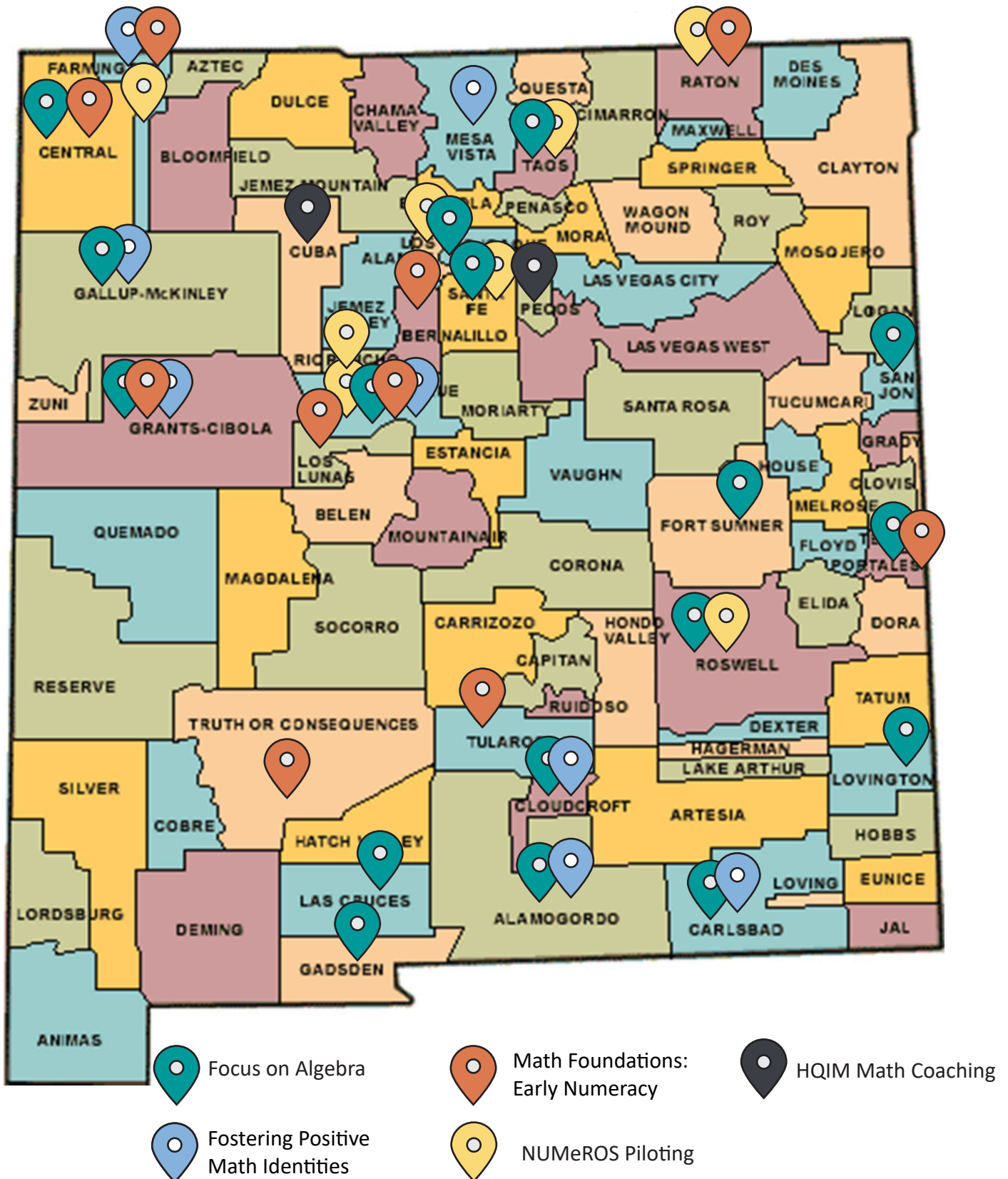
localized phenomena for educators to utilize and incorporate to anchor science instruction.

- Outdoor Learning Community and Place-Based Education Definition: The MSAC outdoor learning working group developed a PED adopted definition for Community and Place-Based Education as follows:

Community and Place-Based Education engages New Mexico land and cultures as the starting point for learning within all academic subjects, ensuring that the curriculum is deeply connected to the local community and students' identities, cultures, and experiences. This approach provides community-connected instruction that infuses high-level content, inquiry-based learning, and problem-solving with real-world learning opportunities, increasing academic achievement and engagement, improving individual and collective health, and building pride in oneself and in the State of New Mexico.

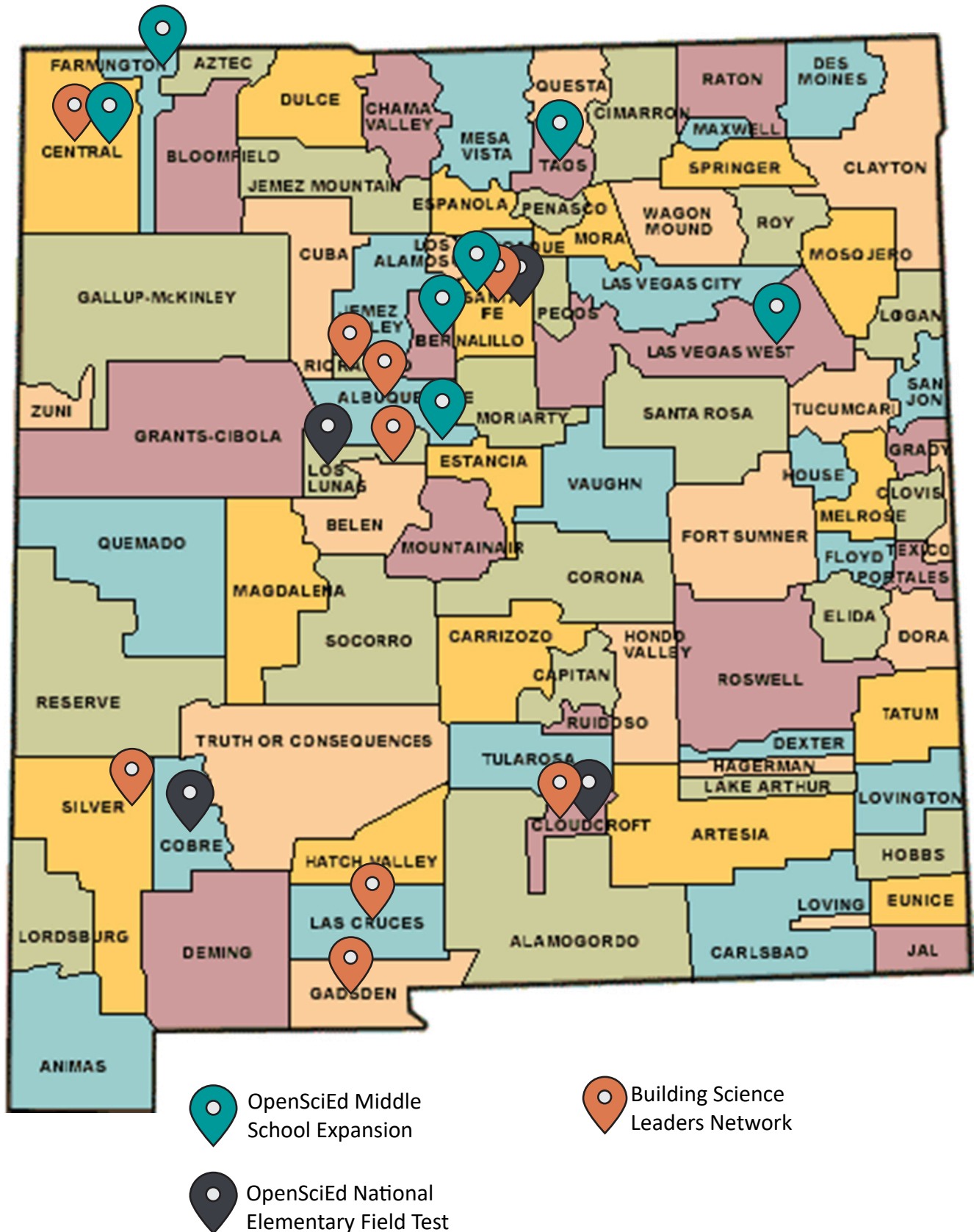
Mathematics Program Map

The map below shows districts that participated in mathematics professional learning programs during the 2023–24 school year.



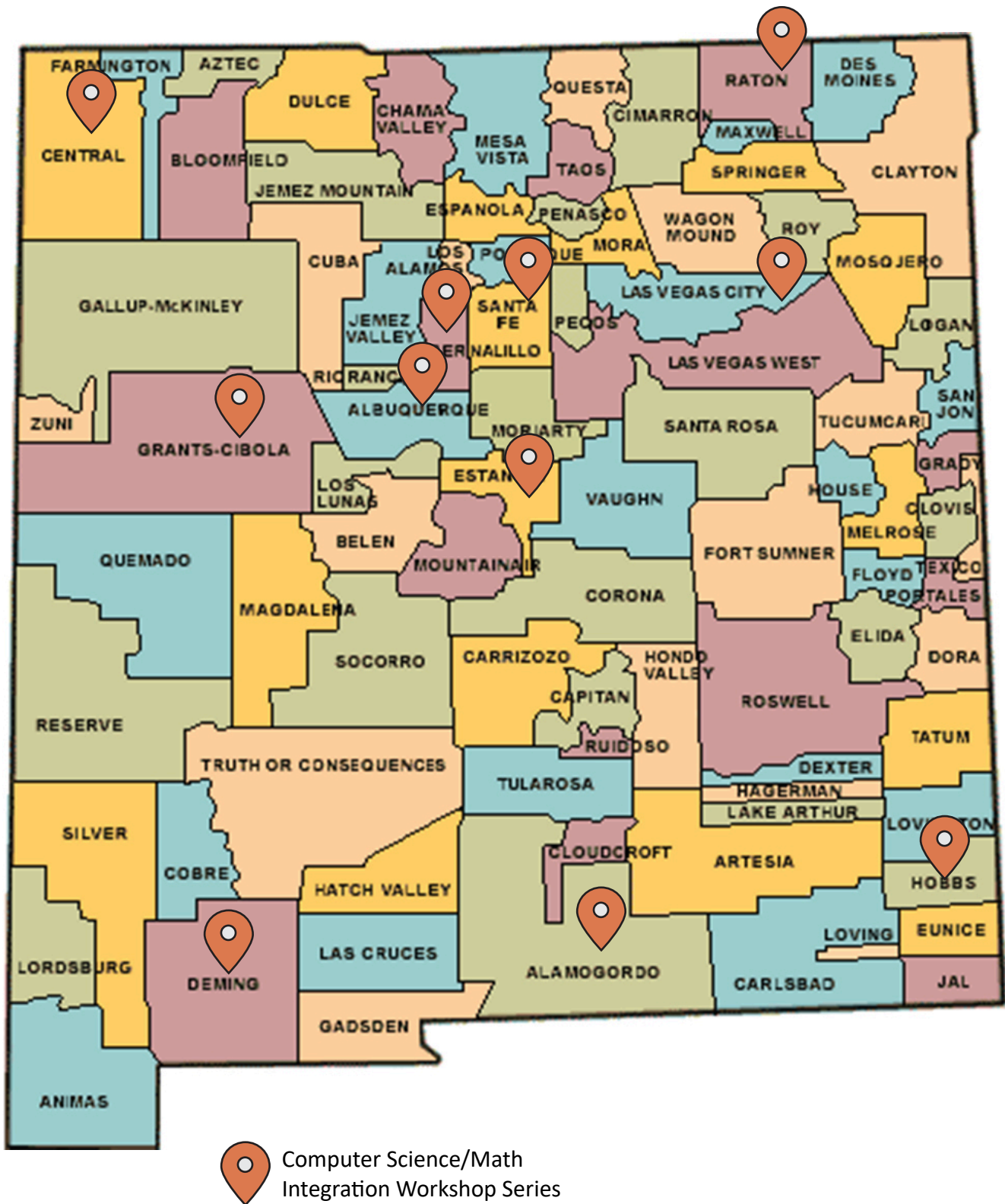
Science Program Map

The map below shows districts that participated in science professional learning programs during the 2023–24 school year.



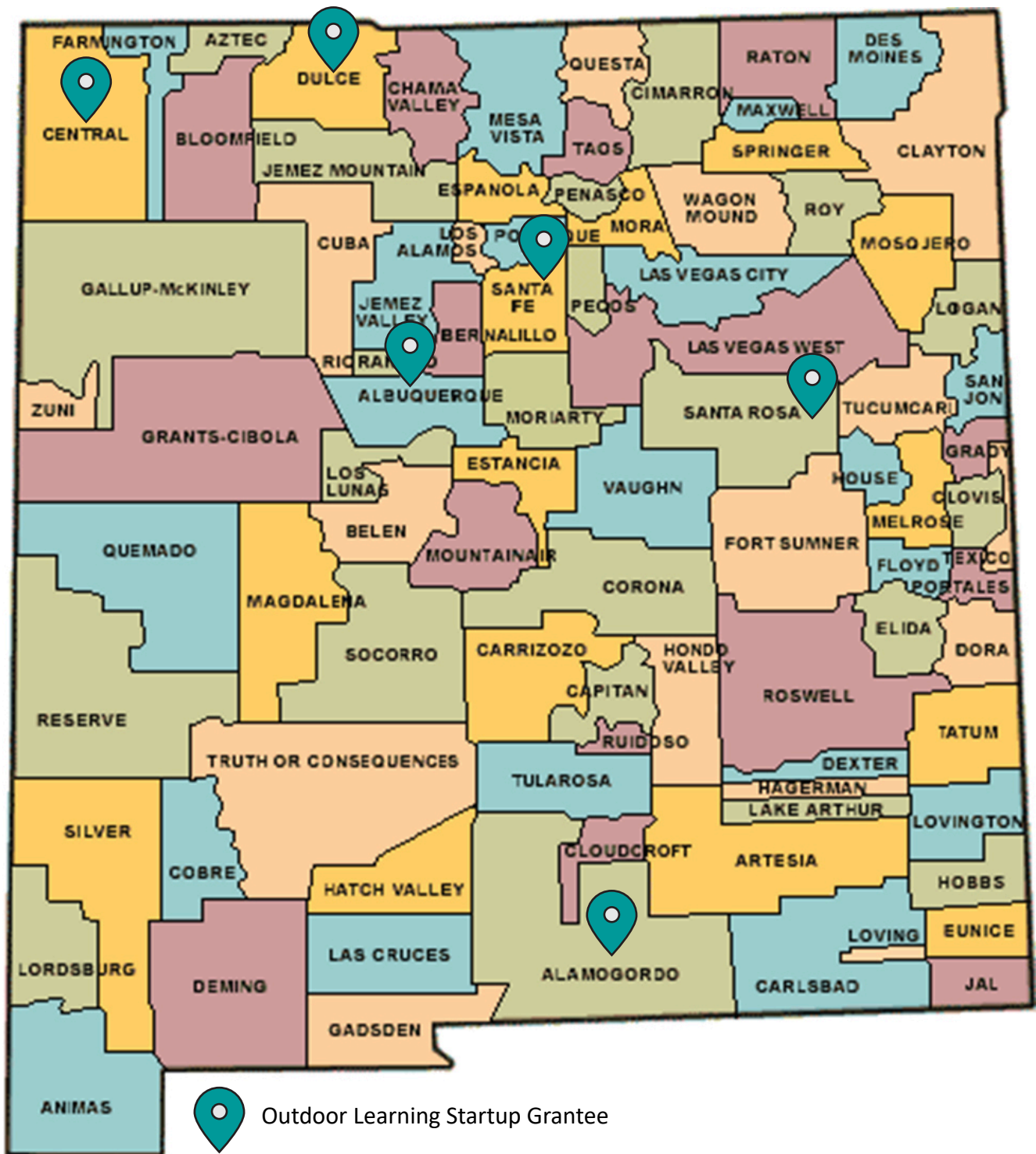
Computer Science Program Map

The map below shows districts that participated in computer science professional learning programs during the 2023–24 school year.



Outdoor Learning Program Map

The map below shows districts that participated in outdoor learning programs during the 2023–24 school year.



The MSAC comprises twelve members representing New Mexico's diverse demographics, including geographic distribution, gender, and ethnic diversity. The members represent public schools, public postsecondary educational institutions, the private sector, national laboratories, science- and engineering-based businesses, and one member represents the New Mexico Partnership for Mathematics and Science Education. The MSAC advises the PED, the MSB, and the Legislature as they seek to implement policy and programs according to the Mathematics and Science Education Act (See Appendix B).

In addition, the MSAC produces an annual report on public elementary and secondary science, technology, engineering and mathematics (STEM) student achievement as part of its charge. This 2023–24 school year annual report serves as that document and seeks to:

1. Provide concrete recommendations for enhancing mathematics, computer science, outdoor learning, and science education in New Mexico based on the STEM Strategic Framework, the New Mexico Instructional Scope, and the PED Comprehensive Strategic Plan,
2. Highlight the activities of the MSAC,
3. Describe the activities of the MSB, and
4. Summarize student mathematics and science achievement and enrollment data.

In addition to the STEM Strategic Framework, the NM Instructional Scope and the PED Strategic Plan documents, MSAC informs recommendations based on members' expertise, affiliations, scholarly work, and connections to local communities.

The primary sources of assessment data results were obtained from the All Valid Tests (AVT), available through the PED Assessment, Research, Evaluation and Accountability (AREA) Division and compiled from summative test vendor files. The AVT includes all test scores from:

- Dynamic Learning Maps (DLM), comprised of grades 5, 8, and 11 student scores in science, math, and ELA,
- Spanish Standards-Based Assessment (SBA) for high school,
- Measures of Student Success and Achievement (MSSA), which is a summative assessment for mathematics and English language arts administered at the end of grades 3-8,
- Scholastic Aptitude Test (SAT), which is a summative assessment for mathematics and English language arts administered at the end of grade 11, and
- Assessment of Science Readiness (ASR), which is a summative assessment for science administered at the end of grades 5, 8, and 11.

Critical Issues in STEM Education and Associated Action Recommendations of the MSAC for SY2024–25

Mathematics Critical Issues

The MSAC recommend that PED and the Legislature continue to support mathematics education with the following:

- Require all teacher preparation programs include a minimum of 3 hours of mathematics methods aligned to national standards. Currently only traditional programs have this requirement. Alternative licensure and special education programs lack this requirement.
- Require all teacher preparation programs include a minimum of 3 hours of mathematics methods aligned to national standards. Currently only traditional programs have this requirement. Alternative licensure and special education programs lack this requirement.
- Require all teachers who teach mathematics to participate in collaborative, on-going job,

embedded professional learning in mathematics content and pedagogy as a part of maintaining their professional license.

- Ensure every elementary school has an instructional coach or math teacher leader with an Elementary Math Specialist endorsement to work with teachers during their professional day to plan, assess, reflect, and collaborate around their students' opportunities to learn and thrive as mathematicians.

Science Critical

The MSAC recommends that PED and the Legislature continue to support science education with the following:

- Support implementation of Elementary Science Specialist (ESS).
 - Update science competencies for ESS to align with the NM STEM Ready! Science Standards and the PED's 2022 Comprehensive Strategic Plan.
 - Recommend all elementary school students participate in five hours/week of phenomena-based, three-dimensional science instruction that is aligned with the NM STEM Ready! Science Standards and supported by an ESS.
 - Incentivize every elementary school to have an ESS by providing state funding to districts that can only be utilized for school ESS teachers.
 - Add pay differential to teacher salary for ESS
 - Support dedicated funding for equipment and consumables to be specifically used for K-12 classrooms aligned to the NM STEM Ready! Science Standards.
- Support dedicated funding for equipment and consumables to be specifically used for K-12 classrooms aligned to the NM STEM Ready! Science Standards.
- Foster a network of collaboration between formal and informal science organizations.
 - Fund an annual Science Driving Change Conference to promote partnerships between formal and informal science educators.

Computer Science Critical Issues

In order to ensure high quality computer science education for all students, the MSAC recommends:

- Create, implement, fund and recruit educators to earn a K-6 Computer Science (CS) licensure endorsement.
- Continue to support and fund K-12 teacher professional learning opportunities in CS and CS ecosystems (connecting classrooms, non-profits, museums, workforce partners).

Outdoor Learning Critical Issues

The MSAC recommends that PED and the Legislature continue to support outdoor learning with the following:

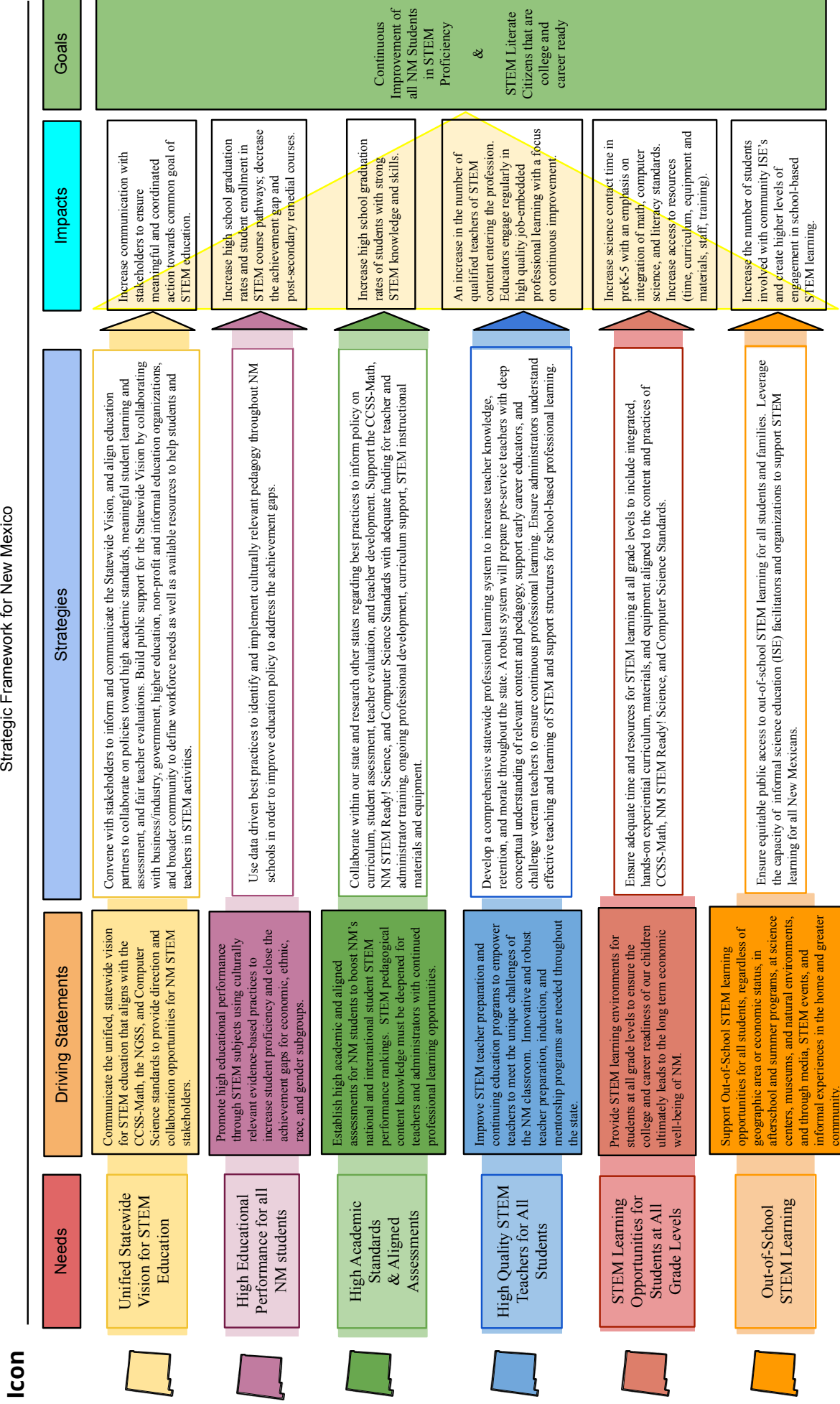
- Develop an implementation framework for the state, districts, and schools.
- Provide \$5 million in state legislative funding for teacher and administrator professional learning opportunities and materials that create and expand outdoor learning opportunities.
- Continue to strengthen and form partnerships with community, government, and nonprofit groups that support outdoor learning.

STEM Strategic Framework for New Mexico

The STEM Strategic Framework helps the MSAC determine their yearly priorities for STEM education. The MSAC developed the initial framework in 2015 and last updated it in 2019. This framework is adaptive and changes based on the ongoing needs of the state. Alignment to the MSAC's STEM Strategic Framework is notated throughout this report with the following icons, one for each need/driving statement.

May 2019

Math and Science Advisory Council Science, Technology, Engineering & Mathematics (STEM) Strategic Framework for New Mexico



Mathematics

The MSAC's Statement

Every child and youth in New Mexico is capable of learning and doing mathematics and meeting high standards. Every teacher in New Mexico is capable of teaching children and youth mathematics in ways that ensure their students thrive as mathematicians. The critical issue in mathematics education for our state is that we do not have a system that supports the deep and on-going work mathematics teachers, PreK–grade 12, need to create the conditions that ensure our children and youth have access to the opportunities that help them to thrive as the mathematicians that they are. 12% proficiency is not a reflection of who and what our students are capable of as they complete high school. It is a reflection of students' lack of access to the culturally and linguistically responsive mathematics learning opportunities they need to thrive, year after year, as has been documented in the Yazzie Martinez vs. the State of NM lawsuit (2018). National standards for mathematics education and the academic standards NM has adopted calls for a student-centered, inquiry-based approach to teaching mathematics in elementary, middle and high school classrooms. In special education classrooms, teachers lack the opportunity to develop the specialized knowledge needed to be responsive to students' individual mathematical development needs. The pedagogical shift which national standards of practice call for eludes many New Mexico educators, largely because they lack access to time and opportunities for professional development. Prioritizing professional growth and culturally and linguistically responsive instruction is necessary to ensure our students have access to learning mathematics that is rich, rigorous, relevant, and joyful.

Students' lack of systematic access to rich, rigorous, relevant, and joyful opportunities to learn mathematics in ways that support their sense-making and problem solving is not only impacting students' achievement scores, it is impacting their identities, abilities, and aspirations. How many youth are not pursuing careers in STEM— which more and more is becoming an aspect of every field—because of their lack of opportunities to develop the skills, knowledge, and identities as “math people?” Transforming students' opportunities to learn mathematics in NM is not just vital for our children and their future pathways, it is also vital for New Mexico and our state's future course in the 21st century. STEM readiness is essential for ensuring New Mexico's citizens can participate in the technological-science based economies of the future. Fluidity, flexibility and problem solving in mathematics is the foundation of STEM.

Transforming our children and youth's opportunities to learn mathematics will require change at every level in our system, from teacher and leader preparation to ongoing support for teachers and leaders. This change is required to ensure that every child has access to the opportunities they need to thrive as mathematicians in the 21st century. This call for change is echoed by various other mathematics focused education organizations, including:

- National Council of Teachers in Mathematics (NCTM)
- Association of Math Teacher Educators (AMTE)
- TODOS: Mathematics for All
- Council for Exceptional Children (CEC)
- Institute of Education Sciences (IES)

Trends on Mathematics Student Achievement

These scores are not representative of what NM's children and youth are capable of. NM needs to build an education system that ensures every child and youth has access to mathematics learning opportunities that meet their needs and aspirations and help them to develop identities as mathematicians. The MSAC recommends a more comprehensive data pull and analysis to more fully understand the opportunities students have to learn mathematics. What curricula are being used? What type of preparation do the teachers who are teaching children and youth

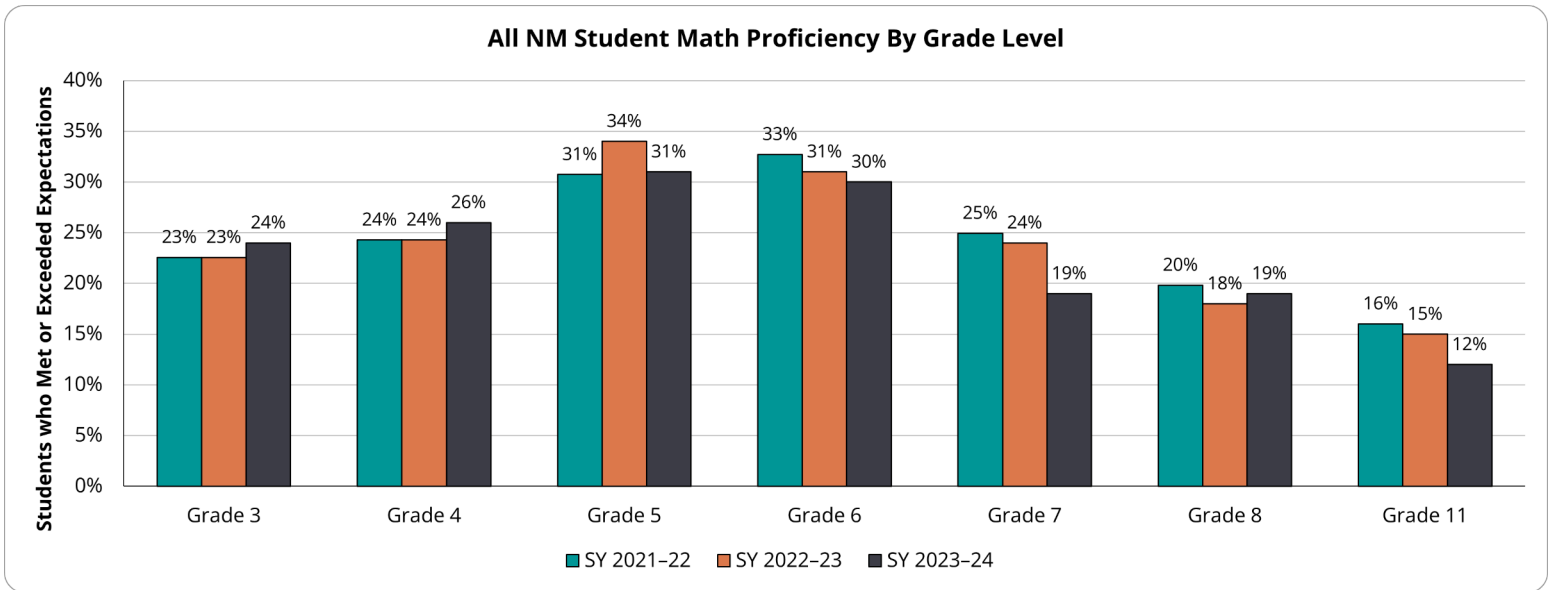


Figure 1. All New Mexico students who met or exceeded expectations on the mathematics statewide summative assessment from SY2021–22 through SY2023–24

mathematics have? How long have teachers been teaching? What professional learning do teachers have access to that supports their mathematics instruction? How are teachers being supported to integrate culturally and linguistically responsive teaching strategies into their mathematics instruction?

These scores underscore the findings of the Yazzie/Martinez lawsuit (Figure 2). Black, Hispanic, Native American, English Learners, Students with Disabilities and students from economically disadvantaged backgrounds continue to lack access to the mathematics learning opportunities that meet their needs and interests. Every student is capable of doing and learning mathematics proficiently, but to do so they need access to teachers who have been prepared to teach NM’s culturally and linguistically diverse students using national standards of practice.

Learning mathematics is a developmental process. Students’ conceptual understanding of numbers and operations in kindergarten through third grade has implication for their outcomes in grade 11. Our students are capable of being proficient in mathematics, but they need the opportunities to develop a conceptual understanding of mathematics concepts and problem solving. NM legislators have supported important shifts in mathematics education at the secondary level by shifting mathematics graduation requirements, and increasing students’ pathways to learn and use mathematics based on their interests and aspirations. As NM’s educators implement the new graduation requirements, NM must ensure teachers have the support they need to teach in the new pathways in culturally and linguistically responsive ways.

Mathematics

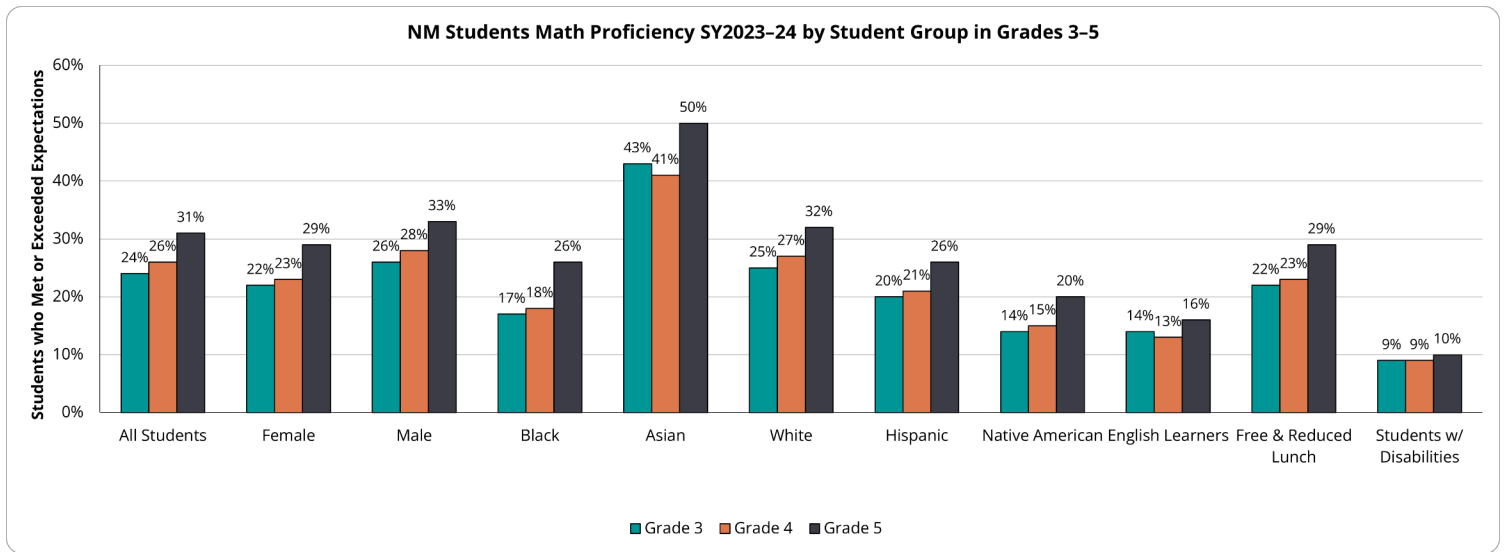


Figure 2. All New Mexico students in elementary (grades 3–5) who met or exceeded expectations on the statewide mathematics assessment by student groups from SY2021–22 through SY2023–24

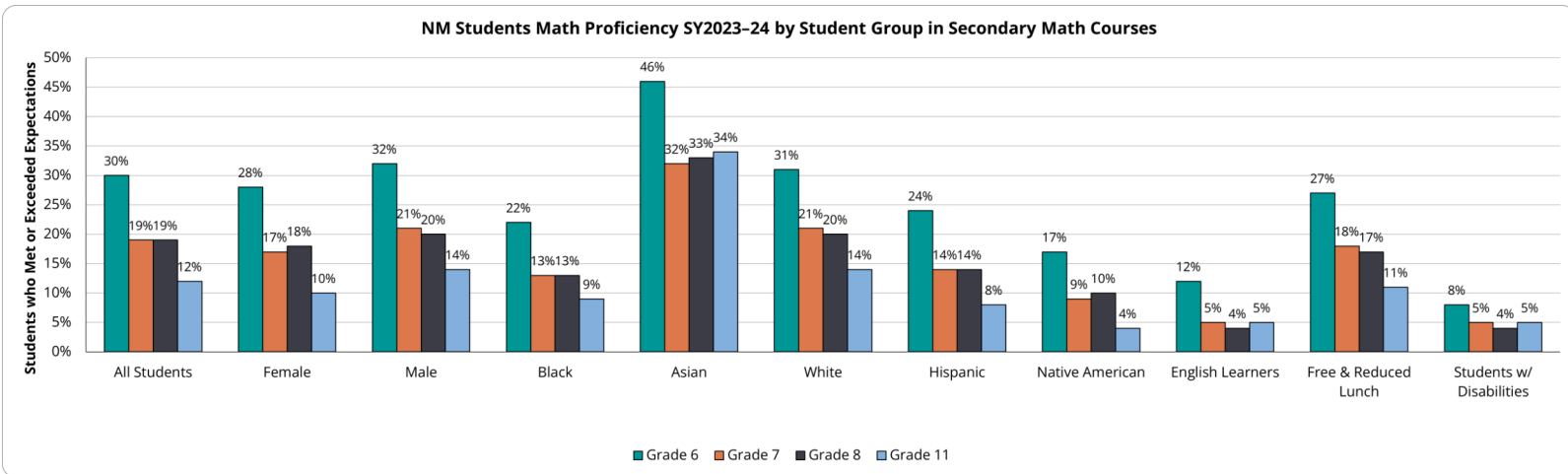


Figure 3. All New Mexico students in secondary mathematics (grades 6–8, 11) who met or exceeded expectations on the statewide mathematics assessment by student group SY2023–24

Activities of the Math and Science Bureau

Math Foundations: An Early Numeracy Initiative



89 Educators
13 LEAs

Strategy II-A Deeper Learning
Strategy II-B Community-Based Culturally and Linguistically Responsive Education
Strategy II-C Social-Emotional Learning

Math Foundations was geared toward school teams in grades 4–5, including administrators, instructional coaches and mathematics educators, to deepen their mathematical content and pedagogical knowledge specific to numeracy. Facilitators supported educators in applying strategies for implementing equitable classroom discourse and fostering a culture of perseverance and problem-solving among students.

School teams engaged in collaborative virtual and asynchronous learning through the PED Canvas learning management system (LMS) and face-to-face learning

throughout the series. Alongside this series, school leaders participated in additional support sessions to lead their teams in ongoing support between sessions.

Two model sessions were provided: a nine-day ‘train the trainer’ model and a five-day professional learning for educators and math partners across the state. From the nine-day ‘train the trainer’ session, key findings discuss the impact of Early Numeracy professional learning sessions on participants’ knowledge and confidence regarding pedagogical content and strategies

“I think it goes back to the three different levels of rigor, the conceptual understanding of mathematics in itself. Off the top of my head, yesterday, we did lots of work with fractions, and I was never taught the way that the facilitators are teaching us. So, I was ready to do standard algorithm, let’s just do it, get out of the way... But doing it the way the facilitators have been having us do it, it shows more of an understanding of one third plus two thirds. So, it’s helped me. It’s hard for me, it’s difficult, but I got really engaged with it yesterday and just enjoyed learning something new.”

-School Site Administrator

to promote discourse among students. Some key findings include the following:

Teachers reported consistent increases in knowledge in each element of pedagogical content knowledge. Prior to the professional learning sessions, over 50% of respondents reported being only competent in each pedagogical content knowledge area; however, after completing all of the training sessions, over 50% of respondents reported an increase to proficient or expert in each area. In particular, knowledge about applying foundational number relationships to problem solving grew from 31% proficient or expert in the first session to 53% proficient or expert in the last session. One of the most significant increases was respondents’ understanding of how educators’ beliefs can influence student success in mathematics, which grew from 42% to 100% proficient or expert.

Ratings of knowledge of the discourse strategies increased at least two-fold. Before the professional learning sessions, 12%–23% of respondents reported being a novice or advanced beginner in each discourse strategy. However, after the professional learning sessions, knowledge of discourse strategies increased, and all respondents rated themselves higher than novices or advanced

beginners. The greatest increases occurred in “Monitoring student responses in order to be prepared to connect student strategies to intended learning and address misconceptions” and “Selecting and sequencing student responses in order to be prepared to connect student strategies to intended learning and address misconceptions”.

For both strategies, the percentages of respondents rating themselves as proficient or expert increased from 29% at the beginning of the professional learning sessions to 69% after the sessions, an increase of 40 percentage points.

More than half of teachers reported high confidence with pedagogical content and

strategies. In surveys, teachers also reported consistent increases in confidence in each element of pedagogical content knowledge. On the low end, only 32% of respondents reported a high level of confidence in applying the fundamentals of the Universal Design for Learning (UDL) framework to foster a culture that supports students' perseverance in problem-solving, and 69% of respondents reported low or moderate confidence in this area. However, after the sessions, the percentage of respondents reporting high confidence increased to 53%. Similarly, 66% of teachers initially reported low or moderate confidence in implementing the components of rigor identified in the mathematics standards, and 32% reported high confidence. However, after the professional learning sessions, 58% of respondents reported high confidence in implementing the components of rigor identified in the mathematics standards. After the professional learning, one math coach said, "Oh my gosh, 20 years in the classroom, and I can now see the conceptual instructional piece of fractions completely different. And I had so many questions like, - why are you doing this? If I was in a coaching session, and I saw this, and I saw students struggling, I would now be able to say, Let's talk about why we're doing this piece. Why are we finding the reciprocal? Let's look at it on a number line. How could we apply this on a number line?' So that students can visualize fractions. I mean, it's just really, like I said, broaden my opportunities to help teachers think in a different way."

Re-Envision High School Math Pathways Working Group

34 Members



Stakeholders from 16 LEAs, institutions of higher education, professional organizations, and industry representatives, each bringing their unique expertise, participated in the Re-Envisioning High School Math Pathways working group. This collaborative effort, which includes stakeholders from K-12 mathematics, postsecondary, workforce, informal education, and national labs, began its work in March

2023. Their task was to create modern and innovative mathematics pathways that align with students' goals and aspirations. The working group's belief in promoting student-centered cultures of learning emphasized communication and collaboration among peers, engaging students in meaningful mathematical tasks, making meaningful interdisciplinary connections, and leverage technology appropriately to promote student engagement and critical thinking. The working group ensured the pathways being developed should not limit students if their interests change, allowing students to switch pathways during their HS career.

The Charles A Dana Center at University of Texas at Austin played a pivotal role in facilitating the working group. They brought in the latest research from other states and research publications, and their classroom expertise or lens from postsecondary and workforce into the conversations.

The working group released its recommendations for public comment from January to March 2024. PED staff and working group members conducted a listening tour across the state, with stops in Albuquerque, Deming, Farmington, Las Vegas, Portales, Raton and Ruidoso along with virtual sessions. In addition, the draft documents were posted on a website, where over 450 people visited to review and provide feedback.

The working group revised their recommendations for modernized high school pathways through this feedback. These recommendations included recommendations for a modernized Algebra II with core content, knowledge and skills aligned better to suit students' career goals and aspirations. This would include new courses focused on quantitative reasoning, data science, or calculus readiness.

This is a trend occurring in other states to expand options for students. This would empower students and families to choose a flexible pathway that meets their aspirations. The working group also developed recommendations for modernizing Geometry, including statistics and probability interwoven with concepts in Geometry. This approach allows for the rich contextual application and integration of practical math applications, i.e., modeling. Working group members also stated that it allows for focused instruction of statistics and probability standards that may be skipped in traditional Algebra 1 or Algebra 2 courses and will better prepare students for the SAT. Currently, these recommendations are with the PED for review and final determination.

Focus on Algebra



150 Educators
18 LEAs

Strategy II-A Deeper Learning
Strategy II-B Community-Based Culturally and Linguistically Responsive Education
Strategy II-C Social-Emotional Learning
Action I-D-2f Growth Oriented Professional

The Focus on Algebra professional learning series continued for a second year to engage grades 6–9 math educators, including administrators and instructional coaches, to develop effective pedagogy and instructional practices emphasizing algebraic thinking and algebra concepts.

The MSB covered the cost of participants' travel expenditures, including providing mileage reimbursement, lodging, stipends and substitute reimbursements for all in-person and virtual learning events, to reduce barriers for LEAs in participating.

Over 130 hours of hybrid (in-person and virtual synchronous formats) through two intensive summer academies, two year-long synchronous support and asynchronous activities. the series leveraged the NMIS

Mathematics-2.0 to prioritize content and standards for algebra in grades 6–9 and develop formative assessment practices through the lens of culturally and linguistically responsive instruction (CLRI) to meet the learning needs of all students.

The Summer Math Academy, a 4-day workshop supported educators in deepening their understanding of the key shifts in the Common Core Math standards, focusing on the progression of skills that lead up to Algebra 1 and providing strategies for promoting rich discourse and engagement with the Standards for Mathematical Practice.

During the school year, school teams came together to engage in two, 2-day fall and spring in-person convenings and monthly virtual synchronous learning throughout the school year to continue vertical alignment conversations. Each session focusing on progressions of standards, discourse practices, interweaving social-emotional learning and culturally & linguistically responsive instruction.

An independent program evaluation, based upon mixed measures and interviews of students and educators reported: "The evaluation examined the extent to which just-in-time professional learning with virtual system support is associated with changes in (1) teacher knowledge, self efficacy, and use/ implementation of best practices (e.g., algebraic content development, social emotional learning (SEL) competencies, formative assessment practices, and culturally and linguistically responsive pedagogy); and (2) instructional coach and curriculum and instruction (C&I) staff knowledge and self-efficacy in being able to support and collaborate with teachers."

A summary of findings included:

The majority of students reported that the math problems they worked on involved some level of discourse, and the types of student discourse varied. Over half of students (57%) reported that they spoke to each other, not only to the teacher, during math. Students indicated that teachers used a variety of strategies to help them construct

Mathematics

arguments and encourage discourse about math problems.

The majority of students reported encountering real-world math problems and exercised various strategies to solve them. The majority of students reported that they had math problems that they might have to solve in real life (57%). Students reported using several strategies to figure out how to solve the math problems in class.

Students demonstrated high social-emotional learning through confidence in approaching math problems. When asked how they feel when they are given a problem that they are not sure how to do, over three-quarters of students responded that they feel either fine because they'll work hard and try to figure it out (63%) or excited because they love a challenge (14%).

Teachers and leaders made substantial gains in their self-reported knowledge about all strategies. Teachers and leaders assessed their level of knowledge before and after the professional learning. The scale was "Novice, Advanced Beginner, Competent, Proficient, or Expert". Overall, the percentage of teachers reporting their knowledge of key learnings as "Proficient" or "Expert" increased substantially across all knowledge areas.

Teachers and leaders made substantial gains in their self-reported confidence in implementing strategies. The level of confidence reported by participants in implementing central learnings increased greatly after the professional learning for both teachers and leaders. When it comes to building and sustaining the Algebra concepts and practices, both teachers and leaders overwhelmingly reported they were prepared to do so.

Teachers and leaders were highly likely to implement all central learnings. By the final session, overwhelmingly, participating teachers and leaders

indicated they would be likely to implement all strategies from the professional learning sessions in most or all lessons.

Most teachers and leaders anticipated needing occasional support to continue using the skills they learned through the sessions.

Teachers indicated that the most helpful components of the Focus on Algebra training were learning about vertical alignment, the math standards, and productive struggle. There is consistent agreement that vertical alignment gives teachers an eye-opening perspective about math instruction and encourages collaboration between teachers within and across schools.

Collaboration is essential, but can be a challenge within schools. Schools with more than one participant in the training sessions had an easier time fostering collaboration among teachers than did schools with a single participant in the training.

Alignment with existing math initiatives may increase the likelihood of continued implementation. Leaders consistently shared that the Focus on Algebra training aligned with and enhanced other math initiatives at their school or in their district. The principals also discussed how Focus on Algebra not only complemented existing school initiatives, but extended beyond math instruction and were applicable to other subjects.

Leadership has advocated for creating the conditions for using data to improve instruction, and to implement Focus on Algebra across the district. Leaders noted the importance of using data in decision making and of helping teachers find the time to collaborate, discuss, and compare their data with each other. A team was formed in one district to advocate for the use of Focus on Algebra in all the district's schools.

"Transforming a system is about transforming relationships", says Denise Thornton, project lead for the Focus on Algebra series. [Learn more about our collaboration with the PED to enhance algebra readiness through meaningful professional learning. Learn and celebrate how we are transforming math education in New Mexico.](#)

Teachers need dedicated time to reinforce and enhance training strategies.

NUMeROS (Numeracy Unlocks Math Rigor in Our Students)



30 Educators
8 Facilitators
7 LEAs

Strategy II-A Deeper Learning
Strategy II-B Community-Based Culturally and Linguistically Responsive Education
Strategy II-C Social-Emotional Learning
Action I-D-2f Growth Oriented Professional

In collaboration with New Mexico State University (NMSU), we worked on two micro-credential course series for teachers at grades K-2 and grades 3-5. They are designed to build mathematics content knowledge for elementary teachers and provide them with the resources needed to build strong conceptual knowledge and mathematical reasoning in elementary students, leading to students to be algebra ready in middle/high school.

Teachers had the opportunity to develop their professional knowledge in these topics and earn micro-credentials through a series of professional learning sessions. Micro-credentials were earned through completion of assigned tasks including developing content knowledge, application and practice in the classroom, and reflection on student learning.

30 pilot teachers and eight facilitators grew in their understanding of the CCSS-M and the Math Practices, and gained a deeper understanding of how strong math instruction supports building proficient, math strong students. Many participants and facilitators relayed how eye-opening this series was as they dived deeper into vertical articulation of standards that strengthened their teaching and learning.

Fostering Positive Math Identities



14 Educators
4 LEAs

Strategy II-A Deeper Learning
Strategy II-B Community-Based Culturally and Linguistically Responsive Education
Strategy II-C Social-Emotional Learning

The Fostering Positive Math Identities series focused on secondary school teams, including administrators, instructional coaches, and mathematics educators, to support positive educator and student mathematics identities, leveraging the NMIS to sustain mathematical pedagogical shifts in instructional practice.

The theory of change is as follows: In stage 1, teachers first reflect on their math identities. In Stage 2, teachers reflect on their students' math identities. This reflection results in Stage 3—a change in teachers' beliefs, self-efficacy, knowledge of math pedagogy, and instructional practice. The outcome of this reflection is Stage 4—increased student agency, as measured by improved classroom experiences and academic outcomes.

Facilitators guided teams through analyzing mindsets and beliefs around the '5 Equity-based Mathematics Practices' in service of culturally and linguistically responsive education.

School teams engaged in collaborative virtual and asynchronous learning through the PED Canvas learning management system (LMS). Alongside this series, school leaders engaged in leadership-centric session to lead their teams throughout the year.

Mathematics

High-Quality Instructional Materials (HQIM) Math Coaching



2 LEAs

Strategy II-A Deeper Learning
 Strategy II-B Community-Based Culturally and Linguistically Responsive Education
 Action I-D-2f Growth Oriented Professional

The partnership with TeachingLab was instrumental in implementing a comprehensive math coaching framework, which profoundly impacted the schools served. With a qualified, dedicated math coach assigned to each school, we provided targeted support and a feedback cycle of coaching. This resulted in significant progress in elementary math at the two schools. The dedicated math coaches supported two rural schools that served a high population of Martinez/Yazzie student groups at Pecos Elementary and Cuba Elementary.

Teachers met with their math coach once to twice weekly to discuss problems of practice, support needed, and feedback. Site administrators, coaches and Deputy Director Gharrity completed three classroom walks in each classroom at the beginning, middle, and end of the year utilizing the Instructional Practice Guide to monitor implementation, guide conversations with the team, and provide areas of focus for direct teacher coaching.

The [Instructional Practice Guide \(IPG\)](#), from Achieve the Core, was a tool to guide conversations and debrief on areas to focus on for direct teacher coaching. The IPGs grounded the work of the coaches, who could understand each teacher's needs.

The IPG contains three Core Actions to look for during instruction during each classroom visit. Below is a brief description of each Core Action and a table from each school showing how much growth took place throughout the math coaching support based on the IPG data alone.

- Core Action 1 focuses on standard alignment, content being on grade level, and rigor.

- Core Action 2 focuses on instructional strategies such as checking for student understanding, engagement strategies, etc.
- Core Action 3: focuses on pushing students' thinking, engaging them in a productive struggle, asking purposeful questions, etc.

Cuba Elementary School:

BOY-IPG	MOY-IPG	EOY-IPG
Core Action 1: 67%	Core Action 1: 94%	Core Action 1: 94%
Core Action 2: 26%	Core Action 2: 40%	Core Action 2: 65%
Core Action 3: 23%	Core Action 3: 41%	Core Action 3: 63%
Overall: 37%	Overall: 55%	Overall: 72%

Pecos Elementary School:

BOY-IPG	MOY-IPG	EOY-IPG
Core Action 1: 69%	Core Action 1: 97%	Core Action 1: 100%
Core Action 2: 30%	Core Action 2: 67%	Core Action 2: 87%
Core Action 3: 20%	Core Action 3: 65%	Core Action 3: 83%
Overall: 41%	Overall: 75%	Overall: 89%

The data shows large growth in Core Action 2 (instructional strategies such as checking for student understanding, engagement strategies, etc) and Core Action 3 (pushing students' thinking, engaging them in a productive struggle, asking purposeful questions, etc). These are instructional strategies and student behaviors that should occur on a daily basis in core math instruction.

New Mexico Instructional Scope (NMIS) Math 3.0



8 Educators
7 LEAs

Strategy II-A Deeper Learning
Strategy II-B Community-Based Culturally and Linguistically Responsive Education

The MSB worked alongside the Curriculum and Instruction Bureau, New Mexico educators, and The New Teacher Project (TNTP) to revise and publish version 3.0 of the NMIS for Math. This included stronger alignment to a Multi-Layered System of Supports (MLSS), Universal Design for Learning (UDL), and CLRI.

The NMIS is a guidance document for our K–12 educators and administrators to support all students accessing high-quality, on-grade level education. Educators use this guide with lesson planning in conjunction with the NM Math Framework and curriculum materials adopted by the district/school. The NMIS incorporates UDL, formative assessment techniques, and sample items to help teachers support all students in accessing the CCSS-M, through the lens of the Standards for Mathematical Practices.

Implementing the tool is a strategy for ensuring a guaranteed, viable, and equitable curriculum across the state while capitalizing on the leadership and expertise of educators at the local level.

Educators designed the NMIS to:

- Meet districts where they are, with tools to support district-wide horizontal and vertical curricular alignment and provide guidance on the sequencing of standards at the local level.
- Foster programmatic planning at the district and school level and provide a rich foundation for aligned, collaborative conversations about teaching and learning.
- Support teachers in their individual and collaborative instructional planning and in utilizing strategies, including formative classroom assessment, to guide all students in attaining grade level proficiency or above.

Scholarships for Elementary Math Specialist (EMS)



8 Educators
4 LEAs

Strategy II-A Deeper Learning

The MSB partnered with Los Alamos National Laboratory Math and Science Academy to provide scholarships for in-service educators from various LEAs participating in the Math Teacher Leader Network. This initiative supported eight educators for six credit hours of courses in the EMS program at Highlands University.

The program's vision is to develop elementary mathematics specialists in New Mexico LEAs. Specialists are experts in elementary mathematics content and research-based elementary pedagogy, who possess the leadership skill set and the disposition as advocates for student learning, teacher support, and community involvement at the classroom, school, district, and state levels.

The MSAC's Statement

For the SY2023–24 MSAC report, we analyzed data focusing on science proficiency by student groups and summative assessment proficiency by grades 5, 8, and 11. We also compared the percentage of English language arts (ELA) proficiency to science proficiency. In this science student performance analysis, we focus on the total statewide student population who participated in the science assessments.

Trends on Science Student Achievement

Figure 4 provides insights into New Mexico students who are at or above proficiency on the statewide summative assessment for SY2023–24. Among 5th graders, 66% are not proficient; among 8th graders, 65% are not proficient; and among 11th graders, 58% are not proficient. All grade levels show an increase in proficiencies from prior years. This positive trend may relate to a phenomenon wherein a new standardized assessment is implemented and there is a plateau or initial dip in scores, followed by improved scores in subsequent years [Chingos, M. M., & Whitehurst, G. J. (2011). *A Half Century of Student Progress Nationwide.*]

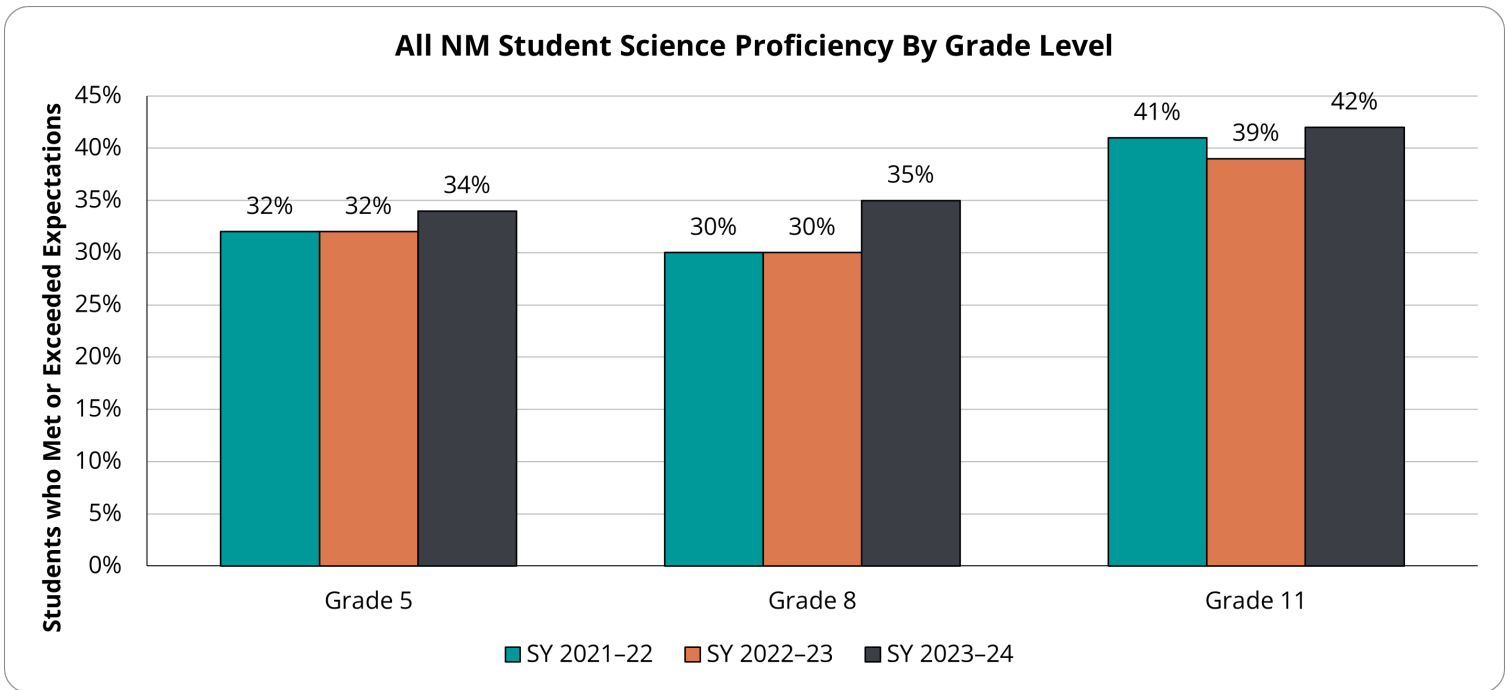


Figure 4. All NM students who met or exceeded expectations on the statewide science summative assessment from SY2021–22 through SY2023–24.

Efforts from the PED MSB in the areas of curriculum and professional learning may also contribute to this positive trend outcome. Some of these efforts are WestEd’s K–12 Alliance to analyze instructional materials to make instruction coherent from the student perspective,

WestEd’s SCALE to support deeper understanding of ways to elicit students’ ideas, and cultural and linguistic resources.

The mission of WestEd’s SCALE Science is to support improvements to teaching and learning through the use of innovative, educative, state-of-the-art performance-based assessments. Implementation of several OpenSciEd field test units for elementary and secondary levels across the state may also be contributing to improvements in students’ outcomes. A more detailed analysis of student outcomes in the districts that implemented WestEd’s SCALE and OpenSciEd will help NM better understand the impacts of these supports.

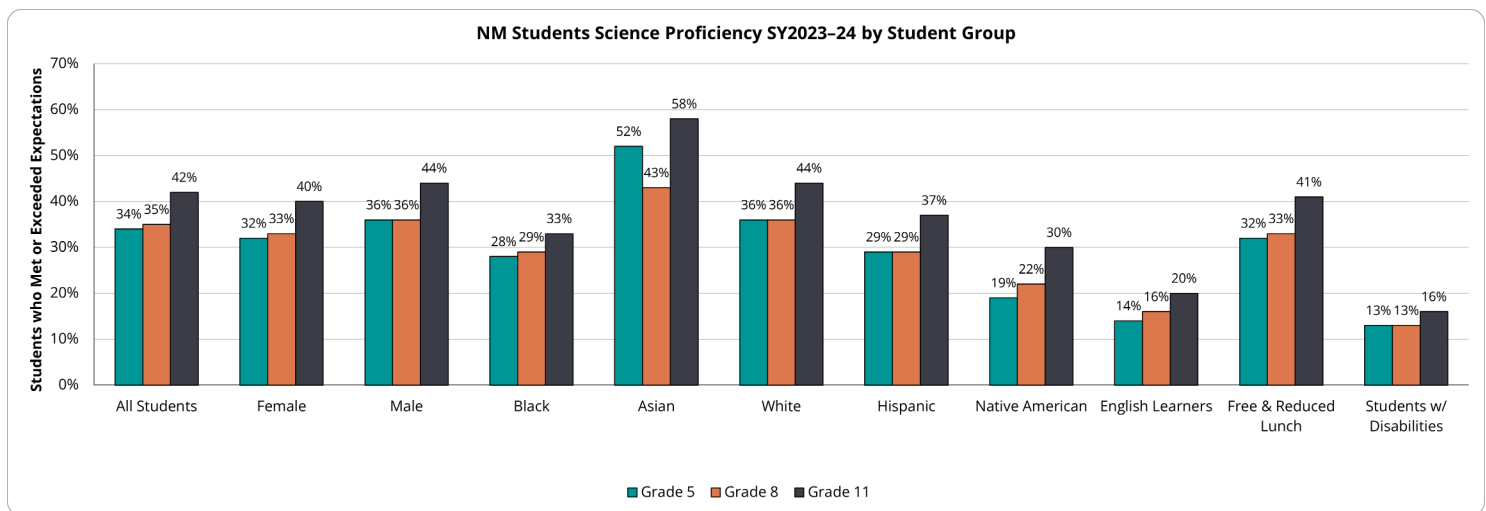


Figure 5. All NM students who met or exceeded expectations on the science statewide assessment for SY2023–24, by student group.

As demonstrated in the data from Figure 5, 51% of Asian students met or exceeded proficiency, 39% of White students met or exceeded proficiency, 32% of Hispanic students met or exceeded proficiency, and only 17% of English language learners met or exceeded proficiency. The significant disparity in proficiency levels among racial groups highlights the need for expanding targeted interventions to improve science education outcomes for under-performing student groups. For the past three years, the MSB has partnered with OpenSciEd, curriculum designers, and writers to field test open source instructional materials supporting phenomena-based instruction and student-perspective coherence. Compared to last year’s data, there has been an increase in proficiency outcomes in general and, in particular, among Hispanics (4%) and ELs (6%). It is essential to continue monitoring and expanding programs based on careful analysis of their effectiveness.

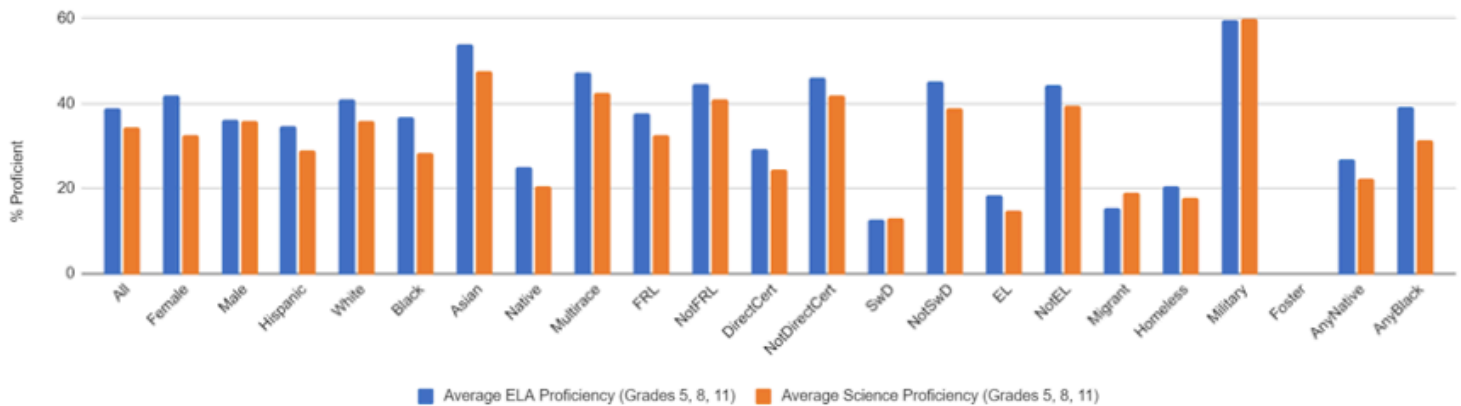


Figure 6. Average proficiency of grades 5, 8 and 11 ELA and science for SY23–24, by student group.

We see a strong relationship between science proficiency scores and ELA scores (Figure 6). Increasing science proficiency can increase overall proficiencies in other fields, particularly in ELA. Language arts and reading comprehension are important to learn science and acquire scientific literacy; science is communicated through language [Neri, N. C., Guill, K., & Retelsdorf, J. (2021). Language in science performance: Do good readers perform better? *European Journal of Psychology of Education*, 36(1), 45–61]. In addition, ELA CCSS for grades K–12 include overlapping standards related to science and technical subjects e.g., citing evidence from text, construct viable arguments and critique reasoning of others.

Strengthening science education may positively impact overall student academic achievement. The demographic distribution and proficiency scores may reflect a need to expand opportunity and access; eliminating differential access to high-quality educational opportunities. It is evident that much work remains to be done in order to reduce achievement gaps between students groups.

Activities of the Math and Science Bureau

Building Science Leaders Network

41 Educators/Facilitators
15 LEAs
2 Partners



Strategy II-A Deeper Learning
Strategy II-B Community-Based Culturally and Linguistically Responsive Education
Action I-D-2f Growth Oriented Professional Learning

[Building Science Leaders Network \(BSL\), developed in conjunction with WestEd's SCALE Science and K-12 Alliance, addressed the needs and constraints of science leaders across New Mexico by creating a statewide community of practice made up of LEA science leaders, including curriculum and instruction, instructional coaches, and school site leaders.](#)

The MSB covered the cost of participants' travel expenditures, including mileage reimbursement, lodging, stipends and substitute reimbursements for all in-person and virtual learning events, to reduce barriers for LEAs in participating.

Science leaders engaged in 80 hours of hybrid (in-person and virtual synchronous format) professional learning over nine full days and four virtual sessions to equip them with skills and tools to build their capacity at their sites. The professional learning series engaged leaders in building expertise around the NM STEM Ready! Science Standards, assisting science educators in implementing three-dimensional (3D) instructional practice, and observing and providing quality feedback to educators in developing their 3D instructional practices. This initiative also built a community of science leaders in different statewide contexts and supported them in building long-term PL arcs based on their local contexts/ data.

Through independent evaluation of the series, including surveying participants at three points

during the year (the beginning, mid-point, and the end) and interviews, we found:

- 70% of participants reported learning a lot through the yearlong initiative.
- 85% reported improved confidence and self-image as science leaders.
- 90% surveyed agreed or strongly agreed that they felt supported in developing training to move towards a vision of equitable teaching and learning in science.
- 96% stated that their participation influenced their day-to-day work.
- Professional learning is relevant to the BSL participants and should be utilized and implemented immediately after the PL.
- BSL participants impacted 2,500 individuals through ongoing support at their sites.

National OpenSciEd Elementary School Field Test

11 Facilitators
96 Field Test Teachers
4 LEAs



Strategy II-A Deeper Learning
Strategy II-B Community-Based Culturally and Linguistically Responsive Education
Action I-D-2f Growth Oriented Professional Learning

The National OpenSciEd Elementary School Field Test is a collaborative effort with other state educational agencies, school districts, classroom educators, experienced science curriculum developers, and the science education community to create research-based, open-source science instructional materials. During the first year, field test teachers in grades K-5 implemented two new units, one each semester.

The MSB covered the participants' travel expenditures, including mileage reimbursement, lodging, and stipends for all in-person and virtual learning events to reduce the barriers LEAs face when participating. The MSB also provided field test kit materials and printed materials. LEAs signed a Memorandum of Understanding agreeing to provide substitute coverage and time for educators to

participate in ongoing job-embedded professional learning activities during the field test.

Throughout each semester (Fall and Spring), the field test educators engaged in job-embedded virtual PLCs to dive deeper into the shifts in pedagogical content knowledge called for when implementing these materials aligned to the NM STEM Ready! Science Standards. We contracted with local New Mexico facilitators to assist with deep learning in the field test instructional materials and facilitate professional learning (in-person and virtually). Facilitators became versed in the OpenSciEd instructional model and in preparing field test educators for classroom implementation. Facilitators also provided practical strategies to support field test educators in examining student work aligned to three-dimensional teaching and learning.

Concurrent with the OpenSciEd field test, Horizon Research collected data from field test educators in the form of surveys, interviews, focus groups, and student artifacts. This data was used to measure the effectiveness of the unit and areas. As a result of the feedback from NM students and teachers, six units are publicly available. These units are determined to be of high-quality design for the Next Generation Science Standards (NGSS) by the National Science Teaching Association (NSTA). In addition, the Math and Science Bureau continued participating in the State Steering Committee and unit advisory committees to provide input on unit development.

OpenSciEd Unit Facilitation Academies & Wrap-Around Supports



28 Educators/Facilitators
14 LEAs

Strategy II-A Deeper Learning
Strategy II-B Community-Based Culturally and Linguistically Responsive Education
Action I-D-2f Growth Oriented Professional Learning

The MSB partnered with the Charles A. Dana

Center at the University of Texas at Austin to construct and provide 70-hours of virtual professional learning. This opportunity successfully equipped OpenSciEd facilitators to train teachers using the OpenSciEd curricular units.

These sessions achieved the following objectives:

- Familiarized facilitators with the OpenSciEd instructional models and the conceptual shifts inherent to phenomenon-based learning.
- Prepared educators for the practical aspects of planning and enacting OpenSciEd units.
- Built capacity to support teachers in enacting and modifying the OpenSciEd curriculum to support diverse learners using Universal Design for Learning principles and culturally and linguistically responsive instructional strategies.
- Applied best practices of adult learning to lead effective professional learning that fosters a collaborative culture among educators.

New Mexico Instructional Scope (NMIS) Science 2.0



8 Educators
6 LEAs

Strategy II-A Deeper Learning
Strategy II-B Community-Based Culturally and Linguistically Responsive Education

The MSB worked alongside the Curriculum and Instruction Bureau, New Mexico educators, and The New Teacher Project (TNTP) to revise and publish version 2.0 of the NMIS for Science. This included stronger alignment to a Multi-Layered System of Supports (MLSS), UDL and CLRI. Science included localized phenomena for educators to utilize and incorporate to anchor science instruction. The

NMIS is a guidance document for our K–12 educators and administrators to support all students in accessing high-quality, on-grade-level education. Educators use this guide with lesson planning in conjunction with curriculum materials adopted by the district/school. It provides guidance on best practices for teachers, resources for supporting English learners, incorporating Universal Design for Learning, formative assessment techniques and sample items that will help teachers support all students in accessing the NM STEM Ready! Science Standards.

Implementing the tool is a strategy for assuring a guaranteed, viable, and equitable curriculum across the state while capitalizing on the leadership and expertise of educators at the local level.

Educators designed the NMIS to:

- Meet districts where they are, with tools to support district-wide horizontal and vertical curricular alignment and provide guidance on the sequencing of standards at the local level.
- Foster programmatic planning at the district and school level and provide a rich foundation for aligned, collaborative conversations about teaching and learning.
- Support teachers in their individual and collaborative instructional planning and utilizing strategies, including formative classroom assessment, to guide all students in attaining grade level proficiency or above.

Activities of the Math and Science Bureau

Math/Computer Science Integration Series



34 Educators
13 LEAs

Strategy II-A Deeper Learning
Strategy II-B Community-Based Culturally and Linguistically Responsive Education

The MSB partnered with The New Teacher Project to provide a 40-hour virtual professional learning course to support integration of computer science with mathematics and science. Throughout the series, educators submitted lesson plans and student artifacts showing how they incorporated data science, computational thinking and coding within their core instruction.

Outdoor Learning

Activities of the Math and Science Bureau

Wilderness First Aid Course

25 Educators, Community and PED Partners

Strategy II-A Deeper Learning
Strategy II-E Enrichment, Extracurricular and Out-of-School-Time Programs

The MSB worked with UNM International Mountain Medicine Center to offer a hybrid course in certifying educators in the most up-to-date, evidence based and practically relevant materials. The Wilderness First Aid course is a 16-hour course that includes a combination lectures, practical skills stations, and scenario practice. Participants receive a certification in Wilderness First Aid that is effective for two years.

Outdoor Learning Start-Up Grants

6 LEAs
2,516 Student

Strategy II-A Deeper Learning
Strategy II-B Community-Based Culturally and Linguistically Responsive Education
Strategy II-C Social Emotional Learning
Strategy II-E Enrichment, Extracurricular and Out-of-School-Time Programs

The Outdoor Learning Start-Up Grants aimed to foster innovation in outdoor learning by increasing access to outdoor education programs for New Mexico students. \$300,000 in competitive grants were available, through an application process open to New Mexico PreK–12 public school districts, state charters and regional education cooperatives. Grant funds are intended to:

- Support outdoor learning and/or environmental education professional learning that integrates instruction in

science, technology, engineering, arts, mathematics, literacy, social studies or humanities.

- Develop a plan to create a new outdoor learning program, including training and supporting public schools teachers on outdoor learning protocols and best practices and developing an outdoor learning space/outdoor classroom on school grounds.

During the 2023–24 school year, the PED Outdoor Learning Initiative granted funds to the following districts and schools:

- Alamogordo Public Schools
- Dulce Independent Schools
- DZİŁ DITŁ'OOÍ School of Empowerment, Action, and Perseverance (DEAP)
- Native American Community Academy (NACA)
- Santa Rosa Consolidated School District
- Turquoise Trail Charter School

Overall, the SY2023–24 grant recipients participated in eight Community of Practice sessions and completed a Wilderness First Aid certification. Through their innovative programming, 2,516 students engaged in outdoor learning last year.

Outdoor Learning Grant funding was instrumental in enhancing outdoor education experiences for students in grades K–5 at the Native American Community Academy (NACA). The Land Based Healing and Learning Department (LBHL) worked closely with K–5 teachers and educational assistants to build confidence in outdoor education protocols and implementation for both the staff and students. LBHL identified ten teachers to serve as land leaders who worked closely with LBHL to discuss, brainstorm, and implement outdoor learning concepts into their classroom curriculum. Land leaders hosted a professional development at the end of the SY2023–24 to showcase their innovative curriculum. The presentations were gallery walk style with hands-on activities open to all NACA staff to experience.

The project team at Santa Rosa High School (SRHS) has developed outdoor learning spaces that extend from the school to the Pecos River. Originally intended as a direct path to the river, the project has expanded to include multiple

educational spaces that will be available for use by students and other stakeholders once they are fully completed. The initial grant allowed the project team to outline the learning spaces between SRHS and the Pecos River, as well as to acquire the necessary equipment and materials that students used during the recent summer boot camp. Additionally, the project made it possible for SRHS to clear areas leading to the Pecos River, where outdoor learning activities will take place in the upcoming school year.

At North Elementary School in Alamogordo, district and campus leadership collaborated to plan for initial grant implementation. The two main goals of this grant were to increase the opportunity and frequency of student outdoor learning use and to promote and expand outdoor learning professional development. The Outdoor Learning Grant at North Elementary met the main goals of the proposal by significantly increasing student outdoor learning opportunities from zero documented in SY2022–23 to 724 students receiving one or more opportunities in SY2023–24. The professional learning opportunities increased from zero documented in SY2022–23 to nine in SY2023–24. North Elementary started the year with an introduction to the grant. All teachers were informed of the initiative and encouraged to utilize outdoor learning spaces for the school year. Monthly professional learning opportunities began in September with budget authority, and teachers began utilizing outdoor learning spaces. Teachers felt comfortable trying the strategies practiced during professional learning sessions in outdoor classrooms with students. They appreciated collaborating over practical uses and students enjoyed the change in the learning environment, the real world and hands-on learning activities, and the opportunity to create, build and grow.

DZİŁ DITŁ'OOÍ School of Empowerment, Action, and Perseverance's (DEAP) Outdoor Learning Initiative advances experiential education and community engagement by establishing a gear Library, greenhouse construction, and diverse land-based learning activities. The newly established gear library offers students and community members access to essential outdoor equipment. It is stocked with items

from reputable vendors and provides tents, backpacks, and field gear, enhancing outdoor education experiences and ensuring safe, effective learning.

The interior construction of DEAP's greenhouse is a significant milestone. This year-round facility supports plant cultivation and agricultural experiments, equipped with advanced irrigation, climate control, and workspaces. The greenhouse promotes sustainable agricultural practices and food sovereignty, aligning with DEAP's mission.

DEAP integrates land-based learning activities as a traditional and modern agricultural practice into its curriculum with the following objectives:

- Navajo Planting Techniques: Teaching traditional methods to promote cultural heritage and sustainable farming.
- Soil Testing: Workshops on soil health educate students on its agricultural impact.
- Garden Box Build-Outs: Expanding garden boxes for more extensive cultivation projects.
- Wool Processing: Connecting students to traditional crafts and sustainable practices through processing workshops.
- Additional Activities: Small-scale projects like composting and seed saving enrich the outdoor learning experience.

At Dulce Independent Schools, funding supported their Farm to Fork program endeavors and project-based learning instructional resources, allowing for more outdoor experiences. The community identified the need for more significant shaded areas, protected spaces throughout the school district, and water access points during the 2023 STEA2M summer program. The first goal was to grow outdoor learning spaces throughout the school district and support the Farm to Fork program by providing all students and families equitable access to outdoor learning environments interacting, playing, exploring, discovering, and learning. Moreover, efforts are needed to integrate culturally and linguistically relevant practices, social-emotional learning, and interdisciplinary, outdoor, and environmental education programs aligned with content

STEM Activities

educational standards while expanding collaboration with local organizations and supporting data-driven decisions based on community needs.

At Turquoise Trail Middle School, the outdoor learning classroom promoted and supported all subjects: math, science, language arts, history, and social studies. Outdoor learning provided an opportunity for hands-on, interactive learning, which helped elevate endeavors related to science, technology, engineering, arts, agriculture, math, and health. Through their outdoor learning program, Turquoise Trail's students and community became stewards of the land and gained a renewed understanding and respect for native lands and cultures. Their unique outdoor learning space taught the importance of resource preservation and environmental sustainability, and it inspired students to consider solutions for some of the world's biggest environmental challenges. Their program included animal science therapy and reading to animals to promote literature. Additionally, students wrote, illustrated, and published a book about the chickens they raised.

Activities of the Math and Science Bureau

Integrating computer science, science, and math in K–12 provides students pathways for success beyond high school. The Math and Science Bureau partnered with other PED bureaus, other state departments, and local, state and national organizations to support programs, educators, and communities essential to strong STEM education.

UNM Research Opportunities for Science Educators (ROSE)

16 High School Educators
14 LEAs

The MSB and UNM professors collaborated to continue year three of the Research Opportunities for Science Educators program to improve the quality of science education in NM. This program enabled twenty science middle and high school science educators to refresh their knowledge and develop new skills while engaging in scientific research. Each educator worked in a lab for five weeks alongside UNM faculty engaged in research. At the program's end, each educator prepared a short presentation on the objectives of their project, research results, accomplishments and highlighted tools and techniques which they were able to bring back to their classrooms used throughout the program.

NM Governor's STEM Challenge and Showcase

61 High School Educators
Over 300 High School Students
29 LEAs

The PED and the LANL-Foundation invited NM high schools to participate in the 2024 NM Governor's STEM Challenge and Showcase. The PED supported sponsor teachers with stipends and a two-day training. The two-day training for sponsor teachers grounded them in the NM STEM Ready! Science Standards, identified best practices for supporting project-based learning and design thinking, and presented the NM Governor's STEM Challenge criteria and requirements.

High school teams and sponsor teacher worked throughout September–December 2023 on a project to answer the annual question. They displayed and presented their projects at the NM Governor's STEM Showcase on January 20, 2024 in Albuquerque.

Presidential Award for Excellence in Mathematics and Science Teaching (PAEMST)

The MSB continued to administer the Presidential Award for Excellence in Math and Science Teaching (PAEMST) on behalf of the White House Office of Science and Technology Policy. In addition to resources housed on the MSB website, the team offered a series of office hours to all interested math and science K-6 applicants on topics related to successfully completing the application. PAEMST alumni and mentors provided guidance and additional support to applicants.

In total, 24 mathematics and 31 science educators were nominated.

The state selection committee selected several math and science state finalists for the K-6 cycle:

- Elaine Blaser, a fourteen-year veteran educator who teaches grade 5 math and science at Carlos Gilbert Elementary School in Santa Fe Public Schools, as a math state finalist.
- Michelle Sanchez, who has been an educator for over twenty-three years and teaches grade 5 math and science at Pojoaque Valley Intermediate School in Pojoaque Valley Public Schools, as a math state finalist.
- Megan Strain, a fourteen-year educator who teaches grade 5 science at Desert Hills Elementary School in Las Cruces Public School, as a science state finalist.

These state finalists represent the most outstanding teachers NM has to offer and serve as both a model and an inspiration to students and fellow teachers. As state finalists, they will represent New Mexico for the National PAEMST Review in K-6 math and science education.

PAEMST national awardees receive a trip to Washington, D.C., where they attend a series of recognition events and professional development opportunities. They also receive a \$10,000 award from NSF, a Presidential certificate, and join an elite cohort of award-winning teachers who can influence state/ jurisdiction and national STEM teaching.

LaunchYears Initiative

The LaunchYears Initiative supports scaling mathematics pathways from high school through postsecondary education and into the workplace, aligned to students' goals and aspirations. New Mexico continued its work with the LaunchYears Initiative by focusing on designing and implementing postsecondary mathematics pathways.

The NM team focused on three recommendations in light of new legislation:

- Aligning secondary math courses and content to the corresponding postsecondary math courses.
- Creating better placement policies that can reduce the amount of time postsecondary students spend taking unnecessary remedial courses.
- Improving communication between high schools and postsecondary institutions to enhance student advising in postsecondary programs, both for current dual-credit students and recently graduated secondary students.

Educator Grants

The MSB values high-quality professional learning provided by partners across the state. In order to increase access and reduce barriers, the MSB supported educators with travel grants. Through these grants:

- 49 educators participated in the New Mexico Science Teachers Association Fall Conference on October 21, 2024 in Farmington, NM.
- 43 educators participated in the MidSchoolMath National Conference on March 2, 2024 in Santa Fe, NM.

United States Department of Education Green Ribbon Schools

The U.S. Department of Education Green Ribbon Schools (ED-GRS) recognizes early learning centers, schools, and districts taking a comprehensive approach to sustainability. ED-GRS awards are granted to those who show incorporation of environmental learning with

STEM Activities

improving environmental and health impacts. In order to be considered for the award, there must be progress shown in three pillars.

- Pillar I: Reducing environmental impact and costs.
- Pillar II: Improving the Health and wellness of students and staff.
- Pillar III: Offering effective environmental and sustainability education.

In 2024, three schools were nominated as New Mexico Green Ribbon Schools: Aldo Leopold Charter School, Polk Middle School, and Cuba Independent School District. The U.S. Department of Education awarded Cuba Independent School District and Polk Middle School with the Green Ribbon honor.

Cuba Independent School District (CISD) serves a student population of rural and Indigenous communities and is deeply committed to fostering a sustainable and healthy environment for students spend time in the garden/farm across grade levels and content areas and during electives for restorative practices. CISD has implemented in-house food growing operations, efficient lighting and HVAC systems, rainwater catchment in their agriculture program, and encourages teachers and students to walk or take public transportation to campus. CISD's district-wide compost system is a hands-on way for students to learn about the methods and benefits of composting. CISD has multiple outdoor classrooms and nature trails to connect students with the environment, promote ecological learning, and provide teachers with alternative environments for instruction. CISD prioritizes the well-being of the community by implementing district-wide social emotional learning curriculum, enhancing student hydration through reusable water bottles and filtered refilling stations, and providing access to nutritious meals utilizing local and district-grown produce. The curriculum integrates environmental topics across subjects and connects to the local agrarian communities and traditional Navajo practices, ensuring all students graduate with a deep appreciation for the environment and the knowledge and skills needed to address pressing environmental issues. The Animal Science classes discuss topics such as range management, ecosystem harmony, and

sustainable and regenerative ranching/animal husbandry practices. Student interns work with the local U.S. Forest Service and soil and water conservation offices to learn about the importance of these agencies and the role they play in sustainability efforts.

Polk Middle School, established in 1968, is a dual language institution offering instruction in English and Spanish. The school is dedicated to championing environmental and agricultural education. 99% free and reduced price lunch eligible. It features a 30,000-square-foot school farm that provides food to families who experience food insecurity. The school farm, which is used for cross-curricular learning projects, consists of 17 growing rows, 11 accessible raised bed, and three hoop houses. In partnership with the Ciudad Soil and Water Conservation District, Polk was awarded nearly \$600,000 from the EPA's Recycling Education and Outreach Grant Program, which Polk staff will use to design and implement PreK-12 composting programs and curricula over three years. The district energy team monitors energy usage and building performance, launched a water leak detection app, and works to increase solar production. Polk aims to create a drought-tolerant community orchard and outdoor learning space. Community events are held at the school's resolana space that features a traditionally built adobe oven. A new STEM lab will include aquaponic and hydroponic systems in collaboration with state agencies. A half-time garden teacher works with educators from all departments to use outdoor learning to support all curricular areas. These include social studies units focused on environmental advocacy, math lessons in geometry and measurement, and science class Farm Fridays that allow students to apply the science that they learn in the classroom in the field. Students participate in walk and bike to school events, and Polk is a pilot school for the district's interventions to encourage active transportation that lowers carbon emissions. In 2023, Polk was awarded \$12.8 million from the Magnet Schools Assistance Program, as part of the STEM Pathway called "Sustaining the Future." Over five years, Polk staff will receive comprehensive professional development on inquiry-based learning and teaching, environmental STEM content,

integration, cross-curricular connections, and engineering design and problem-solving through Project Lead The Way.

2024 Earth Day Festival

The MSB sponsored six tables for the First Annual Earth Day Celebration Festival at Balloon Fiesta Park in Albuquerque. The MSB supported the creation of a sculpture titled “Garbanzo Snout the Grumpy Trout,” with its name and backstory chosen through a vote by PreK students at Los Ranchos PreK and Mission Avenue Elementary PreK. Students from Outdoor Classroom Start-Up schools and students from Green Ribbon Schools were invited to participate in a youth panel for the community. They discussed the impact of outdoor learning on their academics and social-emotional growth. Former Secretary of Public Education, Arsenio Romero, Ph.D., was invited to speak and announce the New Mexico nominees for the Green Ribbon School award.

Council of Chief State School Officers (CCSSO) HQIM Initiative

The MSB has collaborated with the Instructional Materials Bureau and PED leadership in the implementation of the CCSSO HQIM initiative. Its mission is to encourage the use of HQIM during instruction for the purpose of improving student instructional outcomes.

In March, Director Anthony Burns and Director Shafiq Chaudhary participated on a panel along with Massachusetts and BSCS Science Learning. Both directors shared their experience with implementing professional learning opportunities to support readiness for material adoption in science.

Collaboration with the Assessment Bureau

The MSB collaborated with the PED’s Assessment Bureau by providing content expertise during the vetting of the NM-MSSA and NM-ASR assessments, as well as the review of supporting items for bias and sensitivity educator reviews. MSB also worked with the Assessment Bureau and ISTATON in giving feedback for effective teacher workshops in math.

Collaboration with the Instructional Materials Bureau

The MSB recruited and funded both science and math content experts to develop the content criteria rubrics for the upcoming instructional materials summer review. The science and math content experts worked with national partners, WestEd, and SchoolKit to gain technical assistance in the development of the criteria rubrics used to select high-quality instructional materials.

In addition, the MSB provided a two-day training for all contracted science reviewers utilizing Making Sense of SCIENCE Supporting Science Standards Implementation. This training was to enhance participants’ understanding of the NM STEM Ready! Science Standards and shifts that should be seen within instruction.

The MSB collaborated with the Instructional Materials Bureau and with RIVET Education to develop two implementation guides to support LEAs with a roadmap and action steps needed for successful implementation at each stage of HQIM implementation.

[New Mexico Math Instructional Materials Implementation Tool](#)

[New Mexico Science Instructional Materials Implementation Tool](#)

State Climate Adaptation and Resilience Plan Working Group

Governor Michelle Lujan-Grisham directed New Mexico Climate Change Task Force co-chairs to invite state agencies to select at least two members to participate in a three-part adaptation and resilience workshop series hosted by the Climate Policy Bureau at the Environment, Minerals and Natural Resources Department. The PED selected Division Director Jacqueline Costales, Ed.D. and Director Chaudhary as the PED representatives. The three-workshop-series supported the collaborative development of a climate change adaptation and resilience plan for the state.

The iterative workshops, designed as a collaborative effort, first provided an overview of the observed and projected changes to temperature and precipitation for the state. These changes were shown to lead to subsequent climate hazards and impacts, some of which are already affecting New Mexico. Through a Climate Vulnerability Assessment, we identified and ranked the relative vulnerability of critical assets associated with natural systems, critical facilities (i.e. schools/buildings) and infrastructure, people and culture, and economy. The taskforce identified six strategies to support the development of resilient NM communities in the face of climate change: Water Infrastructure, Infrastructure, Ecosystems/Natural Resources, Local Economies, Health/Wellness, and Communities & Culture.

In our continued collaboration with the Climate Policy Bureau, the MSB helped them host a listening tour stop in Santa Fe to collect community feedback on the plan.

New Mexico Science Visioning

The MSB is working with BSCS Science Learning and the National Science Teaching Association (NSTA) to begin development of a science vision for NM. A steering committee

made up of members from the MSAC, industry representatives and informal science educators advise this work.

The outcomes of the project this year included:

- Identifying key stakeholders, including educators, administrators, policymakers, parents, guardians, students, industry representatives, and community leaders.
- Conducting an initial assessment to understand the current state of science education in New Mexico.
- Facilitating a series of stakeholder meetings, workshops, and focus groups to gather input and insights on the vision for science education.
- Utilizing various engagement methods, such as surveys, interviews, and online platforms, to reach a broad spectrum of stakeholders while ensuring representation from diverse communities and perspectives to promote inclusivity and equity in the vision development process.

During summer 2024, a survey was sent out to stakeholders across the state to gather initial input into the vision.

The goal is to develop a state-wide vision for science education, by fall 2024, to begin bringing coherence to our state system and identify tenets for developing an NM Science Framework.

Network of Educators Across the United States (NEXUS) for Science Education Leadership

The MSB, alongside Louisiana, Maryland, Massachusetts, and Washington State, participated in the last year of this collaborative opportunity to provide science education leaders an opportunity to network across states and share ideas and strategies while also providing individualized support and assistance to each state. Leadership teams from the PED and Albuquerque Public Schools increased their shared understanding of the critical actions leadership teams and systems

drivers take in leading effective science curriculum implementation. In networking with other states science education communities, the need for a science vision and implementation tool for New Mexico was reinforced.

Driving Change in Science Education

A state team went to Detroit in July 2023 to participate in two full days of learning about the national science education policy and landscape. The team included Angela Alderete (representing the MSAC), Daniel Delgado (representing NMSTA), Amanda Aragon (Executive Director of NMKidsCan), and Director Chaudhary.

The big goals the team walked away with were advocating for science instructional materials funding and utilizing high-quality science instructional materials. During the conference, Director Chaudhary presented the [state of curriculum implementation](#) in New Mexico.

Collaboration with Cooperative Education Services (CES)

Deputy Director Patricia Gharrity is on the advisory committee for a 6-year study in mathematics. The project is headed by CES. She attends meetings and professional developments and provides input for the study which focuses on 16 districts around the state. CES has partnered with the American Alliance for Innovative Systems (AAIS) to provide professional development and feedback to district leaders, school leaders, and teachers surrounding the following areas:

1. Initial Assessment and Planning
2. Curriculum Development and Alignment
3. Instructional Strategies and Assessment
4. Professional Development and Leadership Training
5. Capacity Building and Sustainability

Conferences/Presentations

MSB staff provided presentations throughout the course of the school year, both to audiences in New Mexico and nation-wide.

In July 2023, Director Chaudhary was invited to present to the LESC on innovations within secondary mathematics being led by the PED.

Director Chaudhary and a middle school educator co-facilitated a session on innovations within science education at the 2023 Charter Schools Conference. The session covered equitable instructional practices, making student thinking visible through formative assessments, and critical planning considerations for applying this instructional routine to curriculum.

In September 2023, Director Chaudhary was invited to present at LESC on innovations within elementary mathematics being led by the PED.

In October 2023, Director Chaudhary presented at the NMSTA Fall Conference on empowering discourse in the classroom through the use of high-quality science instructional units and engaged in a student-centered experience.

In January 2024, Director Chaudhary served as a panelist earlier this year during the [Board of Science Education \(BOSE\) K-12 STEM Education and Workforce Development in Rural Areas committee meeting](#). The committee is conducting a congressional mandated consensus study on K-12 STEM education and workforce development in rural areas. This study is aimed at taking developing recommendations for federal, state, and local entities to improve existing programs for rural STEM education. The committee, which was in the information gathering stage, [invited Director Chaudhary to participate on a panel discussion to explore the policies and constraints states navigate to support STEM education and workforce development in rural areas, as well as the differences observed within tribal systems](#). He provided evidence and testimony on the New Mexico context.

STEM Activities

In March 2024, Director Chaudhary presented at the Council of State Science Supervisors annual meeting. The presentation was focused on productively disrupting traditional models of outdoor learning and family engagement to promote systemic change and more ethical and just future for communities.

Assistant Director Gharrity, Therese Baca-Radler, Ph.D., and Vanessa Barela presented at the Spring Budget Conference on current initiatives and support for outdoor education in New Mexico. Their discussion was focused on the increasing number of outdoor education opportunities in the state. Participants were given resources pertaining to outdoor learning grants.

In June 2024, Director Chaudhary presented at the Cooperative Educational Services (CES) LEAP conference, discussing high-quality anchoring phenomenon and HQIM with built in support for ELs. He repeated the second session at the 2024 Charter School Conference later in June.

Lisa Sanchez presented at the CES LEAP conference as well, focusing on the use of NM-created science rubrics for selecting science HQIM.

Vanessa Barela presented an introduction to outdoor education and incorporating outdoor education into classrooms and outdoor environments. A discussion of best practices and tools for implementing outdoor education was presented, as well as an overview of the Outdoor Learning Canvas Course for teachers who are new to outdoor learning.

Director Chaudhary presented at the Black Education Act Conference with a session focused on diving deep into the '5 Equity-Based Mathematics Teaching Practices' through a student-centered experiential.

Assistant Director Gharrity presented at a joint NCTE/NCTM Conference in New Orleans, LA. Assistant Director Gharrity discussed merging outdoor learning, natural phenomena, and early numeracy foundations to develop experiential learning opportunities. Equity in the outdoors with outdoor learning and community/placed-based education at the

forefront was discussed pertaining to student backgrounds and cultural perspectives and traditions. Community and place-based education engages land and culture and serves as the starting point for learning across all academic subjects. The approach provides connections that allow for high-level, inquiry-based content with real-world learning opportunities and provides more opportunities for students from all racial, linguistic, gender, and socioeconomic groups to support all levels of achievement in math.

National Academies of Science, Engineering, and Mathematics Board of Science Education

Director Chaudhary served as a peer reviewer for the committee report from the National Academies for Engineering, Science and Medicine Board of Science Education. [Equity in K-12 STEM Education: Framing Decisions for the Future](#) approaches equity in STEM education not as a singular goal but as an ongoing process that requires intentional decision-making and action toward addressing and disrupting existing inequities and envisioning a more just future. Stakeholders at all levels of the education system—including state, district, and school leaders; classroom teachers; and community members—have roles as decision-makers who can advance equity. This consensus study report provides five equity frames as a guide to help decision-makers articulate short- and long-term goals for equity and make decisions about policy and practice.

Appendix A: Statutory Requirements

This section describes the laws and rules that apply to the Mathematics and Science Education Act in relevant part as follows:

22-15E-1. Short title.

This act [Chapter 22, Article 15E NMSA 1978] may be cited as the “Mathematics and Science Education Act”.

History: Laws 2007, ch. 44, § 1; 2007, ch. 239, § 1.

22-15E-2. Definitions.

As used in the Mathematics and Science Education Act:

- A. “bureau” means the mathematics and science bureau;
- B. “chief” means the chief of the bureau; and
- C. “council” means the mathematics and science advisory council.

22-15E-3. Bureau created; duties.

History: Laws 2007, ch. 44, § 2; 2007, ch. 239, § 2.

- A. The “mathematics and science bureau» is created in the department. The secretary shall appoint the chief as provided in the Public Education Department Act [9-24-1 NMSA 1978].
- B. The bureau shall:
 1. administer the provisions of the Mathematics and Science Education Act;
 2. provide staff support for and coordinate the activities of the council;
 3. work with the council to develop a statewide strategic plan for mathematics and science education in the public schools and coordinate education activities with other state agencies, the federal government, business consortia and public or private organizations or other persons;
 4. ensure that school districts’ plans include goals for improving mathematics and science education aligned to the department’s strategic plan;
 5. recommend funding mechanisms that support the improvement of mathematics and science education in the state, including web-based mathematics and science curricula, mentoring and web-based homework assistance;
 6. promote partnerships among public schools, higher education institutions, government, business and educational and community organizations to improve the mathematics and science education in the state;
 7. develop and evaluate curricula, instructional programs and professional development programs in mathematics and science aligned with state academic content and performance standards; and assess the outcomes of efforts to improve mathematics and science education using existing data.

History: Laws 2007, ch. 44, § 3; 2007, ch. 239, § 3.

22-15E-4. Mathematics and science advisory council; created; members; terms; vacancies.

- A. The “mathematics and science advisory council» is created, composed of twelve members. Members of the council shall be appointed by the secretary for staggered terms of four years; provided that for the initial appointments, four members shall be appointed for two years, four members shall be appointed for three years and four members shall be appointed for four years. Members shall serve until their successors have been appointed and qualified. A vacancy shall be filled by appointment by the secretary for the unexpired term.
- B. Using a statewide application process, the secretary shall appoint members from throughout the state so as to ensure representation of the state’s demographics, including geographic distribution,

gender and ethnic diversity and as follows:

1. four members from public schools, including at least two mathematics and science teachers and a school district administrator with experience in mathematics and science curricula;
 2. three members from public post-secondary educational institutions with expertise in mathematics or science education;
 3. four members from the private sector, including the national laboratories, museums and science- and engineering-based businesses; and
 4. one member who represents the New Mexico partnership for mathematics and science education.
- C. Members of the council shall elect a chair from among the membership. The council shall meet at the call of the chair not less than quarterly.
- D. Members of the council are entitled to receive per diem and mileage pursuant to the provisions of the Per Diem and Mileage Act [10-8-1 NMSA 1978] but shall receive no other compensation, perquisite or allowance.

History: Laws 2007, ch. 44, § 4; 2007, ch. 239, § 4

22-15E-5. Council duties.

The council shall:

- A. advise the bureau on implementation of the bureau's duties pursuant to the Mathematics and Science Education Act;
- B. make recommendations to the bureau and the department regarding the statewide strategic plan for improving mathematics and science education and advise on its implementation and incorporation into the department's five-year strategic plan for public elementary and secondary education in the state;
- C. advise the bureau, the department and the legislature regarding appropriations for mathematics and science education, administration, resources and services, including programs for public school students and staff;
- D. work with the bureau to determine the need for improvement in mathematics and science achievement of public school students and make recommendations to the department on how to meet these needs; and
- E. produce an annual report on public elementary and secondary mathematics and science student achievement to be submitted to the department, the governor and the legislature no later than November 30 of each year.

History: Laws 2007, ch. 44, § 5; 2007, ch. 239, § 5.

22-15E-6. Mathematics and science proficiency fund; created; purpose; annual reports.

- A. The "mathematics and science proficiency fund" is created as a non-reverting fund in the state treasury. The fund consists of appropriations, gifts, grants, donations and income from investment of the fund. Disbursements from the fund shall be made by warrant of the secretary of finance and administration pursuant to vouchers signed by the secretary of public education or the secretary's authorized representative.

- B. The fund shall be administered by the department, and money in the fund is appropriated to the department to provide awards to public schools, school districts, public post-secondary educational institutions and persons that implement innovative, research-based mathematics and science curricula and professional development programs. The department shall promulgate rules for the application and award of money from the fund, including criteria to evaluate innovative, research-based mathematics and science programs and professional development programs.
- C. Each award recipient shall provide an annual report to the bureau that includes a detailed budget report, a description of the services provided and documented evidence of the stated outcomes of the program funded by the mathematics and science proficiency fund and that provides other information requested by the bureau.

History: Laws 2007, ch. 44, § 6; 2007, ch. 239, § 6.

Appendix B: MSAC Rationale for Critical Issues

Math Action Recommendations

Recommendation #1: Require all teacher preparation programs include a minimum of 3 hours of mathematics methods aligned to national standards. Currently only traditional programs have this requirement. Alternative licensure and special education programs lack this requirement.

The 2023 New Mexico Educator Vacancy Report (Boren, 2023) reported that 1158 people completed a teacher preparation program in SY2022–23. Of those, 253 people completed an alternative elementary licensure program; a pathway that does not require a math methods course. 150 people completed a traditional elementary licensure course which requires six hours of mathematics content and three hours of mathematics methods. While some alternative licensure programs require a three hour math methods course, NM does not have a requirement in place that ensures every elementary teacher has an opportunity to learn the specialized knowledge needed for teaching children and youth mathematics effectively. Indeed, some of the approved programs producing most of the alternative licensure graduates do not require math methods and emphasize pedagogies that contradict national standards of practice (NCTM, 2014). Special education teachers face the same dilemma. 253 teachers graduated from alternative and traditional special education programs in SY2022–23 and none of them were required to learn the specialized knowledge needed to teach mathematics to children and youth who have special needs and rights.

In addition, mathematics positions are the positions with the highest vacancy rates. At the beginning of the 2023 school year, there were 58 vacancies for mathematics teachers, followed by 54 vacancies for science teachers. 58 middle and high school math classes were not staffed. In SY2023–24, 36 people completed alternative licensure programs who were certified to teach math at the secondary level, and while they may have the content background, the state does not require these educators complete a math methods course to learn how to teach youth mathematics in culturally and linguistically responsive ways that are aligned to national standards of professional practice. The outcome of this dynamic is that thousands of New Mexico’s children and youth do not have access to teachers who have been prepared to teach them mathematics in ways that align to national standards of practice.

The PED is updating standards for teacher preparation programs. We (the MSAC) encourage the PED to ensure that those standards align with NCTM and AMTE standards in ways that are culturally and linguistically responsive. In addition we implore the PED and Legislature to require ALL teachers who will be teaching mathematics to complete, at a minimum, three hours of mathematics teaching methods.

While this requirement already exists for traditional programs, it does not exist for alternative programs or special education programs – the programs that are producing the most teachers in our state.

Recommendation #2: Require all mathematics teachers to participate in collaborative, on-going job, embedded professional learning on mathematics content and pedagogy as part of maintaining their professional license.

Every teacher who teaches children and youth mathematics is capable of teaching mathematics in ways that are rich, relevant, rigorous and joyful. All teachers who teach students mathematics need access to on-going, job-embedded professional learning that enhances their mathematical pedagogical content knowledge and practice aligned to national standards. In addition, all secondary teachers need access to supports that help them to navigate and understand the instructional shifts being called for in the graduation requirements related to mathematics. Systematic access to on-going, job-embedded professional learning will help ensure that all teachers in NM who teach mathematics:

- Feel confident as mathematicians.
- Know how children develop a conceptual understanding of mathematics.
- Know and understand the developmental processes involved in learning mathematics.
- Know how to support children and youth through the process of learning mathematics through problem-solving with fluidity, flexibility and joy.
- Know how to support children and youth's mathematical identities and mindsets in culturally and linguistically sustaining ways.
- Refine and grow their professional practice to meet their students' needs, interests and aspirations.
- Ensure on-going access to grow their professional practice in alignment with state and national standards of practices.
 - Understand and employ NCTM's 8 Effective Mathematics Teaching Practices
 - Ensure students have regular opportunities to engage in the Common Core State Standards for Mathematical Practices (CCSS-SMPs)
- Ensure that all students understand how mathematics is used in the real world and be able to apply it to make the best possible decisions.
- Understand that teaching mathematics is as much about thinking and reasoning as about doing equations.

The implementation of collaborative, on-going, job embedded professional learning will provide opportunities for teachers to ensure professional standards have been met, which helps maintain a high-quality of education. When given the opportunity to engage in high-quality, job embedded collaborative professional learning around mathematics, it demonstrates to educators that having the necessary knowledge and skills is held in high regard in the profession and needed to effectively teach and manage a classroom. These practices ensure teachers stay current, build on professional practices, and understand current research that can be implemented in the classroom.

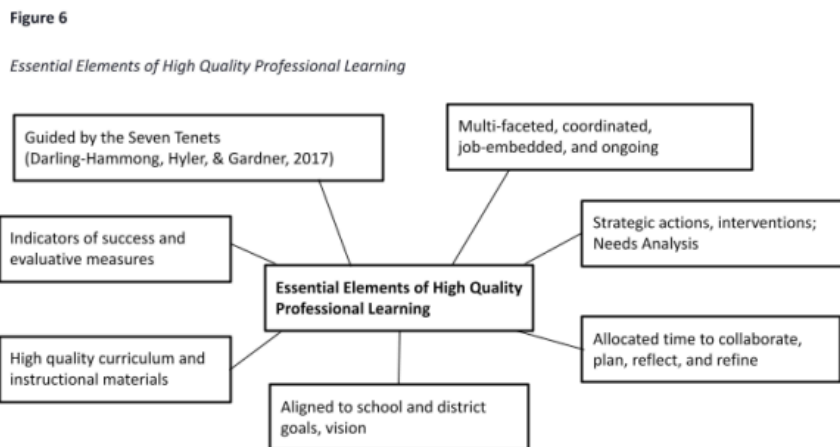
Teachers who engage in collaborative, on-going, job embedded professional learning are committed to certain ethical and professional standards, promoting accountability in their role as an education leader in their school community. Continued certification will support building trust among peers, parents, and community, assuring that children are being taught by qualified professionals. Students taught by teachers who participate in on-going collaborative professional learning perform better academically; access to teachers who are better prepared and more effective matters (i.e. Akiba & Liang, 2016; Darling Hammond, Hyler & Gardner, 2017). Requiring and providing opportunities for teachers to engage in

collaborative, on-going, job-embedded professional learning is a fundamental component of a robust educational system, supporting both educators and students in the learning process.

Recommendation #3: Ensure every elementary school has an instructional coach or math teacher leader with an Elementary Math Specialist endorsement to work with teachers during their professional day to plan, assess, reflect, and collaborate around their students’ opportunities to learn and thrive as mathematicians.

Every teacher needs time and support in their professional day to prepare, teach, assess and reflect on their teaching in collaboration with colleagues and guided by a teacher leader. NM needs to recognize that in order for a teacher to be fully prepared to teach children and youth, that they need time to work individually and with colleagues to plan instruction, assess students’ outcomes from instruction and reflect on the instruction and outcomes collaboratively, in a safe, non-evaluative environment. There is increasing evidence that student outcomes improve when teachers have access to professional learning that (1) builds-in time for teacher-to-teacher collaboration around instructional improvement; (2) includes one-to-one coaching, where coaches work to observe and offer feedback on teachers’ practice; (3) includes follow-up meetings to address teachers’ questions and fine tune implementation; (4) builds subject-specific instructional practices rather than building content knowledge alone; (5) supports teachers’ instruction with concrete instructional materials like curricula or formative assessment items rather than focusing only on general principles; and (6) explicitly attends to strengthening teachers’ relationships with students (Hill and Papay, 2022). These findings affirm NM’s Math Professional Learning Framework.

NM Math Professional Learning Framework:



Meeting this aspirational goal—that every elementary school has an instructional coach or math teacher leader with an Elementary Math Specialist endorsement (EMS)—will require the state to support more teachers to complete EMS programs as part of a master’s or post-bac certificate. It will also require schools to restructure teachers’ professional days to ensure they have time to collaborate and as they plan, teach, assess and reflect together with an EMS.

Science Action Recommendations

Recommendation #1: Support implementation of Elementary Science Specialist (ESS)

The early years of formal education play a critical role in shaping long-term outcomes in science education. Research shows that both the quality of instruction and the time spent engaging with science are key factors in determining how students perform in STEM subjects later in life. During these formative years, children begin to form their sense of identity and belonging related to STEM fields.¹ If students have positive experiences with science during this time, they are more likely to develop a positive STEM identity—a self-belief that they can succeed in subjects like math, science, and technology. Conversely, negative experiences can lead to beliefs that STEM subjects are too difficult or inaccessible, potentially discouraging them from pursuing these fields in the future².

To address this, it is recommended that elementary schools in New Mexico provide at least five hours of high-quality, inquiry-based science instruction each week, in line with the guidelines set by the National Science Teachers Association (NSTA). This approach encourages hands-on, exploratory learning, where students actively participate in investigations and problem-solving activities^{3 4}.

Building an early affinity for STEM increases the likelihood of students developing Science-Literate Identities as they transition to secondary school. This, in turn, sets them on a path toward continued engagement with and success in science and STEM-related subjects⁵.

Key components of this recommendation include:

1. Elementary Science Specialist (ESS) Role:

- Establish ESS positions in elementary schools.
- Align ESS competencies with NM STEM Ready! Science Standards.
- Ensure all elementary students have access to an ESS.
- Provide dedicated funding for ESS salaries.

2. Five Hours per Week of Science Instruction:

- Recommend all elementary school students receive a minimum of five hours per week of phenomena-based, three-dimensional science instruction taught by an ESS. Providing dedicated science instruction led by specialists supports a robust STEM foundation, addressing both the quality of education and equitable access to science learning opportunities.

Recommendation #2: Dedicated Funding for Equipment and Consumables in K–12 Science Classrooms

A critical challenge in implementing the NM STEM Ready! Science Standards is the need for dedicated funding to support the equipment and consumables required for effective, inquiry-based learning. Science classrooms, particularly those emphasizing hands-on, inquiry-driven instruction, often require significant resources, including consumables like lab materials, kits, and other hands-on tools that must be replenished regularly⁶.

Inquiry-based learning—which is central to NM STEM Ready! standards—relies on students actively engaging with science through investigations, data collection, and problem-solving activities. This

¹ Sustaining the Benefits of Early Childhood Education Experiences: A Research Overview Rebecca E. Gomez; Melhuish, E., Ereky-Stevens, K., Petrogiannis, K., Ariescu, A., Penderi, E., Rentzou, K., ... & Leseman, P. (2015). A review of research on the effects of early childhood education and care (ECEC) upon child development. *CARE Project*. Retrieved from <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0285985>

² Oemig, P. A. (2023). Re-imagining science education for English language learners (ELLs) through integrated STEM and multicultural education (pp. 195-206). In A. Esmail, A. Duhon-Ross, J. Blakely & B. Hamann (Eds.), *Social justice perspectives on English language learners*. Lanham: Hamilton Books.

Oemig, P. A. (2021). Science-Literate Identities Among ENLACE Students, *Journal of Latinos and Education*, DOI: <https://doi.org/10.1080/15348431.2021.2013228>

³ <https://www.nsta.org/nstas-official-positions/elementary-school-science>

⁴ PED Comprehensive Strategic Plan (2022) [Comprehensive Strategic Plan](#) Support the whole child

⁵ Oemig, P. A. (2021) Science-Literate Identities Among ENLACE Students, *Journal of Latinos and Education*, DOI: <https://doi.org/10.1080/15348431.2021.2013228>

⁶ New Mexico Legislative Education Study Committee. (2018). *Implementation of New Mexico STEM-Ready Science Standards*. Retrieved from <https://www.nmlegis.gov/handouts/ALESC%20102218%20Item%203%20.1%20-%20Brief%20-%20Next%20Generation%20Science%20Standard%20%28NGSS%29.pdf>

approach creates a more interactive and enriching experience, but it also increases the demand for consumable supplies and specialized equipment¹.

To ensure that all students have access to high-quality science instruction, it is crucial that the state allocates dedicated funding to cover these costs. Without such funding, teachers may struggle to provide the necessary materials for meaningful inquiry-based lessons, limiting the effectiveness of science education. By addressing this funding gap, New Mexico can continue to advance its science education initiatives and provide equitable, high-quality learning experiences for all students^{2 3}.

Recommendation #3: Foster a network of collaboration between formal and informal science organizations.

New Mexico's extensive network of museums, nonprofit organizations, and other institutions houses rich scientific collections and resources. Unfortunately, these valuable assets are often underutilized or inequitably accessed by schools and districts across the state. To address this gap, there is a need to foster stronger collaboration between formal science educators (K–12 teachers) and informal science organizations (museums, nonprofits, and community groups⁴).

The MSAC recommends the establishment of an annual Science Driving Change Conference, which would be supported by the PED. This conference would serve as a platform for:

- Promoting partnerships between formal and informal science educators.
- Increasing access to STEM resources and hands-on learning opportunities for both students and teachers.
- Ensuring that the rich scientific resources available in New Mexico are equally accessed by schools and districts, regardless of location or demographics.

Key Goals of the Conference:

1. Connecting stakeholders: Teachers, community members, and science educators from across the state would gather to identify common goals and interests.
2. Sharing best practices Participants could exchange ideas and strategies for integrating informal science resources (such as museum exhibits, outreach programs, and scientific collections) into classroom instruction.
3. Promoting equity: The conference would focus on ensuring that students from all regions and backgrounds have access to New Mexico's scientific resources and learning opportunities.
4. Fostering long-term relationships: Formalizing relationships between schools and informal science organizations would create lasting partnerships, enhancing science education across the state.

By supporting and funding this annual conference, New Mexico can bridge the gap between formal education systems and the wealth of informal STEM learning opportunities, helping to create a more dynamic, engaging, and equitable science education landscape for all students.

Recommendation #4: Support and Require Continuing Professional Learning Dedicated to Science Instruction

¹ Frontiers in Education. (2021). The positive influence of inquiry-based learning teacher professional development programs on student engagement in STEM. *Frontiers in Education*. <https://doi.org/10.3389/feeduc.2021.693221>

² National Research Council. (2015). *Guide to Implementing the Next Generation Science Standards*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/18802>

³ PED Comprehensive Strategic Plan (2022) [Comprehensive Strategic Plan](#) Close opportunity gaps

⁴ National Academies of Sciences, Engineering, and Medicine. (2021). Call to Action for Science Education: Building Opportunity for the Future. Washington, DC: The National Academies Press. <https://www.nationalacademies.org/our-work/call-to-action-for-science-education>

Center for Advancement of Informal Science Education (CAISE). (2010). Making Science Matter: Collaborations Between Informal Science Education Organizations and Schools. Retrieved from [Making Science Matter: Collaborations Between Informal Science Education Organizations and Schools – informal science.org](#)

<https://www.nationalacademies.org/our-work/call-to-action-for-science-education> Recommendations 5 through 6

<https://careertech.org/resource/stem4-the-power-of-collaboration-for-change/>

NMPED Comprehensive Strategic Plan (2022) [Comprehensive Strategic Plan](#) Develop pathways and profiles of a NM graduate

Appendix

To ensure that New Mexico educators provide high-quality science instruction and continually improve their teaching practices, the MSAC recommends requiring science teachers to participate in continuing professional learning specifically focused on science instruction. This is essential to keep teachers up to date with advancements in science, pedagogy, and the evolving NM STEM Ready! Science Standards¹.

Key Ideas:

1. **Mandatory Professional Learning:**
 - Require all science teachers in New Mexico to complete ongoing professional learning courses that are specifically focused on science instruction.
 - These courses should address current best practices in inquiry-based learning, three-dimensional science education, and emerging technologies relevant to science teaching
2. **Improving Teacher Effectiveness:**
 - Professional learning programs should be designed to help teachers refine their instructional methods, incorporate hands-on, experiential learning, and better engage students in scientific inquiry.
 - Teachers should also have opportunities to collaborate and share knowledge with peers, strengthening science education across districts.
3. **Alignment with NM STEM Ready! Science Standards:**
 - Professional learning courses must align with the NM STEM Ready! Science Standards to ensure that teachers are effectively implementing the latest curricular expectations and promoting phenomena-based, three-dimensional learning in the classroom.
4. **Focus on Equitable Access:**
 - Courses should also address issues of equity in science instruction, equipping teachers with strategies to make STEM education accessible and engaging for all students, regardless of background or geographic location.
5. **Funding and Support:**
 - The state should provide funding and logistical support to ensure that teachers have the time, resources, and access needed to complete these professional learning requirements.

By making professional learning in science instruction mandatory, New Mexico can support its teachers in delivering engaging, standards-aligned science education, while continuously improving their instructional practice. This will help foster better student outcomes in science and ensure that the state's educators are well-equipped to meet the needs of 21-century learners.

Outdoor Learning Action Recommendations

Research indicates that outdoor learning spaces benefit students in a number of important ways. These include increasing academic achievement, lowering stress levels, creating opportunities to practice collaboration and problem solving skills, engaging in culturally relevant education, and helping students feel motivated and enthusiastic about learning and school².

Computer Science Action Recommendations

Computer science not only continues to be an important area of growth for the state of New Mexico, growing concerns around cyber-security and the expansion of artificial intelligence require a diverse workforce with foundational skills in computer science.

¹ Learning Policy Institute. (2020). Improving Education the New Mexico Way: An Evidence-Based Approach. Retrieved from <https://learningpolicyinstitute.org/product/new-mexico-improving-education-report>

Desimone, L. M., & Garet, M. S. (2015). Best practices in teachers' professional development in the United States. *Psychology, Society, & Education*, 7(3), 252-263.

² Nicole M. Arduino, Alison W. Bowers, Noelle Wyman Roth & Nicole Holthuis (2018) Environmental education and K-12 students outcomes: A review and analysis of research, *The Journal of Environmental Education*, 49:1, 1-17, DOI:10.1080/00958964.2017.1366155. <https://www.tandfonline.com/doi/pdf/10.1080/00958964.2017.1366155>