

Spotlight: Math and Science Bureau

Prepared for the New Mexico Public Education Commission

June 15, 2023

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Director

Investing for tomorrow, delivering today.



Presentation Overview

Topics

1. Overview, Alignment and Connections

2. Programs and Policies

3. Intersections

4. Q&A

Noticing/Wondering



On your own

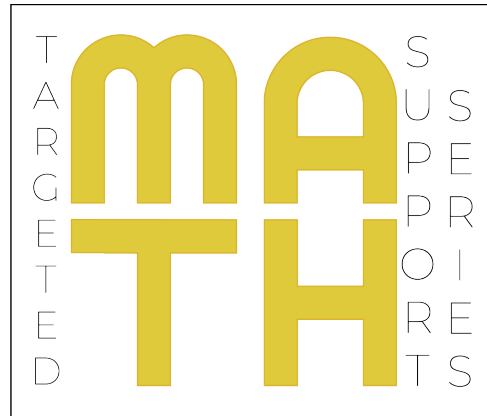
Make a 2-column chart on a sheet of paper to record your noticing and wondering about STEM/Computer Science/Outdoor Education



With a partner

Share one wondering with a partner.

Notice	Wonder

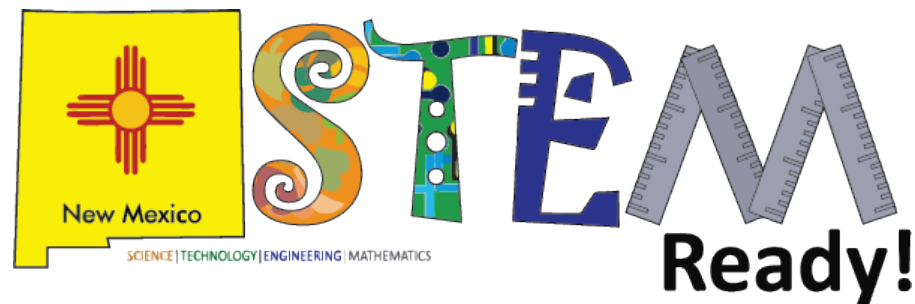


Overview, Alignment & Connections



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.



Our Role

- Setting academic standards
- Supporting school districts, schools and teachers by contributing to the implementation of high-quality curriculum
- Developing systems to train STEM educators for the purpose of improving their instructional practices. This includes addressing the needs of diverse student populations by focusing on equity, culturally and linguistically responsive instruction and inclusion.
- Supporting system coherence



What I need to know?

Mathematics and Science Education Act

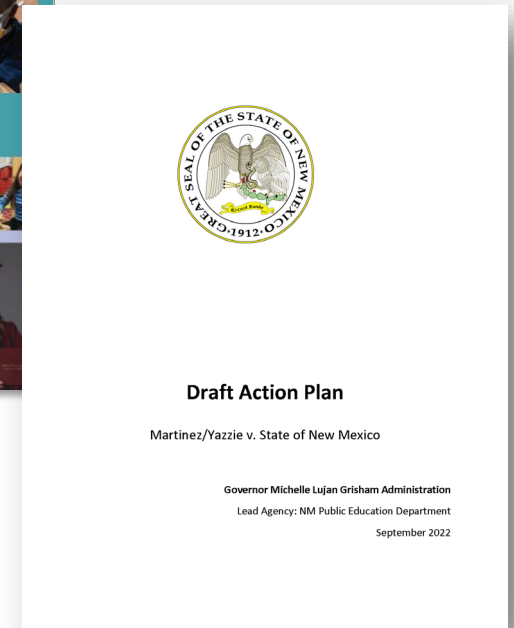
- Signed into law through statute in 2007
- Establishes:
 - The Math and Science Bureau and Bureau Director position
 - A 12-member advisor council appointed by the Secretary of Education
 - The mathematics and science proficiency fund
- Does not include any funding or appropriations



How?

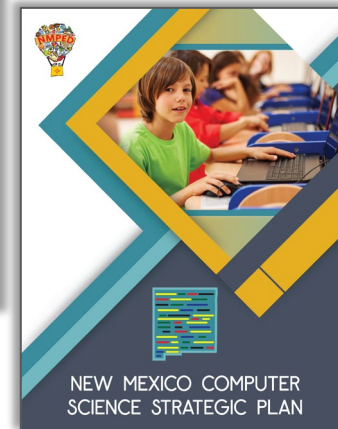
- Guides budgetary and programmatic decision-making with a single-minded focus on one goal:

To assure that all students meet their full potential regardless of race, ethnicity, income or background.



PED STEM Guidance (Released July 2021)

- NM Instructional Scopes for Mathematics 2.0
 - Provides guidance and support to assure that all students in NM have access to content at their grade level combined with the use of impactful instructional strategies
- Mathematics Framework
 - Provides guidance to districts and schools on the critical components that are the foundation to build, implement and strengthen math instruction
- NM Computer Science Strategic Plan
 - A taskforce develop recommendations and put together a five-year plan



Math and Science Advisory Council

Using a statewide application process, the Secretary shall appoint members from throughout the state to ensure representation of the state's demographics, including geographic distribution, gender and ethnic diversity and as follows:



Members from public schools, including at least two mathematics and science teachers and an administrator



Members from public post-secondary educational institutions



Members from the private sector, including the national laboratories, museums and science- and engineering-based businesses



Representative of the New Mexico Partnership for Mathematics and Science Education

Team Professional Learning

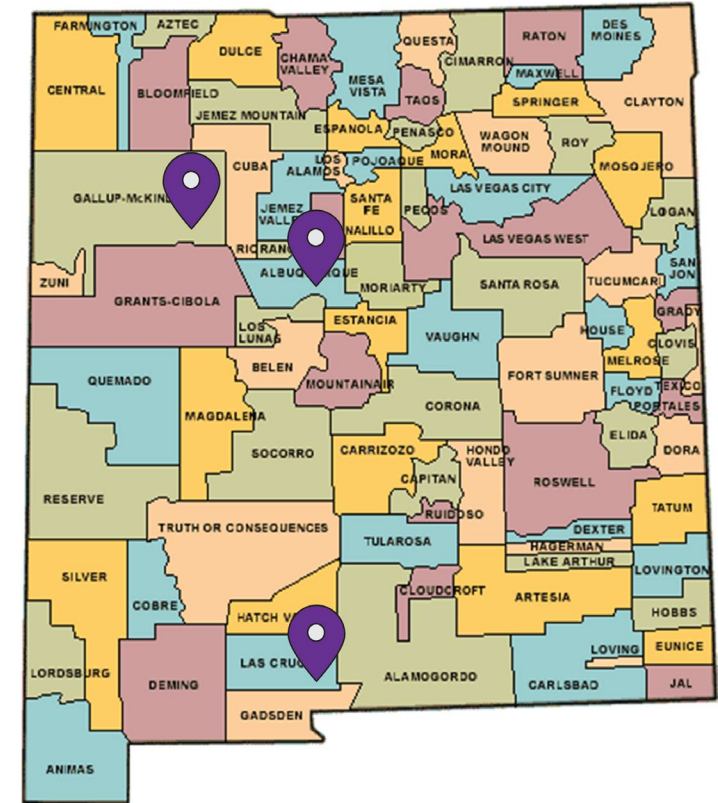
- Math Foundations: An Early Numeracy Initiative (Grades 4–5)
 - Equip mathematics educators for successfully delivering high-quality mathematics instruction

"Our elementary math team has been attending the Math Foundations: Early Numeracy Initiative professional learning series in partnership with NMPED & the Dana Center. This training has made us think deeper about the Key Shifts, the mathematical content and practice standards and math instruction overall. We have had a lot of "aha" moments while participating in the activities and discussions."



Team Professional Learning (cont.)

- Focus on Algebra
 - 2 Year program
 - Grades 6–9
 - Effective pedagogy emphasizing algebraic thinking and algebra concepts with throughlines
 - Support systemic and sustainable schoolwide conversations to analyze instructional programs



Charters participating in Focus on Algebra

Highlighting Innovation

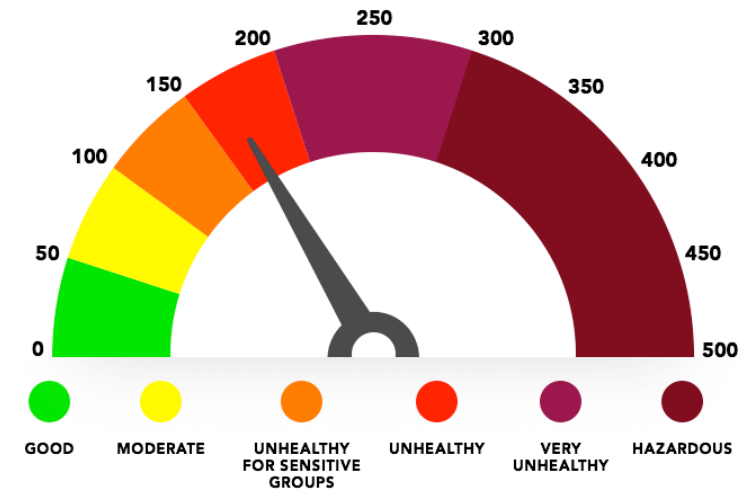
Robert F. Kennedy Charter School

- **Teachers and administrators** reported high confidence in implementing new learning
- **School administration** makes every effort to attend all sessions, including admin-optional sessions



Team Professional Learning *(cont.)*

- Fostering Positive Mathematics Identities
 - Grades 6–12
 - Sustain mathematical pedagogical shifts in service of culturally and linguistically responsive education
 - Develop equity-based pedagogical practices and commit to uplifting historically marginalized voices in the math classroom
 - Includes wrap-around supports for instructional leaders to support this work through at their school sites



Team Professional Learning *(cont.)*

- NM STEM Ready! Storyline Network
 - Designed to support implementation of NM STEM Ready! pedagogical strategies and instructional best practices
 - Support student sensemaking and promote asset-based classroom culture
- 3-Dimensional Formative Assessment Tasks
 - Engagement in collaborative analysis of 3D student work
 - Use formative assessment evidence to center student's 3D learning to monitor and improve 3D teaching and learning
 - Create structures and supports to sustain assessment for learning practices in your school or district.

Highlighting Innovation

Mark Armijo Academy

Science Education Will Involve Less		Science Education Will Involve More
1. Rote memorization of facts and terminology	[Sticky notes]	1. Facts and terminology learned as needed while developing explanations and designing solutions supported by evidence-based arguments and reasoning
2. Learning of ideas disconnected from questions about phenomena	[Sticky notes]	2. Systems thinking and modeling to explain phenomena and to give a relevant context for the ideas to be learned
3. Teachers providing information to the whole class	[Sticky notes]	3. Students conducting investigations, solving problems, and engaging in discussions with teachers' guidance
4. Teachers posing questions with only one right answer	[Sticky notes]	4. Students discussing open-ended questions that focus on the strength of the evidence used to generate claims
5. Students reading textbooks and answering questions at the end of the chapter	[Sticky notes]	5. Students reading multiple sources, including science-related magazines and journal articles and web-based resources; students reading for different purposes, including summarizing evidence-based texts, etc.
6. Pre-planned outcome for "cookbook" laboratories or hands-on activities	[Sticky notes]	6. Relevant task that drives multiple investigations and prompted by students' questions with a range of possible outcomes that collectively lead to a deep understanding of established core scientific ideas
7. Filling out a worksheet	[Sticky notes]	7. Student writing of journals, reports, profiles, and other presentations that explain and argue
8. Overemphasization of activities for students who are perceived to be less able to do science and engineering	[Sticky notes]	8. Provision of supports so that all students can engage in sophisticated science and engineering practices, as well as opportunities to produce original work that communicates their ideas and reasoning
9. Participation by a few students	[Sticky notes]	9. All students are engaged in learning and choose appropriate supports for learning
10. Assessment focused on content knowledge	[Sticky notes]	10. Assessment focuses on learning of the three dimensions of NGSS that spans throughout the grades
11. Unstructured group work focused on completion of the task	[Sticky notes]	11. Students collaborate to build understanding and revise their thinking when presented with new evidence

Team Professional Learning *(cont.)*

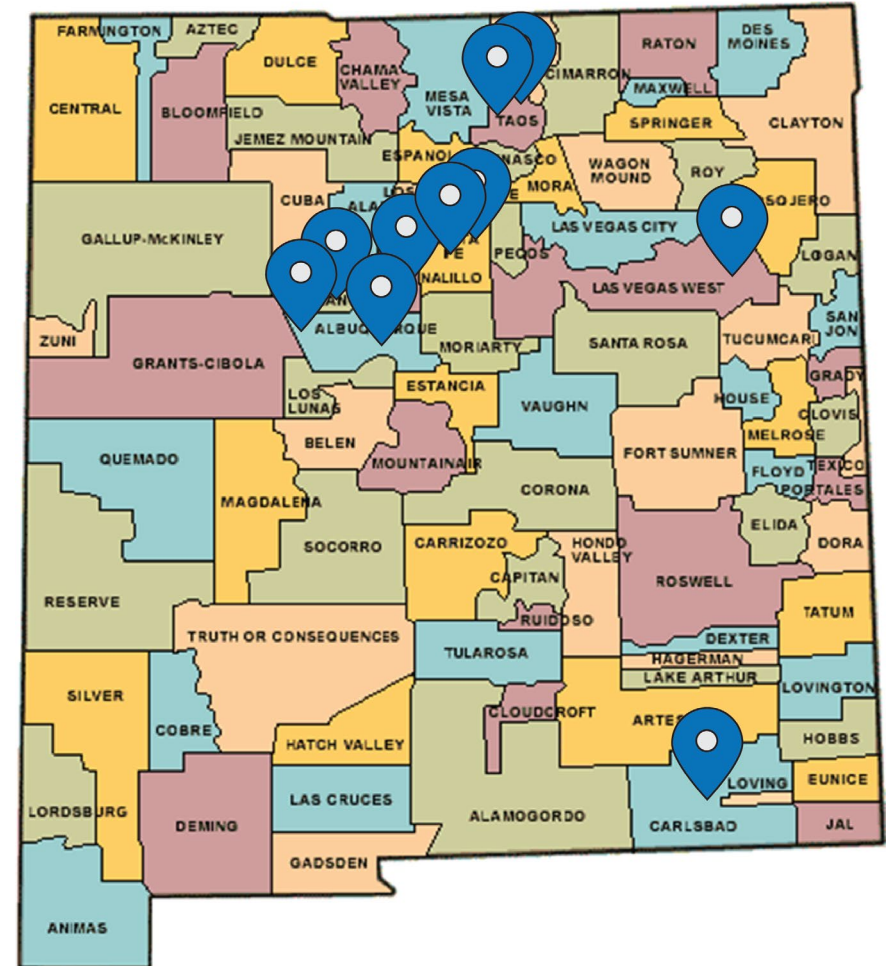
- Integration of Computer Science
 - Grades 4–12
 - Pedagogy and instructional practices to support math and science development
 - Best practices to support computational thinking integration

NEW MEXICO
**COMPUTER
SCIENCE**
SUPPORTS

Supporting Use of High-Quality Materials

OpenSciEd Initiative

- Middle School: Three-year field test (2018–2021) for integrated science courses for Grades 6–8.
 - ✓ Full curriculum publicly available and are determined to be high-quality by edReports
- High school: Two-year field test (2021–2023) for Biology, Chemistry, and Physics with the Earth and Space science standards integrated fully into the courses.
- Elementary School: Two-year field test (2023–2025) for integrating science within school hours in Grades K–5.

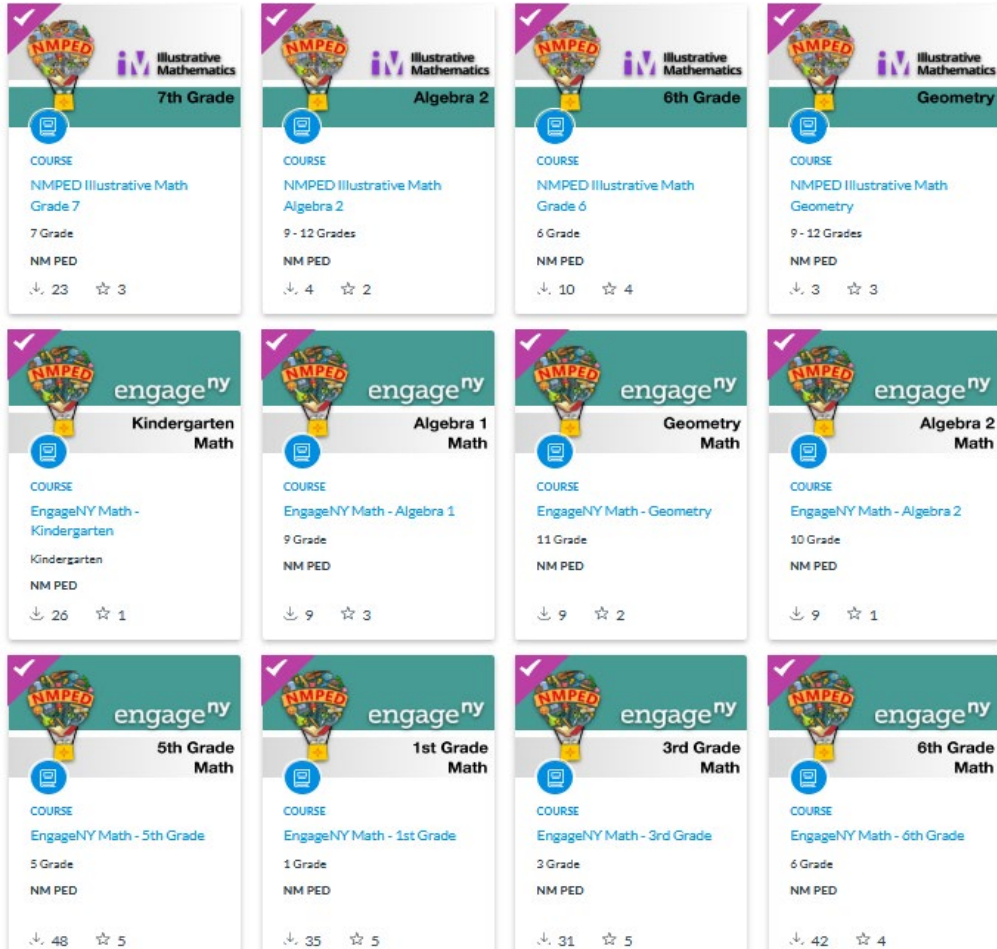


Charters participating in OpenSciEd Initiatives.

Highlighting Innovation

Albuquerque School of Excellence
Taos Integrate School of the Arts

Supporting Use of High-Quality Materials



- NMPED's Learning Management System
 - The system includes full access to highly rated mathematics materials for educators to use in the Canvas platform
 - Available in August 2020
 - Materials include:
 - ✓ Zearn Math, K–5
 - ✓ Illustrative Mathematics, 7–Algebra 2
 - ✓ EngageNY Math, K–Algebra 2

Computer Science Defined

The study of computers and algorithmic processes, including their principles, hardware and software designs, computational thinking, technology integration, and impact on society.



The New Mexico Computer Science Standards were adopted in response to the growing use of computing devices and their impact on every aspect of society. For New Mexico’s students to participate effectively in our technology-driven global economy, a shift in K-12 education must correspond.

In New Mexico, Computer Science (CS) is understood as the study of computers and algorithmic processes, including their principles, hardware and software designs, computational thinking, technology integration, and impact on society.

The NM CS standards blend the core concepts of computer science (what students should know) and computer science practices (what students should do). The CS core concepts and practices should be present throughout instruction to provide authentic and career-connected learning experiences for all students.

The attached Related Definitions look to further define other tools, mediums, and concepts that are related to and work in tandem with Computer Science.



Outdoor and Environmental Education Defined

- **Outdoor learning, or outdoor education,** refers to a broad, interdisciplinary set of activities that include discovery, experimentation, learning about and connecting to the outdoors and natural world, and engaging in environmental and recreational activities in an outdoor setting.
- **Environmental education** is an interdisciplinary educational process that helps people learn more about individual and community connections to natural systems, fostering environmental literacy and civic engagement.
- An **outdoor classroom** is an external shelter or space within the school grounds which creates a practical area for outdoor learning.

New Mexico Outdoor Learning
GUIDANCE FOR 2020-2021 SCHOOL REENTRY

EE+
NMDPE
Cultivating the Future
of Environmental Education

The outdoors is a resource for enhancing learning, social engagement, and health and should be available to all New Mexico students in every community. Experiences in nature and access to the outdoors are associated with greater health and wellbeing and academic success.

In New Mexico, children are experiencing higher rates of stress, depression, obesity, diabetes, and other health risks. These health risks, which increase with health inequity, have been further exacerbated by the pandemic, utilizing outdoor spaces for academic learning and incorporating environmental education into school curricula can help reduce these risks and inequities. COVID-19 has made it more relevant than ever to bring learning outdoors during school reentry to help lower stress while engaging students in a setting that reduces the risk of transmission—similar to when students were brought outside to protect them against tuberculosis and the Spanish Flu at the beginning of the 20th Century.

The most effective outdoor learning is student-centered, culturally relevant and responsive, multidisciplinary, and supports physical, emotional, social, and spiritual health and wellbeing. This guidance document provides administrators, teachers, educators, and families with practical tools, resources, and practices to safely conduct learning outdoors.

There are several specific areas where outdoor and environmental education programs can help schools, students, teachers, and families. The following areas are expanded upon in these guidelines:

- Using School Grounds for Outdoor Learning
- Supporting Teachers in Outdoor Learning
- Supporting At-Home Outdoor Learning

There are many approaches to outdoor and environmental learning and education, including conservation, experiential, environmental, nature-based, and place-based education. School districts are encouraged to incorporate as many of these approaches as feasible.

DEFINITIONS

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Reentry Support Guidance Public Education Department
NEW MEXICO
FOR MORE INFORMATION CONTACT: Coven.Perez@doe.nm.gov ped.state.nm.us

(Outdoor Education Guidance Document, 2020)

PED Outdoor Education Outcomes

Action Items for Teachers	Outcomes for Students
Provide all students and families with equitable access to outdoor learning environments to interact, play, explore, and learn.	Students develop a deeper appreciation for the places where they reside.
Integrate culturally sustaining, social emotional, interdisciplinary, outdoor and environmental education programs that are aligned with content standards and are in collaboration with local organizations and based on community need.	Students develop cultural competence and social emotional intelligence through standards aligned, interdisciplinary outdoor learning experiences.
Provide a variety of learning experiences that integrate environmental literacy and systems thinking concepts.	Students engage in learning experiences that support systems thinking through the observation, collection, and application of information gained through play, exploration and discovery in an outdoor learning environment.
Make connections between local, regional, national, and global community systems and how they work together for a sustainable future.	Students demonstrate the ability to critically reflect systemic and structural issues related to justice, equity, diversity, and inclusion.

Startup Grants

- Awarded to entities that increased students' equitable access to outdoor learning environments to interact, play, explore, discover, and learn.
- Integrate culturally sustaining, social-emotional, interdisciplinary, outdoor, and environmental education programs that are aligned with state content standards and are in collaboration with local organizations and based on community need.

**OUTDOOR
LEARNING**
— INITIATIVE —

Highlighting Innovation

Native American Community Academy

- Students participate in Land-Based education, healing, and learning.
- Working to strengthen the kinship with lands and waters by reclaiming their identity as beings who are integral to the ecology.

Definition/EU: Land-Based Education is using Indigenous protocol and awareness to create meaningful healing and tangible learning experiences in connection with the natural world.

Mission: Strengthening our kinship with Earth Mother to support the community in reclaiming our identity as beings who are integral to the ecology. We are reclaiming our identity by building Indigenous exposure/awareness, application, and creation/design.

EQ: In what way can we strengthen our kinship with Earth Mother to support the community in reclaiming our identity as beings who are integral to the ecology? In what ways are we reclaiming our identity by building Indigenous exposure/awareness, application, and creation/design?

Food Keepers



Water Keepers



Medicine Keepers



Presidential Awards for Excellence in Math & Science Teaching (PAEMST)

- Awarded to high-quality STEM educators
- Recognizes educators with deep content knowledge of the subjects they teach and the ability to motivate and enable students to be successful in those areas



Congratulations to Our NM PAEMST State Finalist



Amanda Kraft
New Mexico International School
Science 7-12



National Work to Broaden Participation





Programs and Policies

Supporting STEM/CS/Outdoor Education



Math is Me

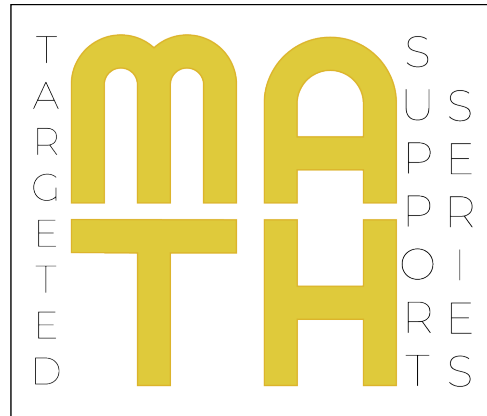
- Breaks down myths about girls and racial minorities
- Starting point for courageous conversations
- Calls for mindset shift
- Meeting the needs of our students



Programs and Policies

- Universal Instruction
 - Re-envision high school math pathways
 - ✓ Better align to prepare for skills in STEM careers
 - ✓ Equitable pathways for students
 - Outdoor Learning Standards (interdisciplinary)
- High Quality Instructional Materials
 - Adoption and implementation
 - Curriculum-based professional learning
 - ✓ Job-embedded
- Capacity Building
 - School team & leadership-specific professional learning
 - ✓ Coaching
 - ✓ Micro-credential
- School Recognition
 - Green Ribbon Schools





Intersection Potential

Supporting STEM/CS/Outdoor Education



Considerations for Intersectionality

- Encourage participation in working groups at the PED to plan for:
 - Accessing high-quality STEM/CS/Outdoor learning experiences K-12/K-14
 - Adopting & implementing high-quality instructional materials
 - Envisioning equitable pathways for learners across Grades 6–12
- Utilize the MSAC
 - How is it being utilized to share the charter schools voice?
- Technical Assistance
- Nominate Educators & Schools

Questions?



Thank You!

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