ITEM 4:
NM First
Heather
Bulas

STEM Action Planning

Science, Technology, Engineering & Math

RECEIVED
OCT 29 2015
LESC

EXECUTIVE SUMMARY

OCTOBER 29, 2015

- **Goal 1**: By 2020, increase by 25% the number of students measurably proficient in math and science.
- **Goal 2**: By 2020, graduate 1,000 new science and math teachers. Also, support and retain existing STEM teachers.
- **Goal 3**: By 2020, increase by 25% the number of college graduates in STEM fields (including health).

RECOMMENDATIONS TO THE LEGISLATURE

- **RECOMMENDATION 1:** Increase funding for the Math & Science Bureau, and watch for opportunities to better leverage literacy dollars that can also support math or science.
- **RECOMMENDATION 2:** Build more science into K-3 Plus through curricula like *Seeds of Science/Roots of Reading*.
- **RECOMMENDATION 3:** Investigate how to increase time/capacity for science in elementary classrooms.
- **RECOMMENDATION 4:** Increase funding for after-school and summer programs that include STEM – or prioritize existing funding toward STEM.
- **RECOMMENDATION 5**: Continue to fund all these initiatives, and consider increases to the TLRP.
- **RECOMMENDATION 6:** Consider expanding eligibility for TLRP to include rural areas in addition to just high-risk schools.

RECOMMENDATIONS, continued

- **RECOMMENDATION 7**: Urge HED to do a cost study on the potential impacts of adding math-certified and science-certified education majors to the list of degrees for which the NM higher education funding formula provides performance pay.

- **RECOMMENDATION 8**: Monitor the national effort and, when complete, urge PED to fulfill SM130 and update the NM elementary teacher competencies.

- **RECOMMENDATION 9**: Strengthen *existing* teachers by continuing to invest in quality professional development, but don't reinvent the wheel. Focus on evidence-based programs in NM.

- **RECOMMENDATION 10:** Continued/increase support for programs that support STEM students in college, including internships and student research.

- **RECOMMENDATION 11:** Study best practices regarding implementation of alternate, or multiple mathematics pathways at NM institutions of higher education.

Contact:

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New Mexico First
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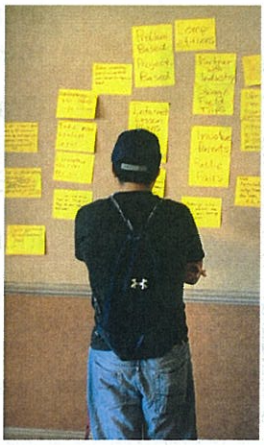
STEM Action Team

PRESENTATION TO THE LESC, OCTOBER 2015

CONTEXT

What is the STEM Action Team?

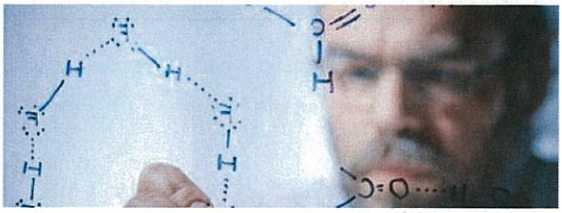


- Statewide coalition
- Employers, teachers, professors, nonprofit professionals
- Seeks to improve STEM education and raise awareness among policymakers and public

- Convened by: **NM Partnership for Math & Science Education**
- Managed by: **New Mexico First**

CONTEXT

Why STEM, Why Now?



- **EVERY** child deserves:
  - a bright future
  - tools with which to forge a path
  - a meaningful career
- How many future jobs will require STEM skills?
  - **80%**
- Industry Retirees

CONTEXT

Three Measurable Goals, by 2020

1. Increase by 25% the **number of students measurably proficient** in math and science.
2. Graduate 1,000 **new teachers** in science and math. Also, support and retain existing STEM teachers.
3. Increase by 25% the **number of college graduates** in STEM fields (including health).

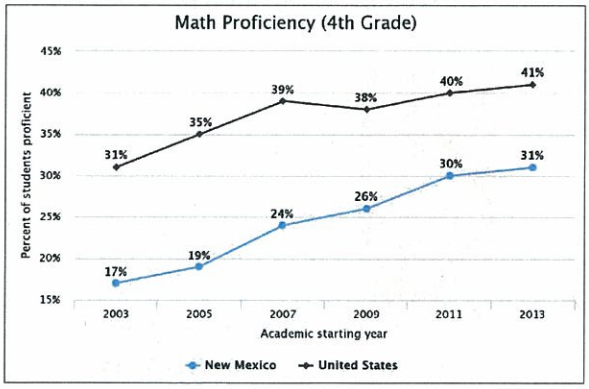
Voluntary targets established in SM38-Sapien/HM19-Stewart, 2014.

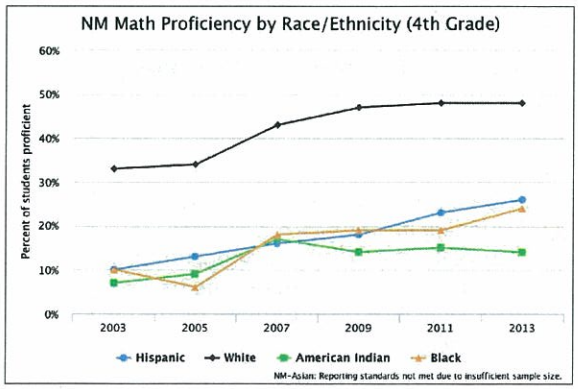
GOAL 1
Student Proficiency

By 2020, increase by 25% the number of students measurably proficient in math and science.

Based on SM38-2014, Sapien and HM 19-2014, Stewart

CHALLENGE
Disparities in Achievement

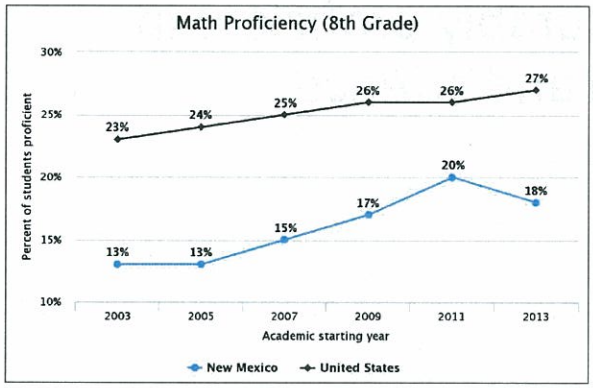


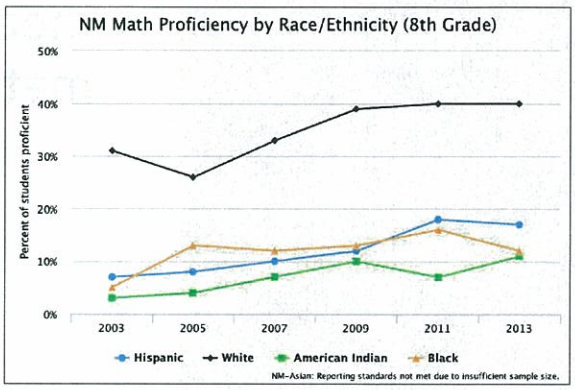


Data source: U.S. Department of Education

CHALLENGE

Disparities in Achievement





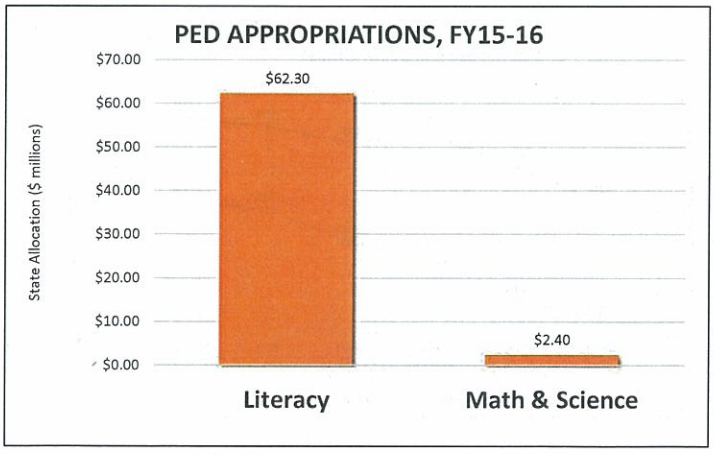
Data source: U.S. Department of Education

CHALLENGE

K-12 STEM Underfunded

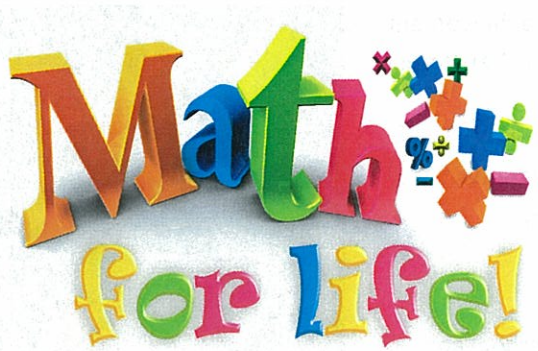
- Lawmakers place a heavy emphasis on early literacy.
- But… It's more complex than it looks.

RECOMMENDATION: Increase funding for the Math & Science Bureau, and watch for opportunities to better leverage literacy dollars that can also support math or science.



CONTEXT

Elementary Math is Critical



- What is the single strongest predictor of long-term academic success?
  - MATH.
- School-entry math also predicts later literacy skills.

Source: Duncan et al., 2007; Hooper et al., 2010

CHALLENGE

Elementary Science Overlooked

- Early science = key to long-term critical thinking and love of learning.
- Science often overlooked until 4th grade (tied to testing).
- K-3 Plus = a great opportunity to bring in science.

RECOMMENDATION: Build more science into K-3 Plus through curricula like *Seeds of Science/Roots of Reading*.

RECOMMENDATION: Investigate how to increase time/capacity for science in elementary classrooms.

CHALLENGE

Students in School only 20% of Waking Hours

- Summer and after-school programs boost student achievement
- After-school programs in NM offer less STEM than other states:
  - 69% of US after-school programs offer STEM
  - 37% of NM after-school programs offer STEM
- 80% of NM parents want STEM in after-school programs
- 70,000 NM students in after-school programs today.
- 90,000 more students would enroll if they could.

RECOMMENDATION: Increase funding for after-school and summer programs that include STEM – or prioritize existing funding toward STEM.

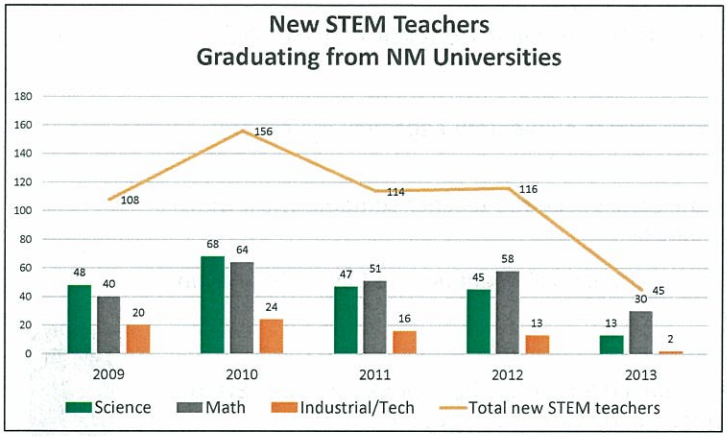
GOAL 2
Teachers

Based on SM38-2014, Sapien and HM 19-2014, Stewart

By 2020, graduate 1,000 new science and math teachers. Also, support and retain existing STEM teachers.

CONTEXT

New STEM Teachers



Source: NM EARS Report

Existing Teacher Incentives:

- Teacher Loan for Service (LFS)
- Teacher Loan Repayment Program (TLRP)
- STEM and Hard-to-Staff Teacher Initiative

RECOMMENDATION: Continue to fund all these initiatives, and consider increases to the TLRP.

RECOMMENDATION: Consider expanding eligibility for **TLRP** to include rural areas in addition to just high-risk schools.

QUESTION

Would Universities Benefit From Incentives?

Higher Ed Funding Formula Incentives

- Currently the formula pays universities extra for STEM grads, but not for math & science education grads.
- The amount is not huge, but it creates dialogue about the value of STEM.
- HM 83 (Jimmie Hall) asked for research on this issue.

RECOMMENDATION: Urge HED to do a cost study on the potential impacts of adding math-certified and science-certified education majors to the list of degrees for which the NM higher education funding formula provides performance pay.

CHALLENGE

NM Administrative Code Outdated

- Quality of teaching is key to raising student proficiency and creating love of learning.
- Teachers are made, not born.
- SB329 (2015) reduced the number of math credits elementary education majors are required to take, from 9 to 6.
- SM130 (2015) called on PED to update the state's required teacher competencies, which guide the faculty syllabi for education courses
- Effort by the AMTE is doing that work on a national scale right now, led by UNM's Kristin Umland, Ph.D.

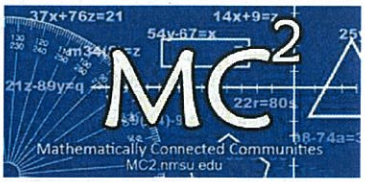
RECOMMENDATION: Monitor the national effort and, when complete, urge PED to fulfill SM130 and update the NM elementary teacher competencies.

CHALLENGE

Retain and Support Existing Teachers

- Ongoing, quality professional development for math & science teachers is essential.
  - Remain current in a changing world.
  - Hands-on learning is more effective, but takes more prep and training.
- Evidence-based programs already exist. Examples:
  - Making Sense of Science
  - Mathematically Connected Communities (MC^2)

RECOMMENDATION: Strengthen *existing* teachers by continuing to invest in quality professional development, but don't reinvent the wheel. Focus on evidence-based programs in NM.



Making Sense of SCIENCE

"It's creating a culture shift within the schools as these teachers bring back the lessons they're learning, about how to become better facilitators in learning."

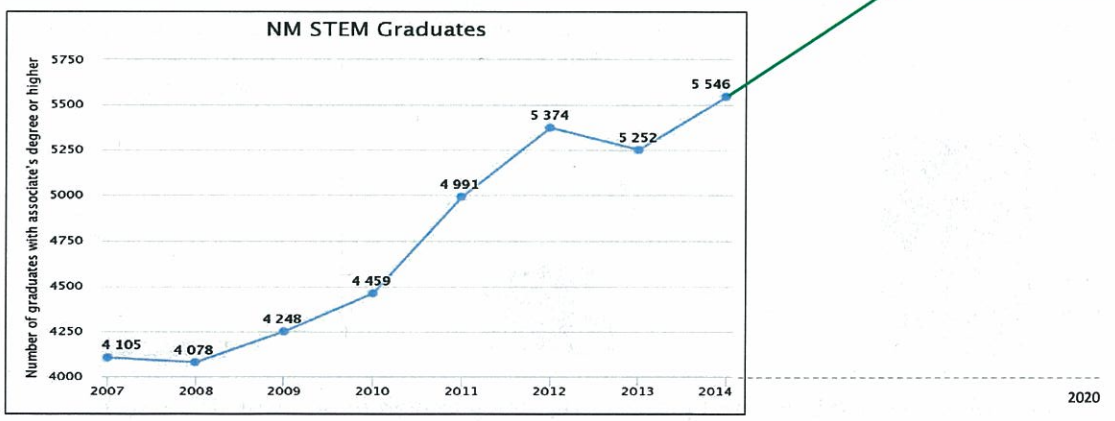
PD coordinator, Oakland school district

GOAL 3
College STEM Grads

By 2020, increase by 25% the number of college graduates in STEM fields (including health).

Based on SM38-2014, Sapien and HM 19-2014, Stewart

How Many STEM Grads?



Data Source: U.S. Department of Education

CHALLENGE

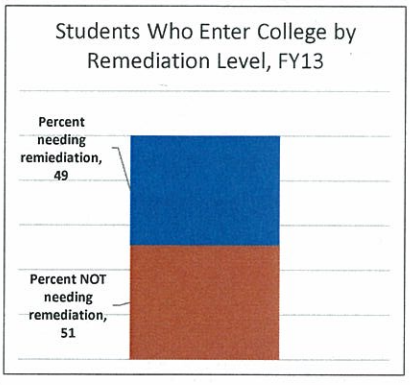
Keep College Grads in STEM

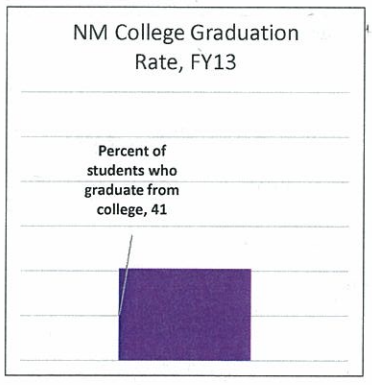
- Support for college students in STEM fields exists, such as the NM Alliance for Minority Participation (AMP), STEM Gateway, ARMAS, and more.
- Hands-on internships and research keep students engaged in STEM.

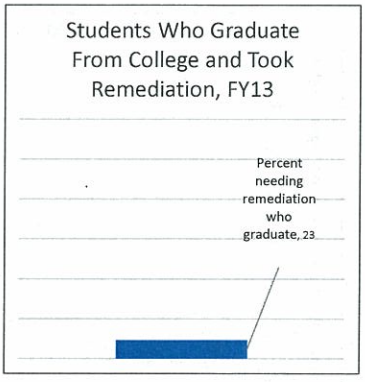
RECOMMENDATION: Continued/increase support for programs that support STEM students in college, including internships and student research.

CHALLENGE

Remedial Math Tar Pit





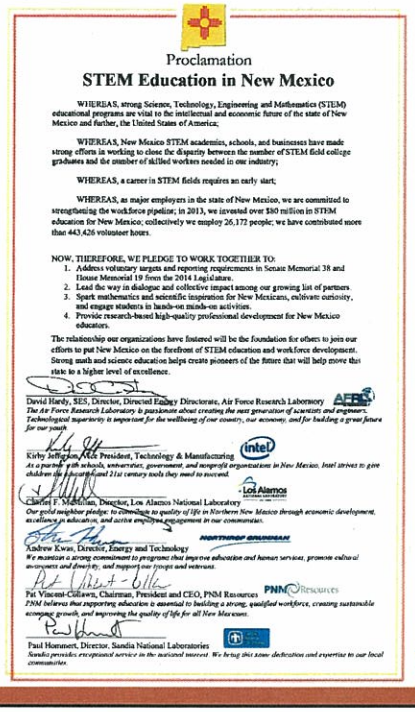


RECOMMENDATION: Study best practices regarding implementation of alternate, or multiple mathematics pathways at NM institutions of higher education.

PROGRESS

Industry Is Your Partner

- 2014 Proclamation
- HM 21/SM 30 (Garcia-Richards/Stewart): Private Sector STEM Education Partnerships
- Private industries investing ~ $80 million each year in STEM education



Proclamation

STEM Education in New Mexico

WHEREAS, strong Science, Technology, Engineering and Mathematics (STEM) educational programs are vital to the intellectual and economic future of the state of New Mexico and further, the United States of America;

WHEREAS, New Mexico STEM academics, schools, and businesses have made strong efforts in working to close the disparity between the number of STEM field college graduates and the number of skilled workers needed in our industry;

WHEREAS, a career in STEM fields requires an early start;

WHEREAS, as major employers in the state of New Mexico, we are committed to strengthening the workforce pipeline; in 2013, we invested over $80 million in STEM education for New Mexico; collectively we employ 26,172 people; we have contributed more than 443,426 volunteer hours.

NOW, THEREFORE, WE PLEDGE TO WORK TOGETHER TO:

1. Address voluntary targets and reporting requirements in Senate Memorial 38 and House Memorial 19 from the 2014 Legislature.
2. Lead the way in dialogue and collective impact among our growing list of partners.
3. Spark mathematics and scientific inspiration for New Mexicans, cultivate curiosity, and engage students in hands-on minds-on activities.
4. Provide research-based high-quality professional development for New Mexico educators.

The relationship our organizations have fostered will be the foundation for others to join our efforts to put New Mexico on the forefront of STEM education and workforce development. Strong math and science education helps create pioneers of the future that will help move this state to a higher level of excellence.

David Hardy, SES, Director, Directed Energy Directorate, Air Force Research Laboratory
The Air Force Research Laboratory is passionate about creating the next generation of scientists and engineers. Technological superiority is important for the wellbeing of our country, our economy, and for building a great future for our youth

Kirby Jefferson, Vice President, Technology & Manufacturing
As a partner with schools, universities, government, and nonprofit organizations in New Mexico, Intel strives to give children the focused and 21st century tools they need to succeed.

Charles F. McMillan, Director, Los Alamos National Laboratory
Our good neighbor pledge: to contribute to quality of life in Northern New Mexico through economic development, excellence in education, and active employee engagement in our communities.

Andrew Kwas, Director, Energy and Technology
We maintain a strong commitment to programs that improve education and human services, promote cultural awareness and diversity, and support our troops and veterans.

Pat Vincent-Collawn, Chairman, President and CEO, PNM Resources
PNM believes that supporting education is essential to building a strong, qualified workforce, creating sustainable economic growth, and improving the quality of life for all New Mexicans.

Paul Hommert, Director, Sandia National Laboratories
Sandia provides exceptional service in the national interest. We bring this same dedication and expertise to our local communities.

STEM Action Team

PRESENTATION TO THE LESC, OCTOBER 2015