Math and Science Annual Report

November 30, 2014

Hanna Skandera
Secretary of Education

The State of New Mexico

Math and Science Advisory Council
Public Elementary and Secondary Mathematics and Science Achievement
For School Year 2013–2014
Issued November 2014

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Required Notice
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Notes

- This report is available at www.ped.state.nm.us. Click on the A–Z directory to locate it under "Math and Science Bureau."

- All acronyms in this report are defined in the appendix under Glossary and Acronyms

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Executive Summary

Student Data for Math and Science

- Student data for math and science from the New Mexico SBA shows that the majority of New Mexico students are not proficient in math and science.
- Trends are similar for economically disadvantaged students and minority students as for all students.
- In national tests—NM students have made gains since 2007 on the NAEP math results; however, they are still performing below the national average.
- High school math scores reflect steady gains in math proficiency on the SBA since 2010.
- The number of students taking AP courses has increased in Calculus, Computer Science, Statistics, Biology, Chemistry, and Physics.

Activities of the Pubic Education Department in the Math and Science Bureau

- New investment of $1.5 million for STEM Teacher Initiative stipends appropriated by the New Mexico legislature
- Continuing $1.2 million from Math and Science Partnership federal funding supports Mathematically Connected Communities for support of math teachers
- $298,357 in robotics capital outlay funding from the New Mexico legislature's appropriation
- Partnership with New Mexico Informal Science Education Network (ISE-NET) to provide additional opportunities in math and science to more students
- Rebuilding relationships with stakeholders
- Increased collaboration within the PED and with other state agencies
- Hiring of STEM Professional Development Specialist
- Participation in the Partnership for Assessment of Readiness for College and Careers (PARCC) Operational Working Group, item and test review

Activities of the Math and Science Community Stakeholders

- New Mexico's students and families have many rich out-of-school opportunities in STEM fields.
- Stakeholders include national laboratories, institutions of higher education, museums, and other venues of informal education, community businesses, and other state agencies.

Recommendations by the Math and Science Advisory Council to Address the Critical Issues

Educational equity for all New Mexico's students

- Study and address the achievement gap of Hispanic, Native American, African American, and economically disadvantaged students

High academic standards

- Continued support for common core implementation, ensuring adequate professional learning for teachers
- Adoption and successful implementation of the Next Generation Science Standards

Coherent systems to support highly trained STEM teachers

- Increase of targeted funding for programs that produce results
- Develop a shared vision and goals across the education continuum
- Adopt improved standards for professional learning to improve teacher professional development that is aligned to content standards
- Provide adequate funding, time, and structures to promote continuous job-embedded professional learning

School environments that support STEM learning

- Provide adequate time for STEM learning at the elementary level, including time for STEM experiences outside of school
- Provide adequate resources for STEM learning, including curriculum, materials, and equipment

Strong ecosystem of STEM education

- Develop and communicate a state-wide vision for STEM education
- Build collaborations with industry partners, informal education organizations, and out-of-school program providers

- Seek consensus and build collaborations across stakeholders, including government agencies, school districts, colleges and universities, and teachers
- Analyze data of student outcomes rigorously; use best practices in psychometrics to equate SBA results with PARCC assessments where possible, in order to track the aggregate performance of students longitudinally over several years

Introduction

The wealth and welfare of our country and the state of New Mexico depend on the innovative ideas and advanced skills of its population. Will this country maintain its leadership role in cutting-edge scientific and medical research? Will we be able to successfully address the challenges posed by climate change and population growth, to develop new materials, or design new computers? How well will we construct the bridges and new roads necessary to maintain our country's infrastructure so that we remain globally competitive? And, will we maintain our leading role in science and technology—a necessity, if we wish to ensure a sufficient number of high-paying jobs for our citizens.

The answer to these questions will largely be determined by the effectiveness of the education we provide to our children, especially in science, technology, engineering, and mathematics (STEM). Science provides a broader view of our natural world. It brings understanding of physical processes around us and offers ways to model and predict the changes that may affect society. Technology and engineering improve our everyday lives—better communications, faster and safer travel, improved productivity. They enable us to achieve the unthinkable. Finally, mathematics pervades every aspect of our lives and provides the tools necessary to analyze and interpret the data to help solve complex problems.

How well the state of New Mexico will fare depends on how well we educate New Mexico students, particularly in STEM disciplines. As this report shows, while New Mexico students do show some marginal improvements in math and science proficiency scores over the last several years, they still lag behind their peers nationally. As a result, there is a compelling need to rethink the system of education in New Mexico.

The Math and Science Advisory Council (MSAC) is dedicated to fulfilling its role in advising the Math and Science Bureau, the Public Education Department, and the legislature on the needs for improving math and science education in the state. As part of its activity, the MSAC reviewed the status of elementary and secondary math and science education in New Mexico and identified five critical issues to be addressed. Additionally, MSAC made recommendations to address each critical issue based on their work over the past year—gathering ideas from existing STEM organizations, community stakeholders, trends, and best practices from the literature on high-performing schools. These five critical issues are part of a larger strategic framework that will serve as a foundation for our work this coming year.

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
(8) 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.

Detailed Report

1.0 Student Data

1.1 Trends in Student Achievement Data

This report includes student achievement data as measured by the New Mexico Standards Based Assessment (SBA), the National Assessment of Educational Progress (NAEP), the American College Testing (ACT), and the Scholastic Assessment Test (SAT).

1.1.1 New Mexico Standards-Based Assessment

By 2015, all statewide mathematics accountability tests in New Mexico will be developed and administered by the Partnership for Readiness in College and Career (PARCC). New Mexico is seeking to better prepare teachers and students to meet the heightened expectations of the new learning standards and the PARCC assessments by steadily raising the alignment of the state's standards-based assessment to the Common Core State Standards (CCSS). In 2013–2014, there was a "bridge" SBA for students in all tested grades (3–8, 10, and 11) that looked and felt more like the PARCC assessment. This means that students experienced test questions more directly aligned to the CCSS. By 2014–2015, all NM students will be taking the PARCC assessments in mathematics.

Figure 1

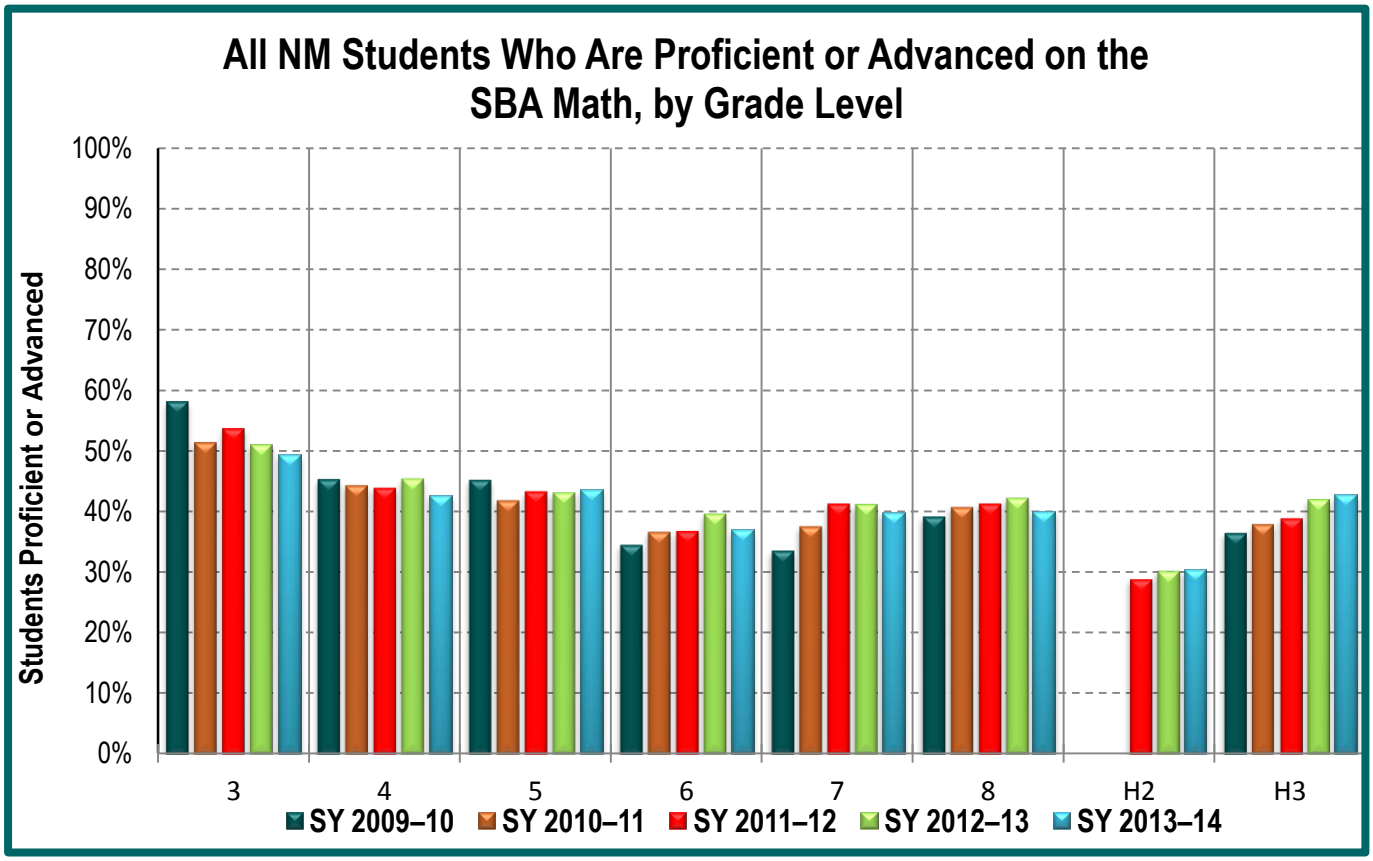

Figure 1 shows the percentage of NM students who are proficient or advanced on the math portion of the SBA over the past five years.

Figure 1a

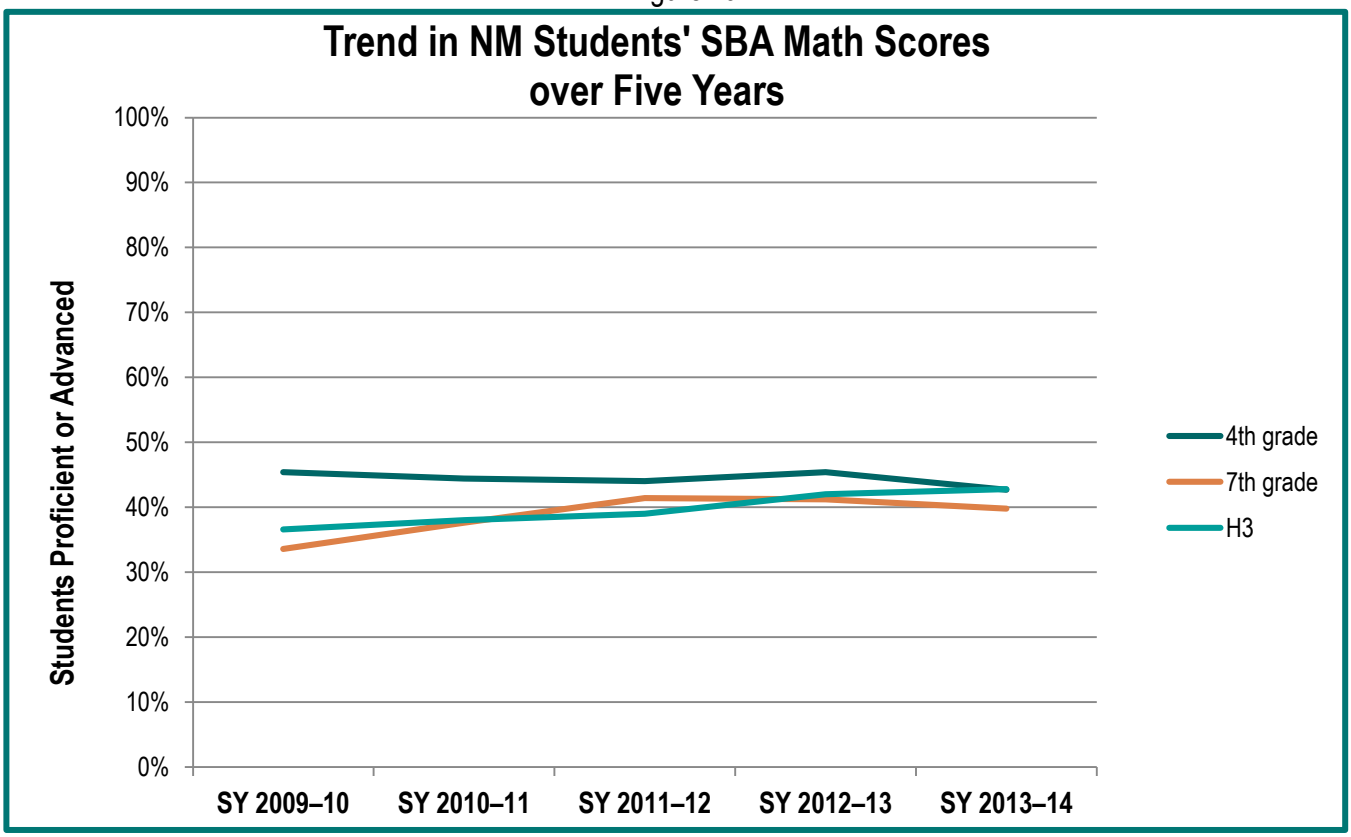

Figure 1a shows the trend in NM over the last five years in SBA math proficiency scores for an elementary grade (4th), a middle school grade (8th), and a high school grade (H3).

Table 1. The percentage of NM students who are proficient or advanced on the math portion of the SBA over the past five years

Grade	3	4	5	6	7	8	H2	H3
SY 2009–10	58.2%	45.4%	45.3%	34.6%	33.6%	39.2%		36.6%
SY 2010–11	51.5%	44.4%	41.9%	36.7%	37.6%	40.8%		38.0%
SY 2011–12	53.8%	44.0%	43.4%	36.9%	41.4%	41.4%	29.0%	39.0%
SY 2012–13	51.0%	45.4%	43.1%	39.6%	41.2%	42.2%	30.2%	42.0%
SY 2013–14	49.4%	42.7%	43.7%	37.0%	39.8%	40.0%	30.4%	42.8%

Note: H1 students are in their first year of high school and are not tested. H2 students are in their second year of high school and have been tested since 2011–2012. Traditionally, H2 status indicates a sophomore, but it can also signify a student who has insufficient credits to be a sophomore but who is in his/her 2rd year of high school. H3 students are in their third year of high school.

Figures 1 and 1a show that while math proficiency in elementary and middle school grades for the past five years remains relatively flat, high school scores reflect steady gains in math proficiency.

Figure 2

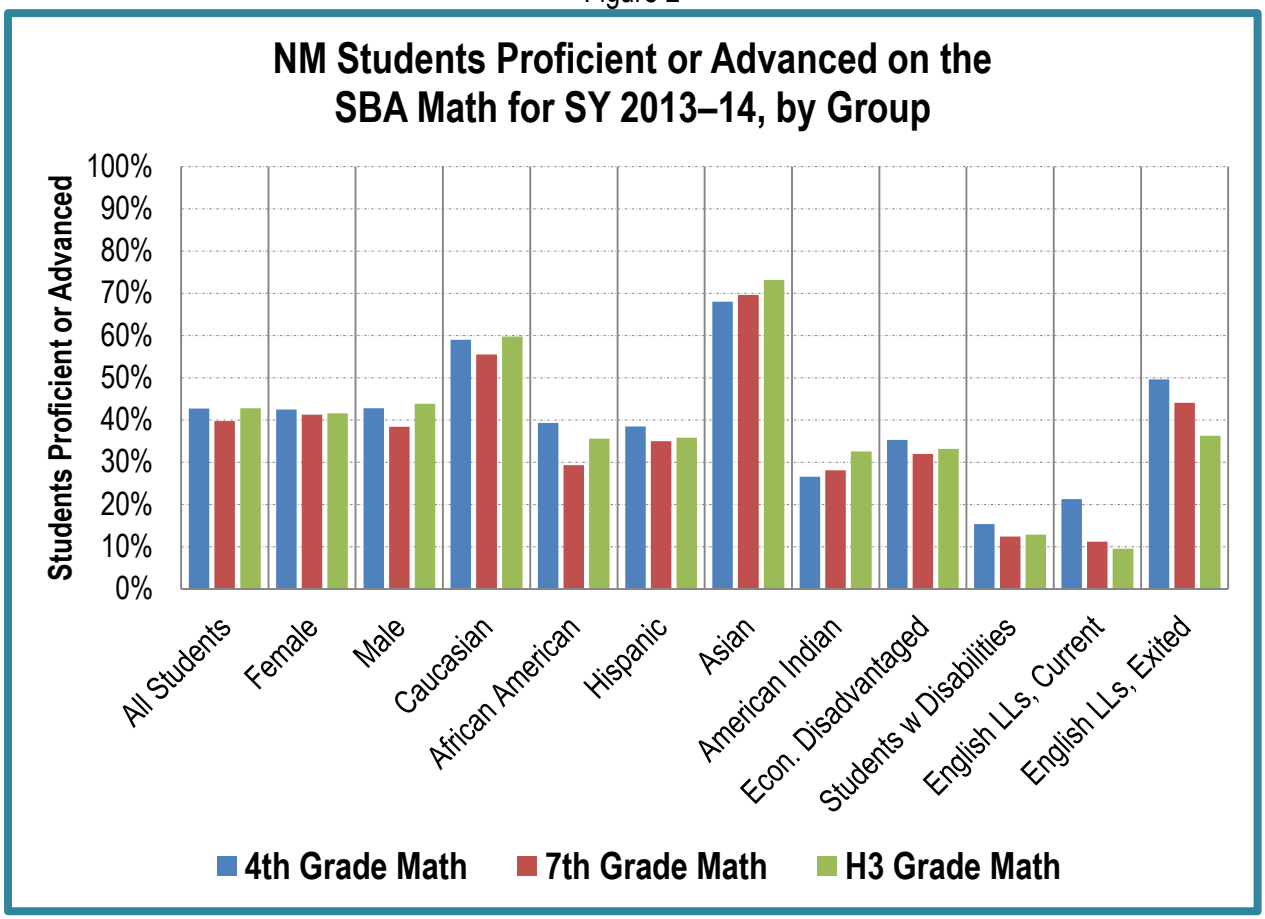

Figure 2 and Table 2 show that the percentage of students who are proficient and advanced in subgroups of Hispanic and American Indian—the dominant sub-groups in New Mexico—is smaller than the percentage of proficient scores of the Caucasian and Asian sub-groups for the most recent school year. The same trend holds for the percentage in the economically disadvantaged subgroup.

Table 2. New Mexico Students Proficient or Advanced on the SBA Math for SY 2013–14, by Group

	4th Grade Math	7th Grade Math	H3 Grade Math
All Students	42.7%	39.8%	42.8%
Female	42.5%	41.3%	41.6%
Male	42.8%	38.4%	43.9%
Caucasian	59.0%	55.5%	59.8%
African American	39.3%	29.3%	35.6%
Hispanic	38.5%	35.0%	35.8%
Asian	68.0%	69.6%	73.2%
American Indian	26.6%	28.1%	32.6%
Econ. Disadvantaged	35.3%	32.0%	33.2%
Students w/ Disabilities	15.4%	12.4%	12.9%
English LLs, Current	21.3%	11.2%	9.5%
English LLs, Exited	49.6%	44.1%	36.3%

Figure 3

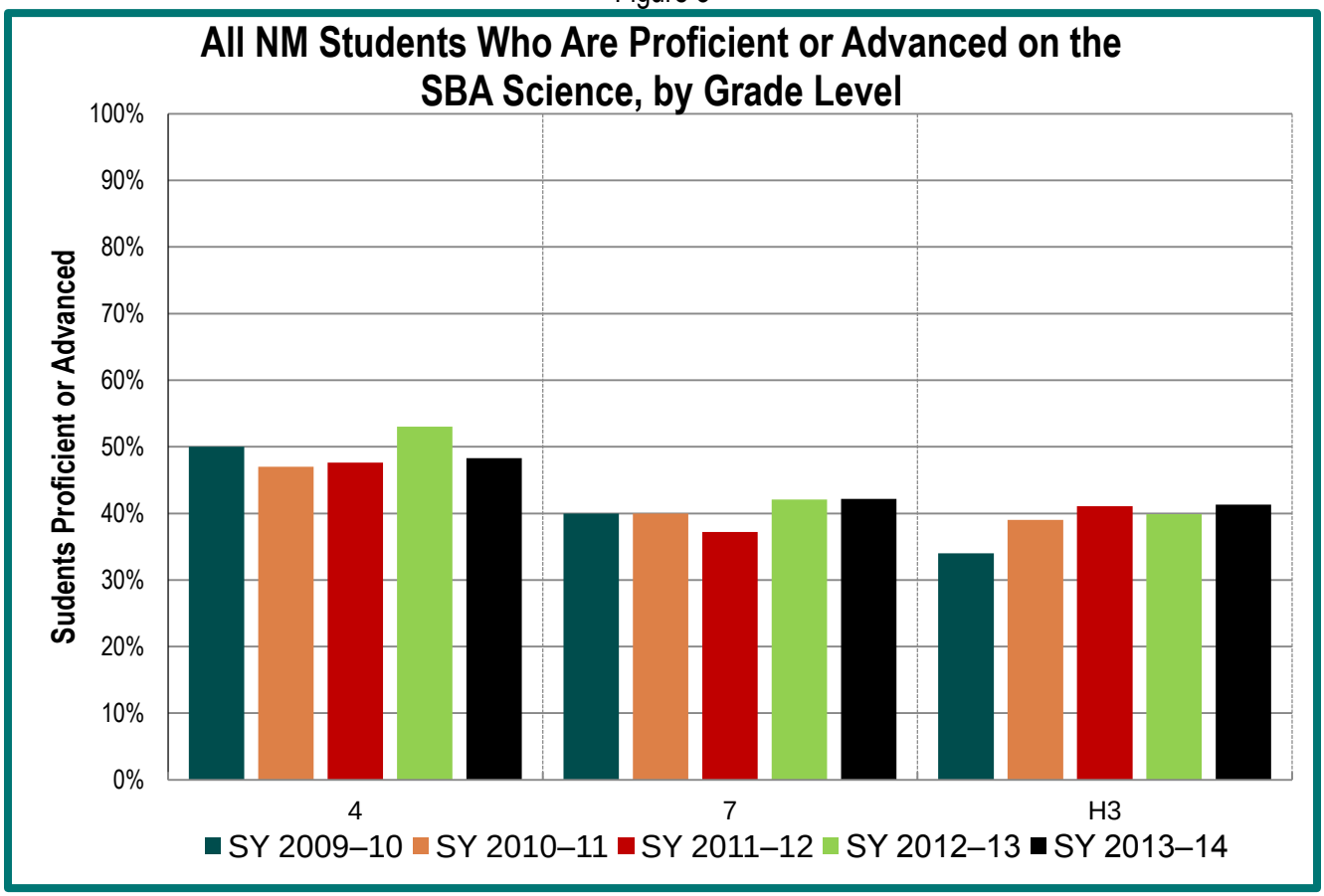

Figure 3 shows the percentage of NM students who are proficient or advanced on the science portion of the SBA over the past five years. Note: The SBA Science in NM is only administered in grades 4, 7, and H3 every year.

Figure 3a

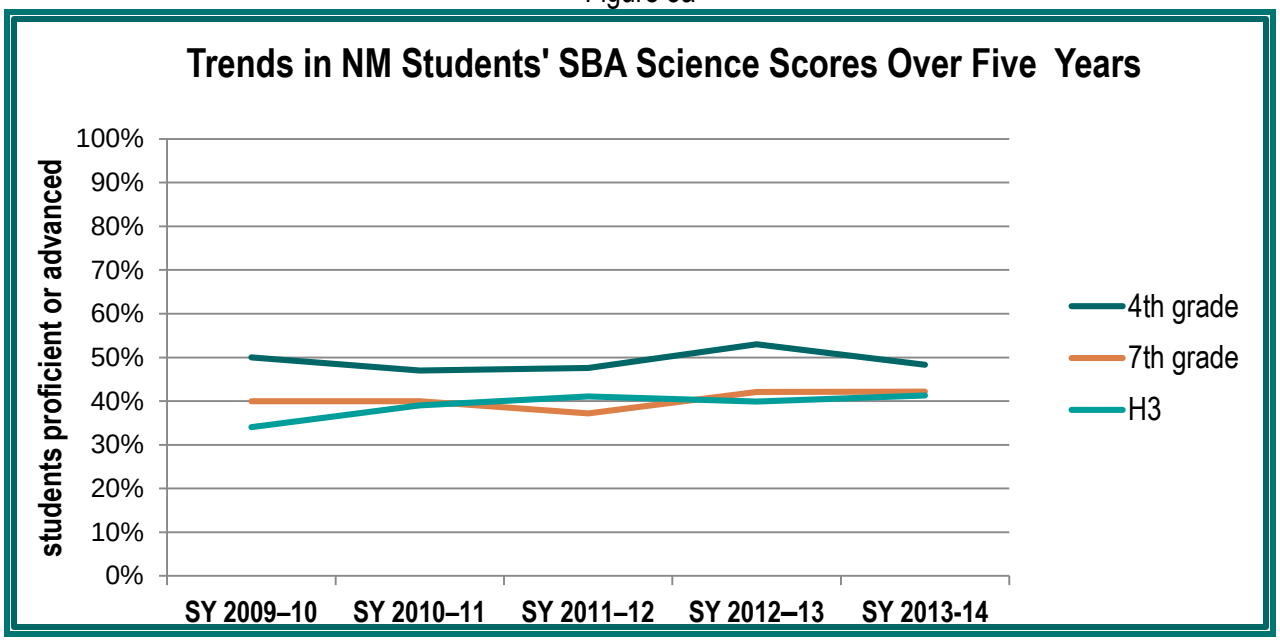

Figure 3a shows the trend in NM over the last five years in SBA science proficiency scores for an elementary grade (4th), a middle school grade (7th), and a high school grade (H3).

Table 3. The percentage of students in NM who are proficient or advanced on the science portion of the SBA over the past five years

	Grade 4	Grade 7	H3
SY 2009–10	50.0%	40.0%	34.0%
SY 2010–11	47.0%	40.0%	39.0%
SY 2011–12	47.6%	37.2%	41.1%
SY 2012–13	53.0%	42.1%	39.9%
SY 2013–14	48.3%	42.2%	41.3%

Figure 3 and 3a confirm that science proficiency has remained relatively flat for all students in the 4th, 7th, and high school H3 grades over the past five years.

Figure 4

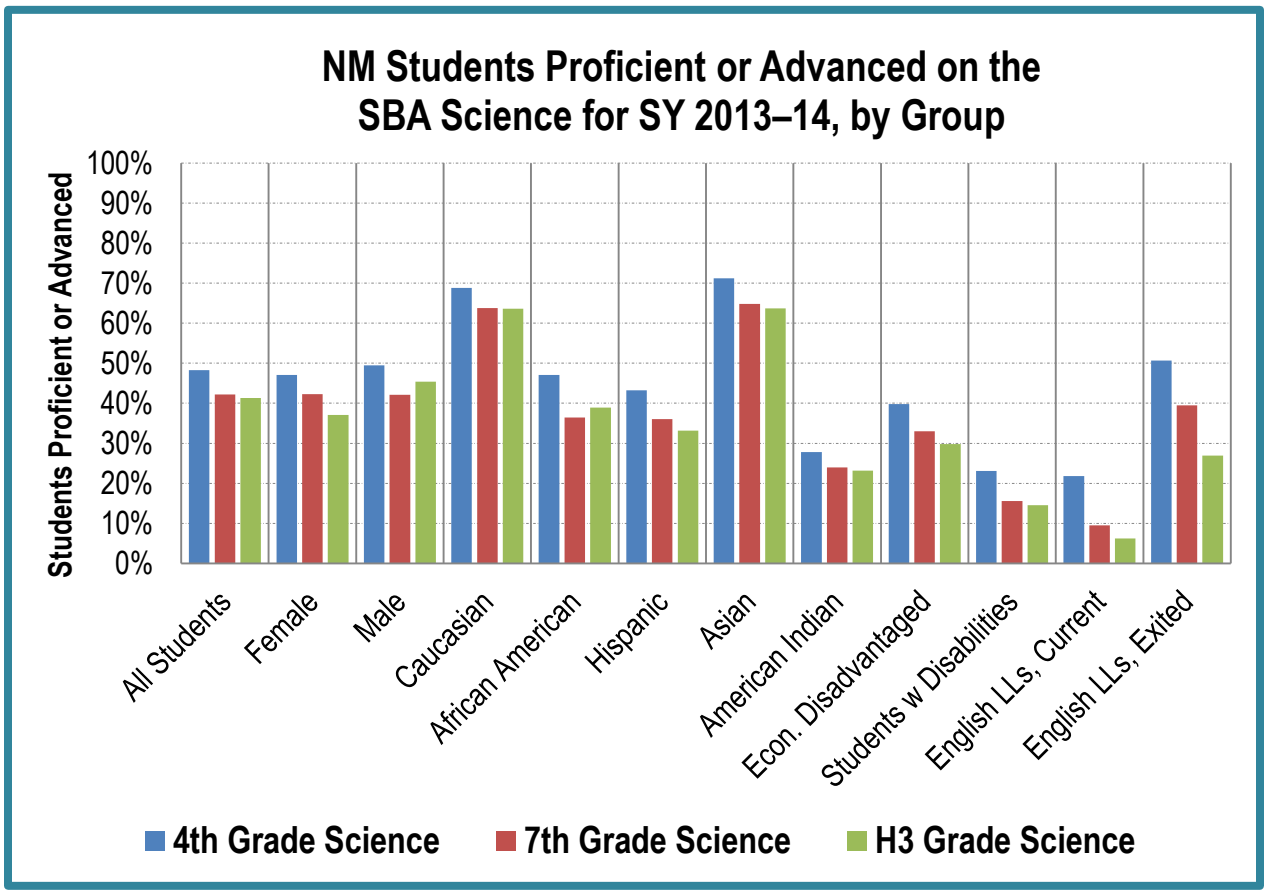

Table 4. New Mexico Students Proficient or Advanced on the SBA Science for SY 2013–14, by Group

	4th Grade Science	7th Grade Science	H3 Grade Science
All Students	48.3%	42.2%	41.3%
Female	47.1%	42.3%	37.1%
Male	49.5%	42.1%	45.4%
Caucasian	68.8%	63.8%	63.6%
African American	47.1%	36.4%	38.9%
Hispanic	43.2%	36%	33.2%
Asian	71.2%	64.8%	63.7%
American Indian	27.8%	24%	23.2%
Econ. Disadvantaged	39.8%	33%	29.8%
Students w/ Disabilities	23.1%	15.6%	14.5%
English LLs, Current	21.8%	9.5%	6.2%
English LLs, Exited	50.7%	39.5%	26.9%

Figure 4 and Table 4 show that the percentage of students who are proficient and advanced in the sub-groups of Hispanic and American Indian—the dominant sub-groups in New Mexico—is smaller than the percentage of proficient scores of the Caucasian and Asian sub-groups. The same trend holds for the percentage in the economically disadvantaged subgroup.

1.1.2 National Assessment of Educational Progress (NAEP)

NAEP results are important because they provide us a way to compare student achievement across states and to compare student proficiency levels on state assessments with a national standard. Extensive data on recent NAEP results are available at the Nation's Report Card website: (http://nationsreportcard.gov).

Since the late 1960s, NAEP exams have been given periodically to a random sample of U.S. students in mathematics, reading, science, writing, the arts, civics, economics, geography, and U.S. history at the 4th, 8th, and 12th grade levels. The results are not reported at the individual student level. In fact, given the matrix sampling used to cover a wide variety of content, all students do not receive the same exams. Like the New Mexico SBAs, the NAEP exams include both multiple-choice and extended-response items. NAEP does not provide state-level results for 12th grade. Table 7 shows NAEP math results for New Mexico in 4th and 8th grades as well as average national (public) achievement data.

Table 5a. Comparison of 4th Grade Students, Proficient or Advanced, on NAEP Math

	New Mexico Grade 4	Nation Grade 4
Math 2007	24%	39%
Math 2009	26%	39%
Math 2011	30%	39%
Math 2013	31%	41%

Table 5b. Comparison of 8th Grade Students, Proficient or Advanced, on NAEP Math

	New Mexico Grade 8	Nation Grade 8
Math 2007	18%	32%
Math 2009	20%	34%
Math 2011	24%	34%
Math 2013	23%	34%

New Mexico ranks lower than the national average for both grades 4 and 8 on the NAEP mathematics results. Although NM students have made gains since 2007 on the NAEP math results, they are still performing below the national average.

Table 6a. Comparison of 4th Grade Students, Proficient or Advanced, on NAEP Science

Subject	New Mexico	Nation
	Grade 4	Grade 4
Science 2005	18%	18%
Science* 2009	24%	32%
Science* 2011	24%	N/A
Science 2013	N/A	N/A

Table 6b. Comparison of 8th Grade Students, Proficient or Advanced, on NAEP Science

Subject	New Mexico	Nation
	Grade 8	Grade 8
Science 2005	27%	27%
Science* 2009	21%	27%
Science* 2011	23%	31%
Science 2013	N/A	N/A

*State participation in the NAEP science assessment is voluntary. And while most states participated in the 2009 assessment, all 50 states, the District of Columbia, and Department of Defense schools elected to participate in 2011. The schools and students participating in NAEP assessments are selected to be representative of all schools nationally and of public schools at the state level. Samples of schools and students are drawn from participating states and from the District of Columbia and Department of Defense schools.

NAEP results listed above are from the 2014 State Snapshot Report.

The data show that approximately one-quarter of New Mexico students in grades 4 and 8 were proficient or advanced in science in 2011, lagging behind their counterparts nationwide. Unfortunately, the most recent 2013 data for science is unavailable.

1.1.3 ACT and SAT

ACT and SAT scores are another measure of student achievement. The tables below indicate average scores and participation rates. These tests are not mandatory and are generally taken by college-bound students. The reported scores do not reflect percent correct on test items. The scores are normalized to reflect a comparison of the student's performance to a national population. Many colleges determine entrance requirements based on ACT and SAT scores.

Table 7. ACT Math Scores from 2008 to 2012 (College and Career Readiness benchmark score is 22)

ACT Math	New Mexico			Nation		
School Year	Average	# of Seniors	% of Seniors Participating	Average	# of Seniors	% of Seniors Participating
2009–10	19.7	12,679	64	21.0	1,568,835	47
2010–11	19.5	13,599	72	21.1	1,623,112	49
2011–12	19.6	13,792	75	21.1	1,666,017	52
2012–13	19.7	13,423	70	20.9	1,799,243	54
2013–14	19.7	12,945	64	20.9	1,845,787	43

Table 8. ACT Science Scores from 2008 to 2012 (College and Career Readiness benchmark score is 23)

ACT Science	New Mexico			Nation		
School Year	Average	# of Seniors	% of Seniors Participating	Average	# of Seniors	% of Seniors Participating
2009–10	20.2	12,679	64	20.9	1,568,835	47
2010–11	20.0	13,599	72	20.9	1,623,112	49
2011–12	20.0	13,792	75	20.9	1,666,017	52
2012–13	20.1	13,423	70	20.7	1,799,243	54
2013–14	20.1	12,945	64	20.8	1,845,787	43

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Table 9. SAT Math Scores from 2008 to 2012 (College and Career Readiness benchmark score is 630)

SAT Math	New Mexico			Nation		
School Year	Average	# of Seniors	% of Seniors Participating	Average	# of Seniors	% of Seniors Participating
2009–10	549	1,186	6	505	1,028,492	31
2010–11	529	1,354	6	506	1,267,239	N/A
2011–12	546	2,371	12	514	1,664,479	N/A
2012–13	545	2,303	11	514	1,660,047	N/A
2013–14	543	2,316	11	513	1,672,395	39

Participation rates for the ACT are much larger than those for the SAT.

1.2 Student Course-taking Patterns

1.2.1 Algebra 1 in Grade 8

The 2007 legislature amended state law to include the provision, “Beginning with the 2008–2009 school year, in eighth grade, Algebra 1 shall be offered in regular classroom settings or through on-line courses or agreements with high schools.” [22-13-1E NMSA 1978]

Table 10 shows the percentage of students taking Algebra 1 in 8th grade. In the 2009–2010 school year, about 20 percent of New Mexico 8th graders were enrolled in Algebra 1 and in the 2013–2014 school year, approximately 28 percent took Algebra 1. There has been an overall eight percent increase in students taking Algebra 1 between 2009 and 2014.

Table 10. Percentage of 8th graders taking Algebra 1 in years 2009–10 to 2013–14

Year	Number of Students	Percentage of all 8th Graders
SY 2009–10	4,871	20
SY 2010–11	4,827	20
SY 2011–12	5,959	23
SY 2012–13	7,509	30
SY 2013–14	7,028	28

Note: Students who took Algebra1 in 7th grade are not counted in the above table.

Table 11: Students who Took Algebra I in Grade 8 and Repeated Algebra I in Grade 9

	SY 2009–10		SY 2010–11		SY 2011–12		SY 2012–13		SY 2013–14	
	Number	%	Number	%	Number	%	Number	%	Number	%
Algebra 1	1,706	41	1,525	37	2,355	46	1,880	36	2,385	44

In 2013–14, forty percent of students who took Algebra 1 in 8th grade repeated the course in 9th grade. There is no data to determine if Algebra 1 was retaken for re-learning or to obtain graduation requirement credit. There is currently no state policy on whether or not Algebra 1, taken in the 8th grade, should receive high school credit so that students do not have to repeat it.

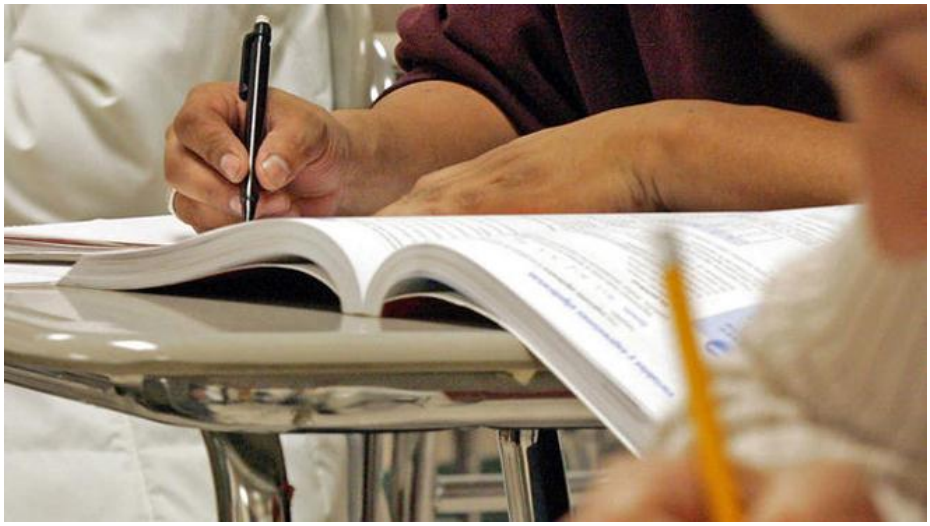
1.2.2 Algebra 2 Enrollments in High School

Table 12 shows Algebra 2 and Algebra 2/Trigonometry enrollments for the past five years.

Table 12

School Year	Percentage of 9–12 Students taking Algebra 2 and Algebra 2 / Trigonometry
SY 2009–10	18.5
SY 2010–11	17.5
SY 2011–12	19.8
SY 2012–13	20.0
SY 2013–14	22.0

The expected maximum number of students taking Algebra 2 and Algebra2/Trigonometry is 25 percent.



1.2.3 High School Science Enrollments for 2013–2014

Current requirements for high school science dictate that students must take three units of science, two of which contain a laboratory component. No specific courses or course sequences are identified in statute, though high schools often require a life science lab and physical science lab.

Figure 5

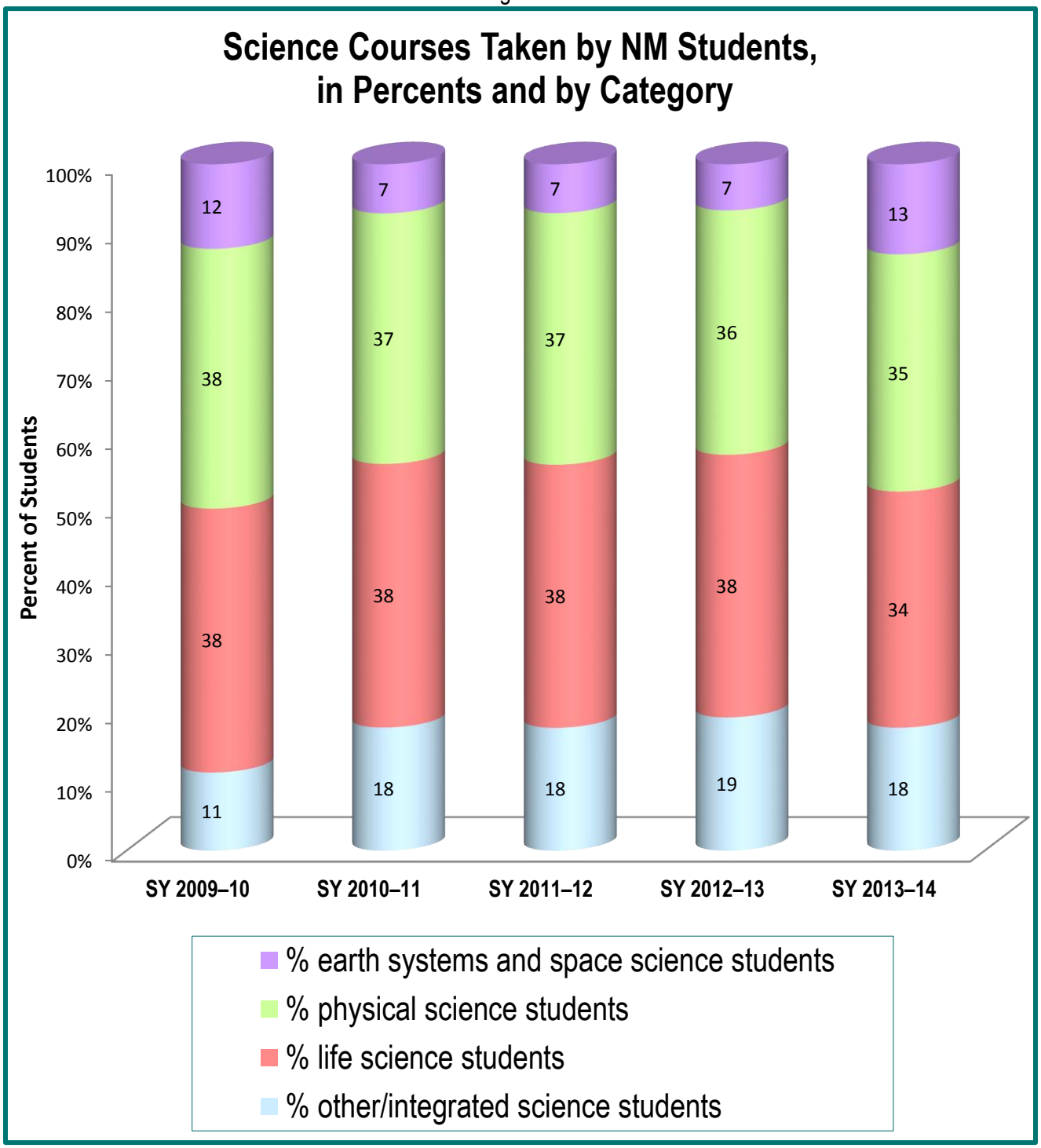


Table 13. Student Enrollment in Science Classes from SY 2009–10 to SY 2013–14

Courses	SY 2009–10	SY 2010–11	SY 2011–12	SY 2012–13	SY 2013–14
IB Science Courses	91	91	91	98	115
Integrated/Unified Science	5,531	4,507	4,507	5,946	7,881
General Science	2,564	2,701	2,701	2,177	2,611
Other	708	6,552	6,552	6,825	5,781
Total Other/Integrated Science Students	**8,894**	**13,851**	**13,851**	**15,046**	**16,388**
AP Biology	460	554	573	658	975
Anatomy and Physiology	3,250	3,232	3,232	3,333	2,922
Biology 1	23,232	22,906	22,906	22,809	24,406
Biology 2	2,210	2,128	2,128	1,593	1,436
Biology Other	954	928	928	1,348	1,893
Total Life Science Students	**30,106**	**29,748**	**29,767**	**29,741**	**31,572**
AP Chemistry	338	309	401	383	747
AP Physics	350	320	420	473	634
Chemistry 1	12,392	12,193	12,193	12,529	13,059
Chemistry 2	815	797	797	606	759
Chemistry Other	833	833	833	150	848
Forensic Science	1,275	1,279	1,279	1,429	1,814
Physical Science	8,746	7,698	7,698	5,910	8,618
Physics 1	4,682	4,640	4,640	5,995	5,067
Physics 2	204	192	192	192	159
Physics Other	18	18	18	4	15
Total Physical Science Students	**29,653**	**28,279**	**28,471**	**27,671**	**31,720**
AP Environmental Science	161	154	140	149	681
Astronomy	1,537	1,515	1,515	1,548	1,320
Earth and Space Sciences	4,262	147	147	59	6,568
Environmental Science	2,985	3,004	3,004	2,688	2,833
Geology	704	708	708	766	628
Total Earth Systems and Space Science Students	**9,649**	**5,528**	**5,514**	**5,210**	**12,030**

New Mexico school districts offer a large variety of science courses, as is evident from Table 13 above. The science SBA is administered in 11th grade. A student will be tested on content that he or she completed up to two years earlier or on content that he or she would not be taking until 12th grade. Some school districts have adopted an integrated science curriculum that may alleviate this problem. Additionally, though earth and space sciences are in the state science standards, few students are taking those courses, which may also have an impact on the SBA student performance.

1.2.4 Advanced Placement (AP)

Since success on the Advanced Placement (AP) examinations taken in high school can give students college credit at many institutions of higher education, AP is often considered an indication of superior achievement in high school. AP grades are reported on a 5-point scale as follows:

5 Extremely well qualified* **4** Well qualified* **3** Qualified*
2 Possibly qualified **1** No recommendation

*May qualify to receive college credit or advanced placement

Traditionally, the measure used to determine AP success at the state level has been the percentage of students taking the exams who scored 3 or higher. Tables 14 and 15 give the AP results for the various math and science tests.

Table 14. Results from Math Advanced Placement 2009 to 2013

Year	Calculus AB		Calculus BC		Computer Science A		Statistics	
	Take Test	% Pass Test	Take Test	% Pass Test	Take Test	% Pass Test	Take Test	% Pass Test
2010	737	48	283	74	50	48	280	45
2011	746	45	230	70	42	14	304	50
2012	931	45	247	84	67	64	358	46
2013	734	35	231	63	54	74	327	36
2014	968	34	190	73	61	67	391	36

Table 15. Results from Science Advanced Placement 2009 to 2013

Year	Biology		Chemistry		Environmental Science		Physics B		Physics C: Elec. and Mag.		Physics C: Mechanics	
	Take Test	% Pass Test	Take Test	% Pass Test	Take Test	% Pass Test	Take Test	% Pass Test	Take Test	% Pass Test	Take Test	% Pass Test
2010	554	39	309	32	154	36	226	48	40	55	54	74
2011	573	39	401	31	140	45	307	53	37	81	76	75
2012	658	35	383	34	149	31	324	48	44	82	105	73
2013	533	49	314	35	207	45	231	54	57	65	119	66
2014	679	53	491	32	229	44	302	44	17	68	76	70

Overall, student success on the math and science AP exams has fluctuated slightly over the last five years. Notably, during the school year 21013–2014, the percentage of students taking and passing the biology exam has increased noticeably. The number of students taking Calculus AB also rose from the previous year, but the pass rate remained flat. We must be cautious that, as we increase the number of students taking the AP tests, we do not lower the quality of the courses.

Figure 6

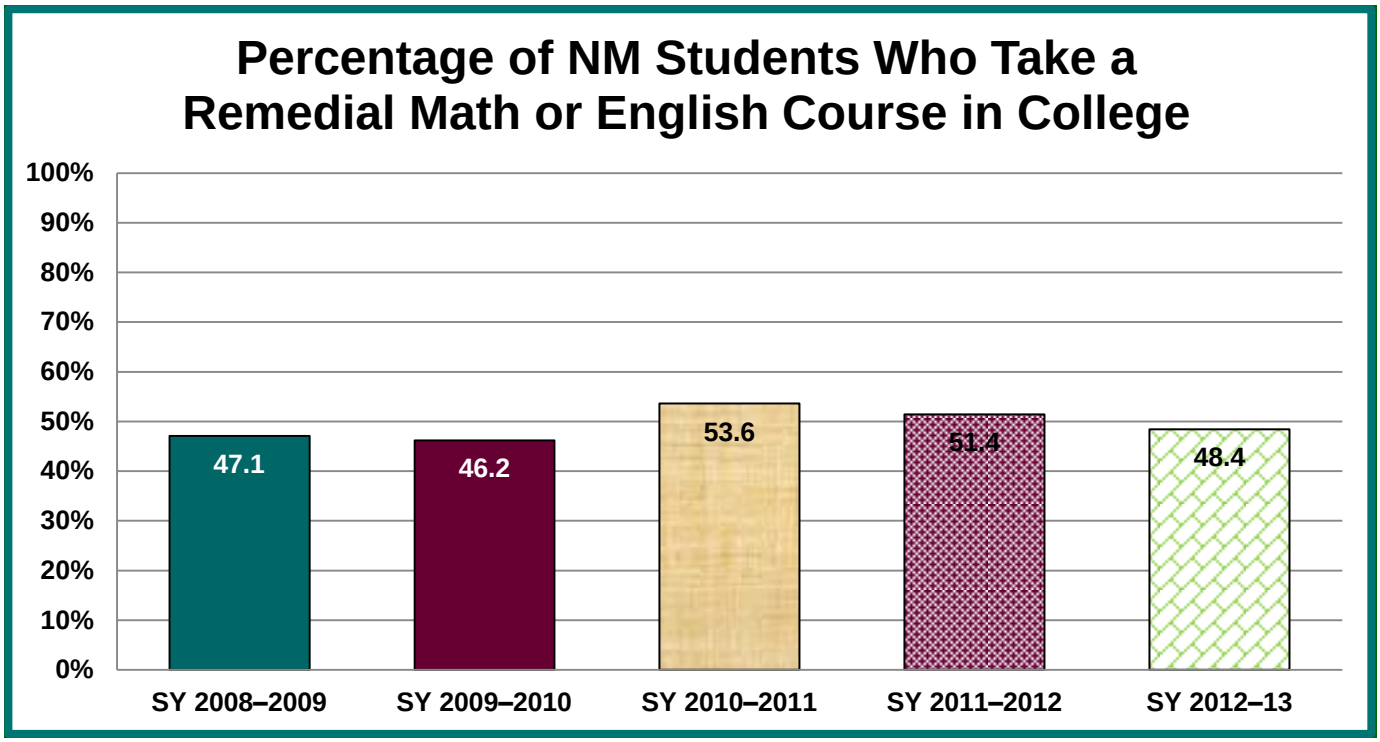
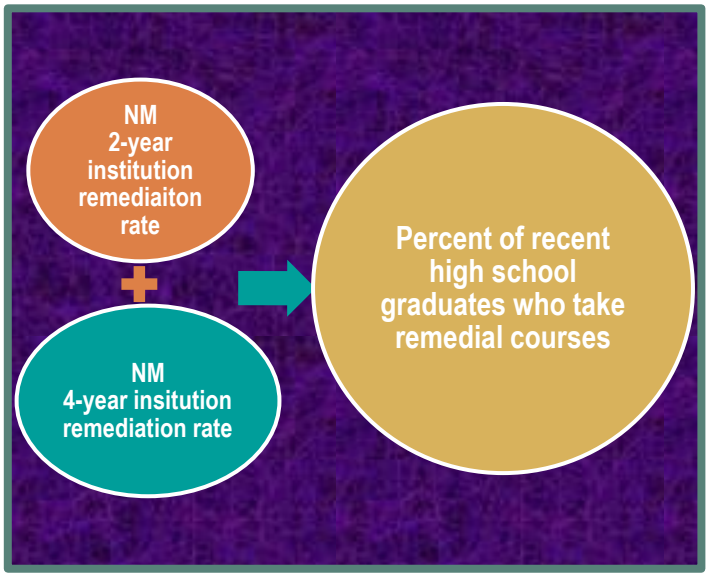


Table 16

	SY 2008–09	SY 2009–10	SY 2010–11	SY 2011–12	SY 2012–13
Percentage of NM Students Taking a Remedial Math or English Course in College	47.1	46.2	53.6	51.45	48.4

Figure 7. How the NM remediation rate is calculated



Two-year Remediation Rate:

65.4 % of the recent NM high school graduates that attend a two-year, public, postsecondary institution, enroll in one or more remediation course (math, reading, or writing). Note that this data might be slightly under-reported*. For 2-year institutions, students are not required to provide their high school graduation year due to open enrollment policy. The cohort identified for this calculation purpose includes students that did provide this information.*

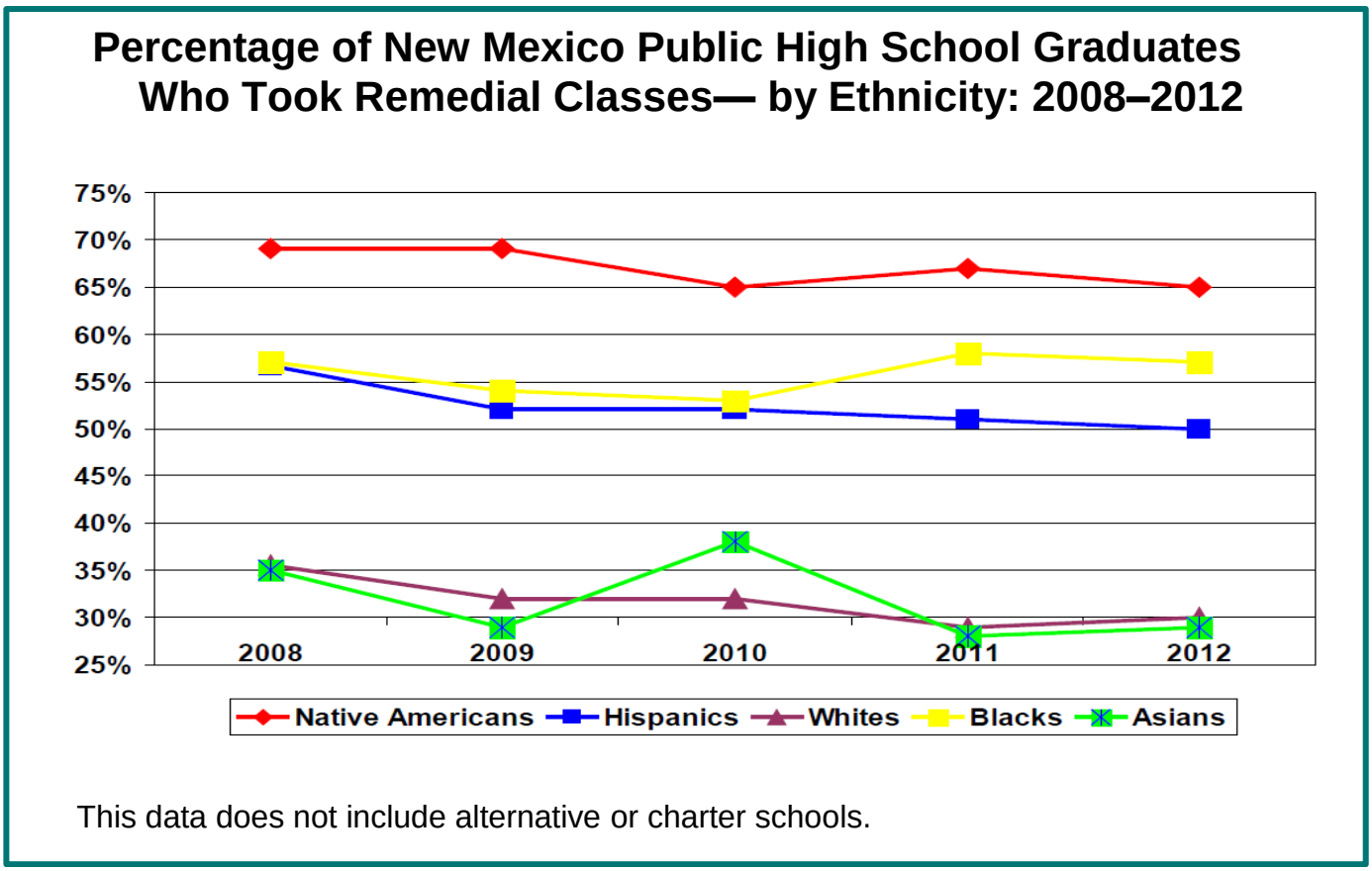
Four- year Remediation Rate:

37.2% of the recent NM high school graduates who attend a four year public postsecondary Institution, enroll in one or more remediation course (math, reading or writing).

The compilation of the total remediation rate is calculated as follows:

- Includes those students who graduated spring 2013 (Note: These data are not from the PED's high school graduating students but from HED eDEAR for students who did provide their high school graduation year.)
- Excludes Dual Credit Courses
- Includes students enrolled in the summer or fall of 2013 as first time freshmen
- Includes18 and 19 year old students
- Includes only students attending NM public high schools and charter high schools
- Includes students who enrolled in either a math, English, reading/developmental courses identified by a NM public postsecondary institution
- Includes NM residents only

Figure 8



Nationally, the need for remediation is widespread. Statistics from the National Council of State Legislatures website, http://www.ncsl.org/issues-research/educ/improving-college-completion-reforming-remedial.aspx#FF show that nationally, when considering all first-time undergraduates, studies have found anywhere from 28 percent to 40 percent of students enroll in at least one remedial course. When looking at only community college students across the nation, several studies have found remediation rates surpassing 50 percent.

Nontraditional adults comprise a significant portion of remedial students. Adults who have been out of high school for some time and are returning to college to earn a degree or receive job training often need to take remedial courses to

strengthen their math, reading, or writing skills. More than 42 million Americans, ages 18 to 64, do not hold a postsecondary degree and would likely need remediation if they were to pursue one.

New Mexico's remedial rate has hovered around 50 percent for the last seven years. In spite of recent statewide efforts to improve the college readiness of high school students and postsecondary efforts to offer alternative approaches to developmental education, the remedial rate of recent high school graduates remained at 51 percent in FY12. Remedial rates are even higher for Native American students (59 percent), Hispanic students (68 percent), low-income students (79 percent), and students entering a two-year college (57 percent). According to the Higher Education Department (HED), in FY13, there were 30,000 students at New Mexico colleges who took 62,000 developmental courses. Math was the most common subject area in which students registered for developmental courses. (Source: Higher Education Department, Report #14-02, College Readiness Report to the Legislative Finance Committee, January 20, 2014)

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2. Actions taken in School Year 2013–2014

This section includes a brief summary of actions taken by the Math and Science Advisory Council (MSAC), the Math and Science Bureau (MSB), and community stakeholder groups to improve student achievement in math and science in New Mexico.

2.1 Activities of the Math and Science Advisory Council

Twelve MSAC members and six MSAC alternates were appointed by Secretary Skandera, with terms effective July 1, 2013. MSAC spent time educating itself, collaborating with community stake holders, and working toward the development of a strategic plan. MSAC currently has a framework for its strategic plan and will work to add details with hopes of completion in fall 2015.

As one of its actions in support of the larger strategic framework of math and science education, MSAC recommended adoption of the Next Generation Science Standards (NGSS) by the New Mexico Public Education Department. Our motion further specified that the standards be adopted as written, without any modifications, for New Mexico. The MSAC endorsement to adopt the NGSS is, however, contingent on implementation with significant financial resources from the Public Education Department for professional development for both teachers and administrators. Additionally, the MSAC recommends a one-year planning period with extensive teacher input and a phased-in rollout for specific grade levels over several years.

The MSAC solicited evaluation of the NGSS and received support for adoption of the NGSS from community organizations including: the New Mexico Academy of Science (NMAS), the Coalition for Excellence in Science and Math Teaching (CESE), and the New Mexico Science Teachers' Association (NMSTA).

The MSAC also supported two legislative memorials passed by the New Mexico state senate and house. Senate Memorial 38 and House Memorial 19 both state:

> *BE IT FURTHER RESOLVED that the Public Education Department be requested to develop a plan for consideration and possible adoption of the Next Generation Science Standards and report to the Legislature by Fall 2014 its intentions regarding potential implementation as well as roll-out of the Common Core State Standards in Mathematics;*

The MSAC made a concerted effort to coordinate all efforts with the New Mexico Partnership for Math and Science Education (NMPMSE) and the STEM Collective Impact Group—two STEM organizations already working to promote high quality science and math education throughout New Mexico.

The MSAC has kept abreast of current national research trends and PED education policies in New Mexico through oral presentations by groups such as the NM STEM Collective Impact Team, the Coalition for Excellence in Science and Math Education, and reading and discussing the current education literature around STEM best practices and policy.

The MSAC supported PED professional development efforts by attending the May 2014 STEM Symposium held in Albuquerque, NM on June 6-7, 2014. The MSAC also heard reports from community stakeholders on educational activities and funding.

Highlights

1. New investment of $1.5 million for STEM Teacher Initiative stipends appropriated by the New Mexico legislature
2. $1.2 million from Math and Science Partnership federal funding that supports Mathematically Connected Communities (MC^2)
3. $298,357 in robotics funding from the New Mexico legislature's appropriation
4. Partnership with New Mexico Informal Science Education Network (ISE-NET)
5. Rebuilding relationships with stakeholders
6. Increased collaboration within the PED and with other state agencies
7. Hiring of STEM Professional Development Specialist
8. Participation in the Partnership for Assessment of Readiness for College and Careers (PARCC) Operational Working Group, Item and Test Review

1. $1.5 million for STEM Teacher Initiative stipends
   The 2014 New Mexico legislature appropriated $1.5 million to provide stipends to teachers to teach science, math, engineering, and mathematics courses.

   a.) The amount of $860,000 was awarded to 127 teachers in 20 school districts: Artesia, Central Consolidated, Chama Valley, Cimarron, Clayton, Cloudcroft, Cuba, Estancia Valley Classical Academy, Farmington, Gallup-McKinley, Hobbs Municipal, Jal, Jemez Mountain, Lovington, Maxwell, Mesa Vista, Mountainair, Pecos, Peňasco, and Questa. In addition, 111 teachers received stipends to attend professional development on the Common Core State Standards-Mathematics. ($88,308.22 not spent by the districts was reverted)

   b.) Another $640,000 provided 881 teachers with additional STEM professional development opportunities.

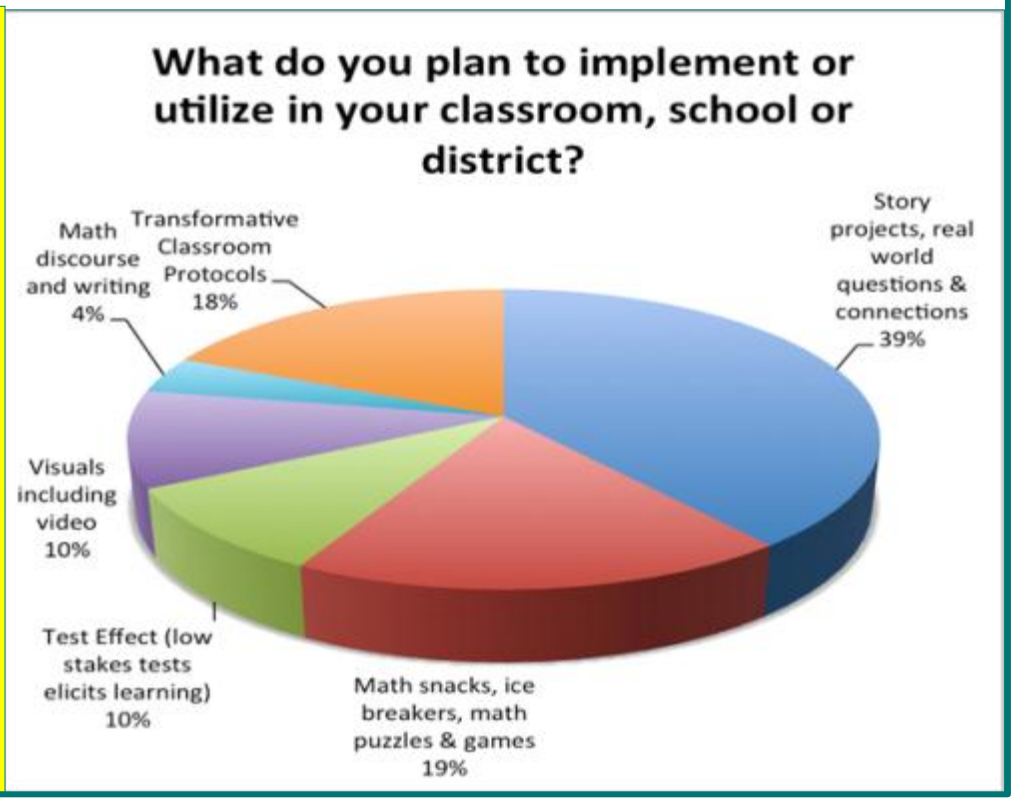
Professional Development Training	# of Teachers	Total Amount
MidSchool Math Conference	275	$275,000.00
Santa Fe Science Initiative Summer Institute	24	$24,000.00
Intensified Algebra 1 Stipends	4	$2,000.00
Storyteller Math Stipends	25	$25,000.00
MESA STEM-E Curriculum Training Stipends	52	$26,000.00
STEM Symposium Stipends	466	$253,530.93
Stipends for Teachers Attending MC^2 Math Institutes	35	$34,469.07
Total	881	$640,000.00

MidSchoolMath National Conference

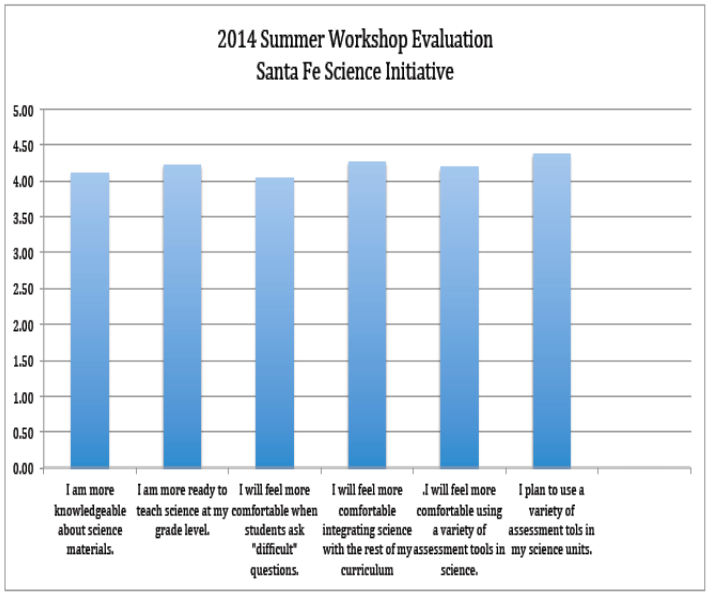
"We need to find ways for ALL kids to learn and enjoy math."

"Bringing my STEM team to the MidSchoolMath National Conference inspired us to shift into high gear as we continue to "champion" our STEM initiative. "

"I will give my math and science teachers a brief overview of parts I participated in and encourage them to use some of these ideas and practices I took away from the conference. I will also try to get them to plan some cross-curricular planning with me at my grade level with us all trying it together."



Santa Fe Science Institute Summer Science Workshop



"Hands-on science … this is how kids should be exposed to science, and how they should learn science."

NM MESA STEM-E Curriculum Training For High School and Middle School Advisors

2014 NM MESA USA
1st Place Middle School Team Overall–Red Mountain Middle School:
Alyssa Lane, Oscar Prieto, David Velez.

2014 NM MESA USA
1st Place High School Team Overall–Alamogordo High School:
Jeremiah Johnson, Dakota Wilson, Nathan Winrow

NM MESA Schools: 2013–2014 Facts and Figures

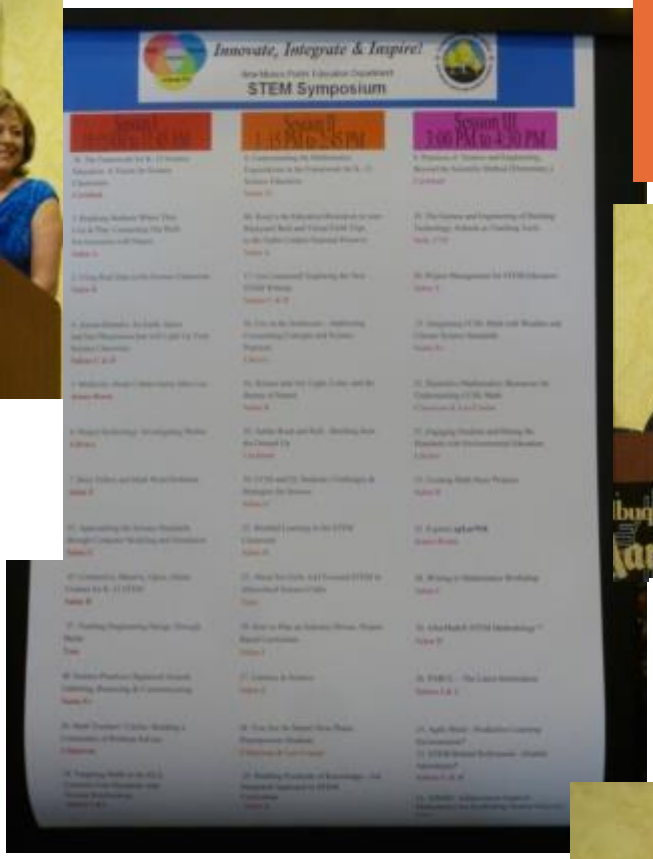
- 4,321 students in grades 6–12
- 47 percent female; 53 percent male students
- 78 percent minority students
- 59 percent of students receive free or reduced school meals
- 30 school districts
- 108 middle and high schools
- 166 MESA advisors
- 50 percent of students' parents have never attended college

Innovate, Integrate & Inspire!

New Mexico Public Education Department

STEM Symposium

Governor Susana Martinez addresses nearly 500 STEM teachers on the importance of STEM learning for New Mexico students.



"After this weekend…I realized that I can be a better teacher than I was before!"

Lesley Galyas, Director of the Math and Science Bureau at the Public Education Department

New Mexico STEM teachers attending the symposium

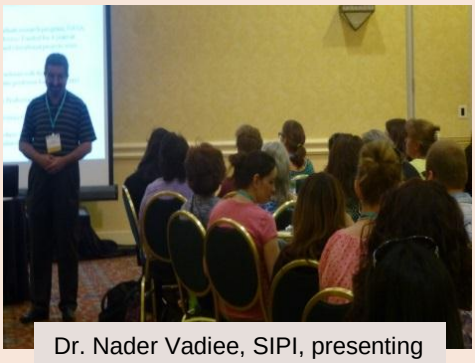
"… I have a renewed dedication to encouraging more girls in STEM

Kateri West, MIT graduate and a NM STEM professional, addresses participants on the role of teachers, counselors, and parents in STEM education.

Math and Science Advisory Council Members participating in the STEM Symposium

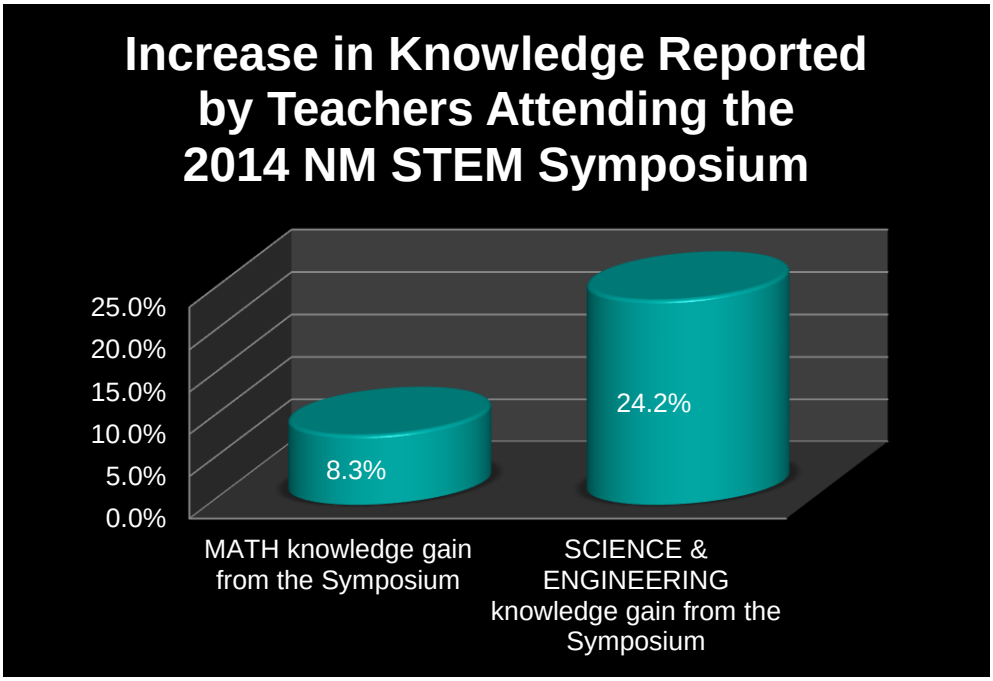
Dr. John Bellum, Sandia National Lab scientist learning about engineering practices with NM teachers.

Selena Connealy, EPSCoR, presenting on Using Data in the Classroom



Dr. Nader Vadiee, SIPI, presenting Culturally Relevant Math Practices

Karen Kinsman, STEM-H UNM, presenting on Project Management



Mathematically Connected Communities (MC²)

$1.2 million from Math and Science Partnership federal funding supports Mathematically Connected Communities (MC²)

The Components of MC²:

- Summer Math Institutes for teachers
- Summer Math Labs with students
- Leadership Academies for principals and administrators
- On-site Professional Learning with teachers
- One- and two-day sessions for customized professional learning

- The partnership includes 6 mathematicians, 11 math educators/specialists, 3 universities—New Mexico State University (NMSU), Western New Mexico University (WNMU), University of New Mexico (UNM)—and 20 New Mexico school districts for school year 2014–2015.

- The partnership is designed to support districts in the effective implementation of CCSS-Math, research-based instructional practices that lead to improved student learning in mathematics.

Summer Math Institute — Developing Professional Knowledge for K–12 Teachers

Components of the One-Week Institute:

- In the morning, participants study the math of their grade band (K–3rd, 4th–6th, or 7th Algebra).
- In the afternoon, participants choose an in-depth study of one of the following topics:
  - Formative Assessment
  - Questioning
  - Creating a Standards-Based Learning Environment

2014 Locations:

- Las Cruces: June 9–13 (97 participants)
- Espanola: June16–20 (78 participants)
- Belen: June 16–20 (102 participants)

Summer Math Labs—
Teachers and Children Learning Together

Components of the One-Week Math Lab:

- Three target grade levels: 3rd, 6th, Algebra 1
- Content aligned to CCSS-M
- Develop instructional practices to support all children, with a focus on English learners and children with special needs
- Authentic, real-time learning in a classroom setting, taught by teacher leaders and mathematicians
- Math Camp Enrichment for children in primary grades

- 2014 Location: Las Cruces, June 2nd –6th
- 50 Teacher participants from all partner districts
- 60 Children entering grades 3, 6, and Alg. 1 participated

Leadership Academy for Principals and District Administrators

Principals from all partner schools participate in the following components:

- **Two-Day Leadership Development** to coincide with Summer Math Institute—approximately 50 principals and district administrators participated.

- **Three Days of Follow-up** during the academic year with teacher leaders. Activities include:
  - School/district **needs assessments** conducted to have relevant data needed for action plan development.
  - Implementation plan monitored and modified; active reflection on successes and challenges of implementation

- **Monthly Check-in** conducted by MC^2 field specialists with district leadership to ensure continuous communication and reflection on district plans.

Robotics Funding

The $298,357.00 legislative appropriation through bond funding provided grants for robotics programs in 21 New Mexico schools.

Partnership with New Mexico Informal Science Education Network (ISE-NET)

Association for Science Technology Centers (ASTC)

CCSS & K–12 Science Framework Training

EPSCoR Energize New Mexico Teacher Training

PARCC, EoCs and CCSS:

Continuing work with a multi-state PARCC (Partnership for Assessment of Readiness for College and Careers) collaboration for item review, data review, range finding, and standards setting helps ensure close alignment between the New Mexico Common Core State Standards for math and the PARCC assessments.

Development and alignment of end-of-course exams (EoC) in science and mathematics courses.

New Mexico Common Core State Standards

NM has adopted the Common Core State Standards (CCSS) for both mathematics and English language arts. On-going support for full implementation included statewide teacher professional development in a variety of formats (face-to-face, on-line courses, webinars, and regional mentoring).

Math and Science Bureau staff collaborated with the New Mexico Education Leader Cadre (NM ELC) to promote the CCSS math transition.

The bureau also engaged community stakeholders to educate parents about common core math assessments.

New Mexico is home to several curricular and out-of-school STEM initiatives that have proven exemplary in promoting student interest and achievement in STEM areas. Some examples are highlighted below.

Los Alamos National Laboratory Foundation—Inquiry Science Education Consortium (ISEC)
In fall 2010, the LANL Foundation launched the Northern New Mexico Inquiry Science Education Consortium (ISEC) as a regional program to improve performance of high-need students in grades K–6. Now in their fourth year of implementation, ISEC is working with 18 districts, nearly one out of three students in northern NM, and providing professional development in science inquiry training for approximately 450 teachers each year.

Los Alamos National Laboratory Northern New Mexico Math and Science Academy (MSA)
The MSA is an intensive three-year professional development program for teachers designed to support whole-school continuous improvement in math and science teaching and learning. Since its establishment in 2000, more than 400 K–12 teachers have participated in MSA's three-year program. Additionally, through a partnership with New Mexico State University (NMSU), 57 teachers have earned master's degrees in teaching math and science.

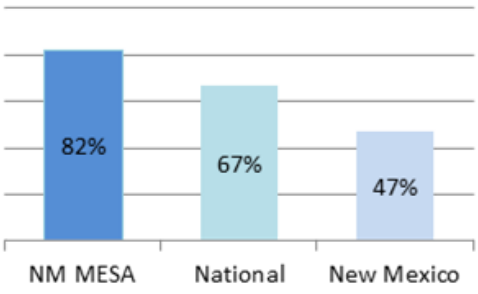
New Mexico Afterschool Alliance (NMASA), STEM Committee
This committee works to integrate STEM activities into the core work of the network of policymakers, educators, childcare providers, youth development leaders, and other stakeholders to increase the quantity and quality of afterschool educational opportunities.

New Mexico EPSCoR (Experimental Program to Stimulate Competitive Research)
The NM EPSCoR program is funded through the National Science Foundation and includes a broad range of learning and research experiences, both formal and informal, across educational levels and age groups. The **New Mexico**

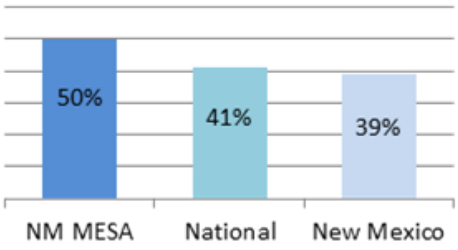
Informal Science Education Network (ISE NET)
This is an EPSCoR program that provides opportunities and resources for informal educators to work together to impact science teaching, science learning, and science awareness throughout the state of New Mexico. EPSCoR also funded Energize New Mexico, a professional development program for elementary educators.

New Mexico MESA
New Mexico Mathematics, Engineering, Science Achievement, Inc. (NM MESA) prepares middle and high school students for college majors and careers in mathematics, engineering, science, and related fields. NM MESA supports programs throughout the state, in which students participate in activities such as field trips, speaker presentations, workshops, academic competitions, community service, and leadership development.

Attending College



Earning Bachelor's Degree or Higher



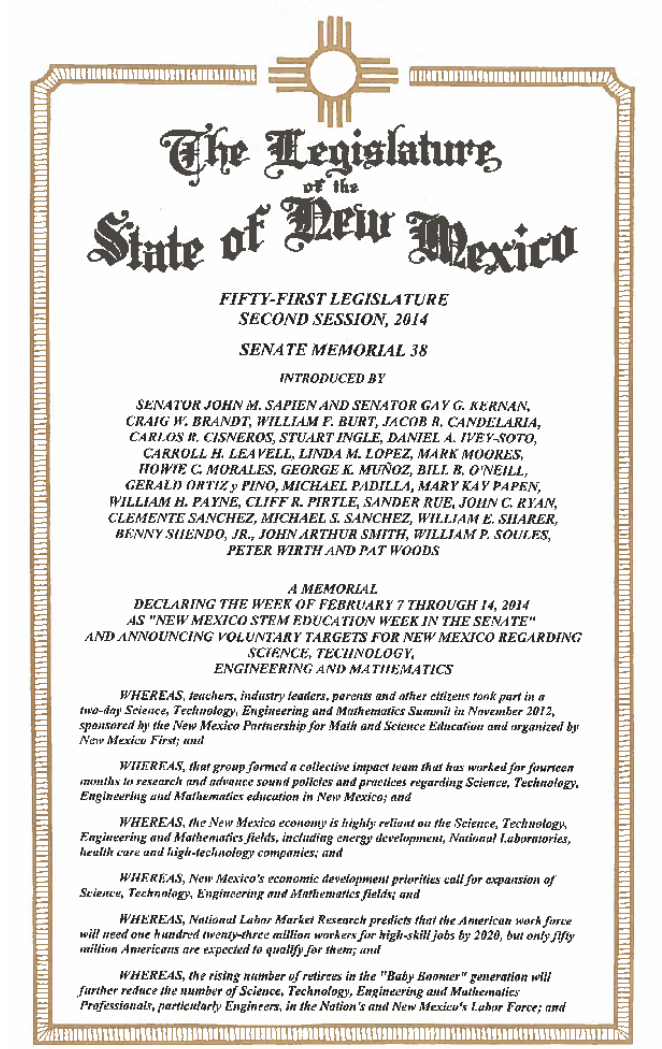
The NM STEM Connection website, nmstem.org, is a new statewide, collaborative website promoting STEM-H education in New Mexico. The website provides STEM resources for NM students, teachers, parents, counselors, and administrators as well as higher education faculty/staff and community members interested in the promotion of STEM education in New Mexico. NM STEM Connection is managed by the UNM STEM-H Center for Outreach, Research, and Education (STEM-H CORE) with support from the NM EPSCoR.

Project GUTS

Participants in Project GUTS, an afterschool computing program, come to understand that STEM is integral to everyday life and can be used to study, and potentially solve, local community problems in fields such as ecology, biology, social sciences, resource management, and public health. When youth in the program were asked how they would investigate a community problem, 80 percent suggested using computer modeling and simulation as a technique to investigate the issue.

STEM Collective Impact Group

This group is organized by the Partnership for Math and Science Education (NMPMSE) and NM First who collaborated to encourage the legislature to pass Senate Memorial (SM) 38, on February 2, 2014. The memorial sets voluntary targets for STEM achievement in New Mexico.



The Legislature of the State of New Mexico

FIFTY-FIRST LEGISLATURE
SECOND SESSION, 2014

SENATE MEMORIAL 38

INTRODUCED BY

SENATOR JOHN M. SAPIEN AND SENATOR GAY G. KERNAN, CRAIG W. BRANDT, WILLIAM F. BURT, JACOB R. CANDELARIA, CARLOS R. CISNEROS, STUART INGLE, DANIEL A. IVEY-SOTO, CARROLL H. LEAVELL, LINDA M. LOPEZ, MARK MOORES, HOWIE C. MORALES, GEORGE K. MUÑOZ, BILL B. O'NEILL, GERALD ORTIZ y PINO, MICHAEL PADILLA, MARY KAY PAPEN, WILLIAM H. PAYNE, CLIFF R. PIRTLE, SANDER RUE, JOHN C. RYAN, CLEMENTE SANCHEZ, MICHAEL S. SANCHEZ, WILLIAM E. SHARER, BENNY SHIENDO, JR., JOHN ARTHUR SMITH, WILLIAM P. SOULES, PETER WIRTH AND PAT WOODS

A MEMORIAL
DECLARING THE WEEK OF FEBRUARY 7 THROUGH 14, 2014
AS "NEW MEXICO STEM EDUCATION WEEK IN THE SENATE"
AND ANNOUNCING VOLUNTARY TARGETS FOR NEW MEXICO REGARDING
SCIENCE, TECHNOLOGY,
ENGINEERING AND MATHEMATICS

WHEREAS, teachers, industry leaders, parents and other citizens took part in a two-day Science, Technology, Engineering and Mathematics Summit in November 2012, sponsored by the New Mexico Partnership for Math and Science Education and organized by New Mexico First; and

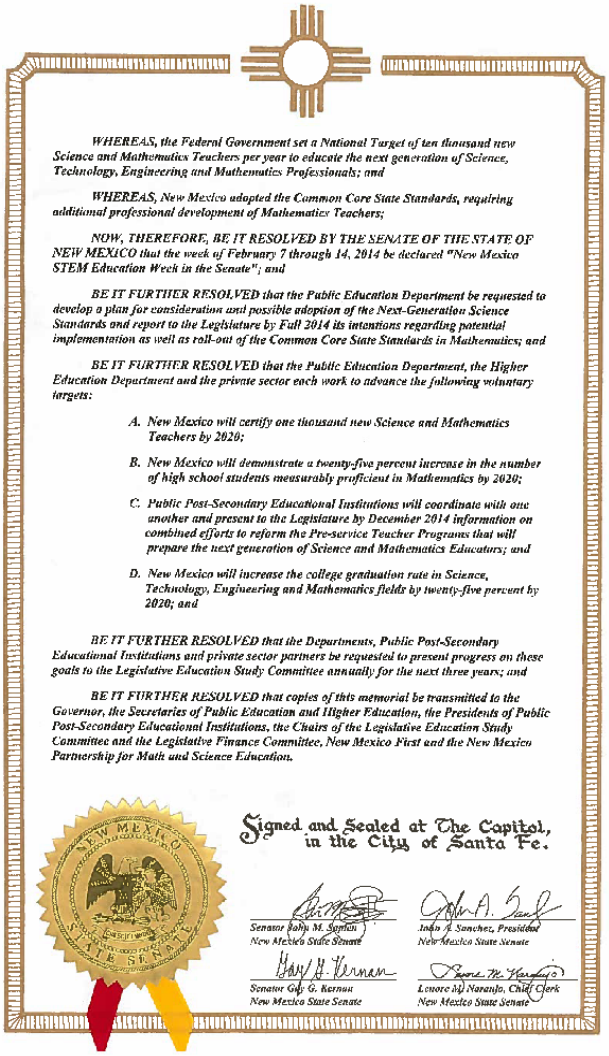
WHEREAS, that group formed a collective impact team that has worked for fourteen months to research and advance sound policies and practices regarding Science, Technology, Engineering and Mathematics education in New Mexico; and

WHEREAS, the New Mexico economy is highly reliant on the Science, Technology, Engineering and Mathematics fields, including energy development, National Laboratories, health care and high-technology companies; and

WHEREAS, New Mexico's economic development priorities call for expansion of Science, Technology, Engineering and Mathematics fields; and

WHEREAS, National Labor Market Research predicts that the American work force will need one hundred twenty-three million workers for high-skill jobs by 2020, but only fifty million Americans are expected to qualify for them; and

WHEREAS, the rising number of retirees in the "Baby Boomer" generation will further reduce the number of Science, Technology, Engineering and Mathematics Professionals, particularly Engineers, in the Nation's and New Mexico's Labor Force; and



WHEREAS, the Federal Government set a National Target of ten thousand new Science and Mathematics Teachers per year to educate the next generation of Science, Technology, Engineering and Mathematics Professionals; and

WHEREAS, New Mexico adopted the Common Core State Standards, requiring additional professional development of Mathematics Teachers;

NOW, THEREFORE, BE IT RESOLVED BY THE SENATE OF THE STATE OF NEW MEXICO that the week of February 7 through 14, 2014 be declared "New Mexico STEM Education Week in the Senate"; and

BE IT FURTHER RESOLVED that the Public Education Department be requested to develop a plan for consideration and possible adoption of the Next-Generation Science Standards and report to the Legislature by Fall 2014 its intentions regarding potential implementation as well as roll-out of the Common Core State Standards in Mathematics; and

BE IT FURTHER RESOLVED that the Public Education Department, the Higher Education Department and the private sector each work to advance the following voluntary targets:

A. New Mexico will certify one thousand new Science and Mathematics Teachers by 2020;

B. New Mexico will demonstrate a twenty-five percent increase in the number of high school students measurably proficient in Mathematics by 2020;

C. Public Post-Secondary Educational Institutions will coordinate with one another and present to the Legislature by December 2014 information on combined efforts to reform the Pre-service Teacher Programs that will prepare the next generation of Science and Mathematics Educators; and

D. New Mexico will increase the college graduation rate in Science, Technology, Engineering and Mathematics fields by twenty-five percent by 2020; and

BE IT FURTHER RESOLVED that the Departments, Public Post-Secondary Educational Institutions and private sector partners be requested to present progress on these goals to the Legislative Education Study Committee annually for the next three years; and

BE IT FURTHER RESOLVED that copies of this memorial be transmitted to the Governor, the Secretaries of Public Education and Higher Education, the Presidents of Public Post-Secondary Educational Institutions, the Chairs of the Legislative Education Study Committee and the Legislative Finance Committee, New Mexico First and the New Mexico Partnership for Math and Science Education.

Signed and Sealed at The Capitol, in the City of Santa Fe.

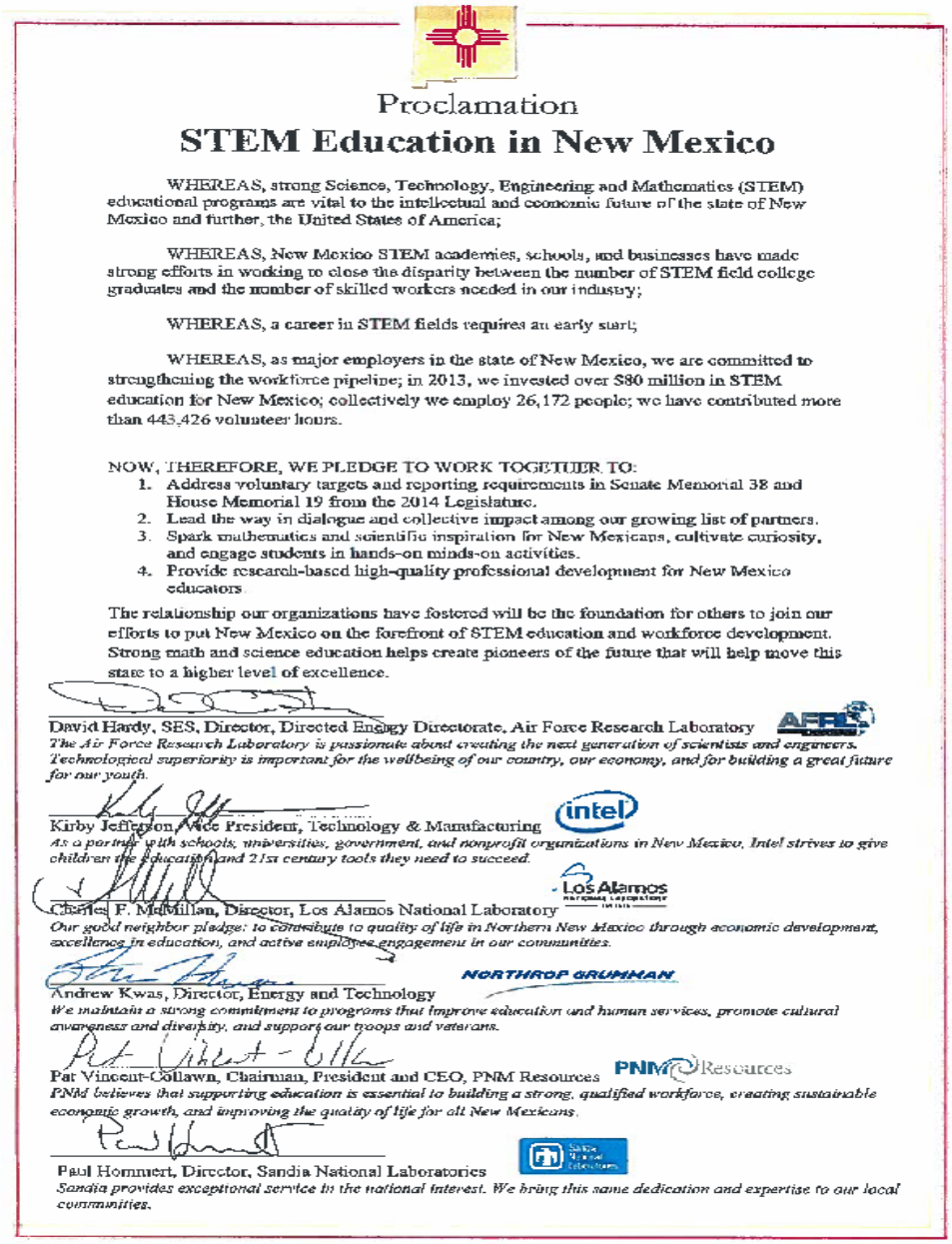
Senator John M. Sapien, New Mexico State Senate
John A. Sanchez, President, New Mexico State Senate
Senator Gay G. Kernan, New Mexico State Senate
Lenore M. Naranjo, Chief Clerk, New Mexico State Senate

STEM Outreach Center at NMSU

The center supports teacher professional development through programs such as the Scientifically Connected Communities (SC2); the Science, Engineering, Mathematics, and Aerospace Academy (SEMAA); the Digital Media Academy (DiMA); and others that support student achievement and participation in STEM fields. In the 2013–14 school year, twenty different events provided professional development for over twelve hundred teachers.

STEM Proclamation by NM Business Leaders

Organized by LANL Community Programs Director Kurt Steinhaus, the six major STEM employers in New Mexico (Air Force Research Laboratory, Intel, Los Alamos National Laboratory, Northrop Grumman, PNM, and Sandia Labs) signed a proclamation to address the voluntary targets in SM 38 through collective impact strategies, including providing research-based professional development for NM educators.



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 academies, 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 education 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.

3. Critical Issues to be Addressed and MSAC Recommendations

The data in this report clearly show that New Mexico students have not improved their math and science proficiency scores over the last several years. Additionally, they consistently lag behind their peers nationally. In alignment with the NM PED strategic plan 2011–2012, members of the Math and Science Advisory Council are working to improve student achievement in STEM. The MSAC members have identified the following critical issues to be addressed and have listed accompanying recommendations to address each one. These issues and recommendations are based on our work over the past year—gathering ideas from existing STEM organizations, community stakeholders, trends, and best practices from the literature on high-performing schools. It should be noted that these five critical issues are part of a larger strategic framework that will be published at a later date.

Educational equity for all New Mexico's students

- Study and address the achievement gap of Hispanic, Native American, African American, and economically disadvantaged students

High academic standards

- Continued support for common core implementation, ensuring adequate professional learning for teachers
- Adoption and successful implementation of the Next Generation Science Standards

Coherent systems to support highly trained STEM teachers

- Increase of targeted funding for programs that produce results
- Develop a shared vision and goals across the education continuum
- Adopt improved standards for professional learning to improve teacher professional development that is aligned to content standards
- Provide adequate funding, time, and structures to promote continuous job-embedded professional learning

School environments that support STEM learning

- Provide adequate time for STEM learning at the elementary level, including time for STEM experiences outside of school
- Provide adequate resources for STEM learning, including curriculum, materials, and equipment

Strong ecosystem of STEM education

- Develop and communicate a state-wide vision for STEM education
- Build collaborations with industry partners, informal education organizations, and out-of-school program providers
- Seek consensus and build collaborations across stakeholders, including government agencies, school districts, colleges and universities, and teachers
- Analyze data of student outcomes rigorously; use best practices in psychometrics to equate SBA results with PARCC assessments where possible, in order to track the aggregate performance of students longitudinally over several years

Appendix A: Out-of-School STEM Learning Opportunities for K–12 Students and Their Families

"Informal environments can stimulate science interest, build learners' scientific knowledge and skill, and—perhaps most importantly—help people learn to be more comfortable and confident in their relationship with science."
National Research Council. (2009). *Learning Science in Informal Environments: People, Places, and Pursuits.* Committee on Learning Science in Informal Environments. Philip Bell, Bruce Lewenstein, Andrew W. Shouse, and Michael A. Feder, Editors. Board on Science Education, Center for Education. Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press.

This information was primarily compiled from the University of New Mexico's STEM-H STEM database: http://nmstemed.org/

The Albuquerque Astronomical Society (TAAS)
TAAS has star parties throughout the school year, both in and outside the classroom. The UNM Campus Observatory is open to the public every Friday night during the fall and spring semesters, and TAAS members run telescopes.

Albuquerque BioPark
The BioPark offers a variety of day camps and classes throughout the year, including seasonal camps, aquarium overnights, evening programs, a teen volunteer program, and family festivals.

Albuquerque Bernalillo County Water Authority (ABCWA)
The ABCWA provides classroom presentations, tours of the Southside Water Reclamation Plant, and a children's water festival for fourth-grade students.

American Chemical Society (ACS)—Central New Mexico
The ACS local section works to recognize several outstanding New Mexico students as part of the ACS Chemistry Olympiad Program.The ACS also administers Project SEED to involve economically disadvantaged students in a summer research program.

Anderson Abruzzo International Balloon Museum
Albuquerque Balloon Museum offers guided tours and activities for students who would enjoy exploring the history of ballooning.

Asombro Institute for Science Education—Desert Science in the Classroom
Dedicated to increasing scientific literacy by fostering an understanding of the Chihuahuan Desert, more than 13,000 K–12 students and 500 teachers in southern New Mexico paricipate in science education programs each year.

Audubon—Randall Davey Audubon Center and Sanctuary
Audubon offers nature walks, family events, and summer camps. Summer campers explore 135 acres of mountain wilderness and a variety of diverse habitats. Partial and full scholarships are available for income-eligible families.

BEMP—Bosque Ecosystem Monitoring Program
The BEMP is long-term, ecological research using volunteers (mainly K–12 teachers and their students) to monitor key indicators of change in the Middle Rio Grande riparian forest—the bosque.

Bosque del Apache National Wildlife Refuge
Refuge staff and volunteers provide environmental education in the new education wing of the visitor center. The refuge also offers workshops, tours, hikes, and family programs, including the Festival of the Cranes.

Bradbury Science Museum
In addition to about 40 interactive exhibits that trace the history of the Manhattan Project and Los Alamos National Laboratory, the museum offers the travelling Science on Wheels van, the Science Fest, and the High Tech Halloween.

Central New Mexico Science and Engineering Research Challenge
The challenge is a regional, middle and high school student competition of science and engineering projects in Bernalillo, Sandoval, Valencia, and Torrance counties. Winners go to the State Science Fair and possibly to the International Science Fair.

Challenger Learning Center New Mexico—Summer Camps and Science Saturdays
The center offers many programs, including Robotics and Advanced Robotics Summer Camp, Build it Better Summer Camp, Crater Kids Summer Camp, International Space Station Summer Camp, and Summer Science Saturdays.

E3 Children's Museum and Science Center—Simply Science
Simply Science is just that...SIMPLE. The Farmington museum and science center introduces children to simple science experiments, and the sort not generally carried out at home in the kitchen. Approriate dress takes into consideration the messy factor.

Environmental Education Association of New Mexico—Project Learning Tree
Project Learning Tree® (PLT) is an award-winning, multi-disciplinary, environmental, education program for educators and students in Pre-K through grade 12. PLT is a program of the American Forest Foundation.

Experiential EE, LLC—Race to the Finish Summer Camp
This innovative, long-term, outreach project motivates New Mexico fifth-grade students and their teachers to protect local water resources by combining a hands-on curriculum, computer technology, and class partnerships.

Explora—Classes for Home Schoolers, Outreach Programs, and Seasonal Camps
A semester of weekly, hour-long, experiential science, technology, and art programs are facilitated by Explora educators. They are provided for home schoolers and as outreach programs for large groups of up to 125 students. Additionally, Explora offers seasonal camps and three-year internships for low-income students.

Farmington Museum at Gateway Park
A wide variety of permanent and traveling exhibits relate the diverse history of the area's cultures. Lecture series, performances, workshops, art shows, and special demonstrations are offered year round.

Fractal Foundation—First Friday Fractals
This is a monthly, full-dome planetarium show at the New Mexico Museum of Natural History that dramatically showcases the beauty of algebra and the connections between math and nature.

Girl Scouts of New Mexico Trails
Girl Scouts introduces girls of every age to STEM experiences relevant to everyday life. STEM experiences are framed within the three Girl Scout processes of girl-led, learning by doing, and cooperative learning.

HMTech
This is a summer STEM program provided by the Black Leadership Committee at Sandia National Laboratories for middle and high school students to explore a variety of STEM careers.

Inquiry Facilitators, Inc—RoboRAVE International
This is an annual robotics competition for teams of two to four kids (big kids too) in Roboquerque, NM.

Las Cruces Museum of Nature and Science
Guided tours, Family Science Saturdays, Science Cafés, spring break, and summer camps are offered at this museum in the Chihuahuan Desert.

Los Alamos National Laboratory—LANL Education Programs
These education programs help prepare a regional population to enter the Laboratory's STEM workforce regional pipeline.

Los Alamos National Laboratory (LANL)—New Mexico Hazmat Challenge
An annual training event for regional hazmat response teams. The event is hosted by the LANL Emergency Operations Division and the Emergency Response Group. Up to 15 high school students can participate.

Maker Faire ABQ
A family-friendly showcase of invention, creativity, and resourcefulness, Maker Faire is a place where people show what they are making and share what they are learning. The aim is to entertain, inform, connect, and grow this DIY community.

Mathcounts
Mathcounts is a national enrichment, coaching, and competition program that promotes middle school mathematic achievement and is supported by the National Society of Professional Engineers (NSPE).

Math Snacks
Short animations, games, and inquiry-based lessons that engage learners in actively building a conceptual understanding of mathematical ideas were developed through the NMSU Learning Games Lab (mathsnacks.org).

Maxwell Museum of Anthropology, UNM
The Maxwell Museum educational programs include check-out kits for Southwest archaeology, biological anthropology, Native American ethnology, and Hispanic ethnology. Additionally, the museum hosts summer camps for youth, ages 8–12.

National Museum of Nuclear Science and History—Nuclear Science Education Programs
The museum offers classroom programs, hands-on science demonstrations, educator workshops, kids' camps, lectures, and much more, including partnering with the YWCA TechGYRLS to host NanoDays at the museum.

National Science Foundation, UNM, Santa Fe Institute—New Mexico Computer Science for All
The Santa Fe Institute, with other partners, is developing an exciting new project called New Mexico Computer Science for All (NM-CSforAll).

National Science Foundation—New Mexico State University—Southwest Center for Microsystems Education (SCME) at the UNM Manufacturing Training and Technology Center
SCME offers professional development and educational materials to excite and engage secondary and post secondary students in the field of microsystems (MEMS) technology.

New Mexico Department of Game and Fish—Project WILD and Project WILD Aquatic
Project WILD is a wildlife education program to develop awareness, knowledge, skills, and commitment that results in informed decisions, responsible behavior, and constructive actions concerning wildlife and the environment.

New Mexico FFA Association
Through this association, students develop leadership, public speaking, and STEM skills through workshops, and they compete in Career Development Events in agriculture, forestry, entomology, and veterinary science at regional, state and national levels.

New Mexico Museum of Natural History (NMMNH)
The NMMNH provides many educational opportunities, offering a variety of camps and programs for visiting school groups. Additionally, it has museum volunteers who take educational programming to K–12 classrooms.

New Mexico Museum of Space History, Alamogordo
Themes for the 2014 summer science camp at the museum included: Homesteading Mars: Red Planet; Green House; Giant Leap: Space 101; Alien Hunter: Mission to; and Rex Rocket's Asteroid Roundup.

New Mexico State Parks
With 35 outdoor classrooms across the state, and many cultural and natural resources to offer educational experiences, the Kids 'n Parks program provides grants to teachers for buses to state parks.

New Mexico State University—Computer Science Outreach
NMSU offers a multi-dimensional program to facilitate a mentor-lead pipeline for NM students into computer science.

NM MESA, Inc.—NM MESA Program
NM MESA is a pre-college program for grades 6 through 12 with an emphasis on STEM. The NM MESA Mission: Empower and motivate New Mexico's culturally diverse students with STEM enrichment.

NM PBS—SciGirls and Summer Learning Day
NM PBS offers training in facilitating SciGirls, a PBS program for girls in grades 5–8 that has the goal of changing how girls think about STEM through inquiry-based investigations and half-hour TV episodes.

NMSU Computer Science—Young Women in Computing
The Young Women in Computing program (YWiC) is an outreach initiative developed with the vision to increase the exposure of and participation in computer science activities for all students in NM.

NMSU STEM Outreach—Academy of Young Scientists—From Stone Age to Space Age
The Southern New Mexico Academy for Young Scientists (AYS) provides opportunities to spark the interest of students in STEM in the Las Cruces area.

NMSU STEM Outreach—Southern New Mexico Science, Engineering, Mathematics, and Aerospace Academy (SNM SEMAA)
SNM SEMAA is an outreach project to increase participation in and retention of historically underrepresented K–12 youth in the STEM fields and includes family festivals, the Aerospace Engineering Lab, and Science Olympiad.

Pajarito Environmental Education Center (PEEC), Los Alamos
Nature walks, Nature Playtime, Take Wings Family Events, Summer Adventure Programs, lectures, classes, and field science curriculum are offered by this nature center on the Pajarito Plateau.

River Source, Inc.—Watershed Watch and Resilient Water Future Programs
River Source focuses on STEM education at all NM schools by teaching cutting-edge watershed monitoring of several physical, chemical, and biological measurements.

Riverside Nature Center, Farmington
The wetlands serve as a wildlife refuge with guided bird tours, Dragonfly Walks, one-to-two-mile strolls, and special events.

Roswell Museum and Art Center—Science Saturdays, Family Science Nights, and Planetarium Shows
Science Saturday, Family Science Nights at Goddard Planetarium, multimedia planetarium shows, star parties at the planetarium with the Roswell Astronomy Club, and field trip visits are offered by the Roswell Museum.

Sandia Mountain Natural History Center—Ecology Field Program
The Ecology Field Program is a free, statewide program for students in 3rd through 8th grades. It is a place-based, hands-on program that introduces students to ecosystems through a 2.5 hour hike and other activites.

Sandia National Laboratories—Adventures in Science and Knowledge (ASK), K–12 Education Partnerships
Sandia Labs offers programs to support the development of the next generation of scientists and engineers, including three unique programs for American Indian students, African American students, and Hispanic students.

Santa Fe Alliance for Science—Santa Fe Alliance for Science (SFAS)
SFAFS is an organization of more than 100 STEM professional volunteers in the Santa Fe area who work with students and teachers to help improve K–14 math and science education.

Santa Fe Alliance for Science, SF Public Schools, Georgia O'Keefe Education Annex, Santa Fe Institute, NM Public Education Department—Santa Fe Science Cafés for Young Thinkers
Held six times each academic year, the purpose of this program is to introduce middle and high school students to interesting topics in science and technology.

Santa Fe Botanical Garden—Family Programs and Community Days
Outdoor classrooms, family mornings, and field trip programs are available for preK–12 youth at the three botanical garden sites: the Museum Hill garden, the Leonora Curtin Wetland Preserve, and the Ortiz Mountains Educational Preserve.

Santa Fe Children's Museum
Informal science learning opportunities are offered through interactive exhibits, school field trips, outreach to schools and community centers, overnight camp-ins, the Youth Apprenticeship Program, and community festivals.

Santa Fe Institute / GUTS y Girls Program—GUTS y Girls Summer Workshops
GUTS y Girls helps girls explore new concepts and careers. During the summer workshop, participants learn about complex systems science through hands-on activities and computer simulations.

Science Education Alliance—Science Advisors Program
The Science Advisors (SCIAD) Program services teachers and students K–12 with local STEM community resources for support with STEM instruction and activities.

Science Education Solutions—Café Scientifique
Conversations with scientists, engineers, and inventors take place in an informal and relaxed setting for young teens, helping them explore the latest ideas in science and technology.

Southern New Mexico Academy for Young Scientists (AYS)
The AYS program for students in 5th, 6th, and 7th grade in the Las Cruces area emphasizes hands-on science field trips and participation in after-school space and science programs.

STEM Fuse—GAME:IT 10,000
STEM Fuse was founded with the mission to promote K–12 STEM education. STEM Fuse plans to do this by generously giving away the terrifically popular, standards-aligned, full-semester game design course GAME:IT to 10,000 high schools.

U.S. Forest Service—Nature Walks, Junior Ranger Programs
The More Kids in the Woods program helps high school students re-establish a connection with their environment. The USFS is also a key partner in the online program Climate Change Live.

University of New Mexico—STEM Education Outreach Programs
The Central NM Science and Engineering Research Challenge, the Central NM Science Olympiad, the STEM Teacher Professional Development Workshop series, and the Student Research Workshop(s) are held each year.

UNM-PNM Statewide Mathematics Contest
The two rounds of exams are designed to test mathematical potential and ingenuity as well as formal knowledge. It is open to all students in grades 7–12 as well as interested students in lower grades.

Valles Caldera Trust—Student Forest Restoration Monitoring
Students learn about forest health, restoration, and management through hands-on data collection and field work. Collected data will be used by the trust to evaluate the condition of forests and restoration projects on the preserve.

Valle de Oro, Albuquerque
This urban wildlife refuge, a few miles south of Albuquerque, offers environmental education opportunities on its 431 acres of land along the Rio Grande River.

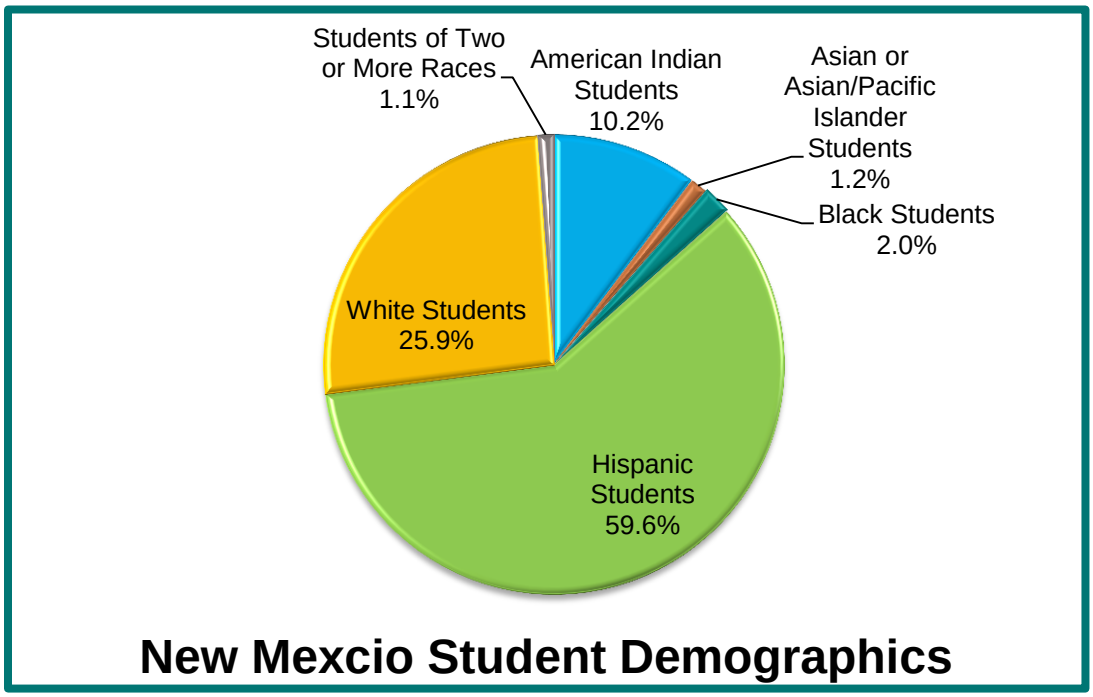
Western Heritage Museum, Hobbs
This regional museum focuses on southeastern NM from prehistory to present. The museum's collections range from archeological artifacts to pioneer household items to modern tools from the oilfield.

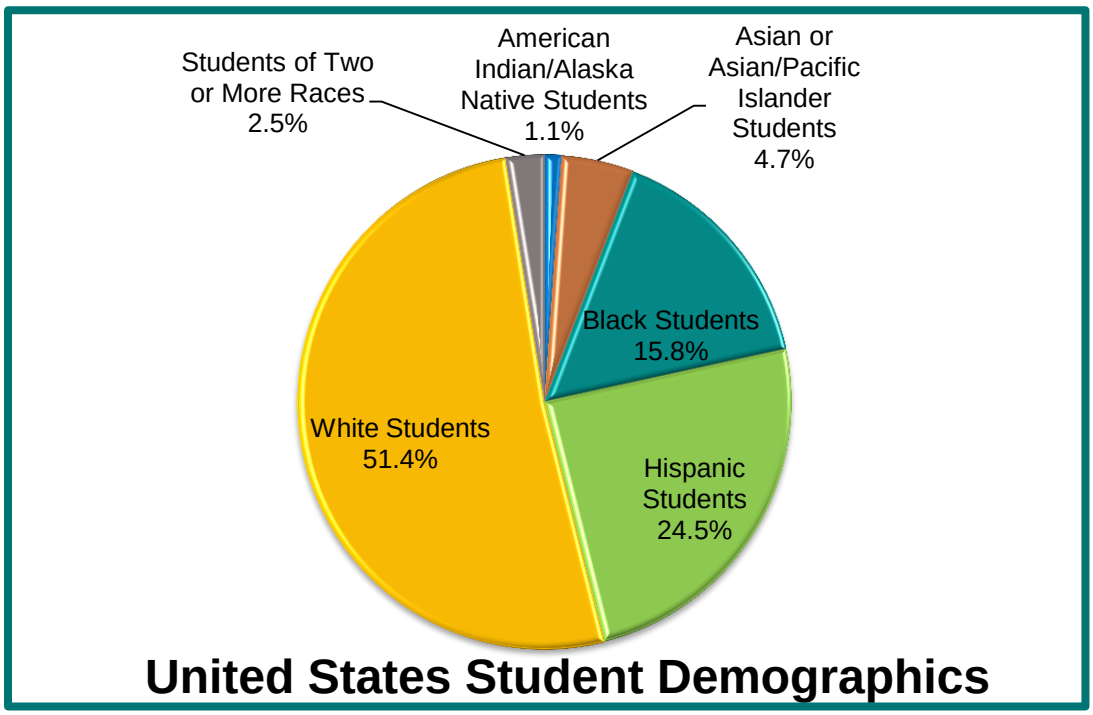
Whitfield Wildlife Conservation Area, Belen
Visitors can take guided nature walks and hikes on trails that lead through several different habitats and plant zones, ranging from meadows and grasslands to riparian woodland. The visitor center is open on Fridays and Saturdays.

Wildlife Center, Española
On-site programs involve at least three raptors, a tour of the 30-plus resident animals, games, and activities. The center offers summer science day camps, three-day Explore Your Watershed programs, and community science nights.

Wildlife West Nature Park, Edgewood
Five-day Junior Zookeepers summer day camps are offered for children ages 9–12 at the 122-acre site. Field trips and bird handling classes are also available.

CCMS	Common Core Math Standards
CNM	Central New Mexico University
eDEAR	Electronic Data Editing and Reporting
EoC	End-of-Course (exam)
EPSCoR	Experimental Program to Stimulate Competitive Research, a National Science Foundation funded grant
H2	Student(s) in their second year of high school. Traditionally, this would be a sophomore, but could also be a student who did not pass 9th grade, and is a reclassified freshman in his/her 2nd year of high school.
H3	Student(s) in their third year of high school. Traditionally, this would be a junior, but could also be a student who has not accumulated enough credits to be a junior, but is in his/her 3rd year of high school.
H4	Student(s) in their fourth year of high school. Traditionally, this would be a senior, but it could also be a student who has not accumulated enough credits to be a senior, but is in his/her 4th year of high school.
HED	Higher Education Department
IDEAL-NM	Innovation Digital Education and Learning in New Mexico
MESA	Mathematics, Engineering, and Science Achievement
MSAC	Math and Science Advisory Council
MSB	Math and Science Bureau of the Public Education Department
NGSS	Next Generation Science Standards
NMPSE	New Mexico Partnership for Math and Science Education
NNMC	Northern New Mexico College
NMSU	New Mexico State University
NSF	National Science Foundation
PARCC	Partnership for Assessment of Readiness for College and Career
PD	Professional development
PED	New Mexico Public Education Department
PNM	Public Service Company of New Mexico
SBA	New Mexico Standards Based Assessment
SPED	Special education
STARS	Student Teacher Accountability Reporting System (STARS) catalogs. Volume 1 provides a standard data set framework for each student in the 3Y–grade 12 public education system. Volume 2 has reference materials including all approved course descriptions.
STEM	Science, Technology, Engineering, and Mathematics
SY	School year
UNM	University of New Mexico





Percent of Students Qualifying for Free or Reduced Lunch

New Mexico	66.2%
United States	46.0%

Data Source: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "State Nonfiscal Public Elementary/Secondary Education Survey", 2011–12 v.1a.