

NEW MEXICO'S STEM-H ECOSYSTEM: A WORKING PAPER



Prepared For The STEM Coalition Steering Committee:

Jenny Parks, CEO, LANL Foundation

Gwendolyn Perea Warniment, K-12 Program Director, LANL Foundation

Kathy Keith, Director, Community Programs Office, LANL

Zach Leonard, Math and Science Academy, LANL

Selena Connealy, Education and Outreach Manager, NM EPSCoR

Patricia Sullivan, Associate Dean for Outreach, College of Engineering, NMSU

Steven Lucero, Co-Founder and General Partner, Perpetua Partners

Jennifer Case Nevarez, Director, NM Techworks

May 11, 2018

Prepared By:

Dr. Peter Winograd

Peter.winograd.nm@gmail.com; 505-340-5654

Table Of Contents

- **Executive Summary**
- **Acknowledgments**
- **How Might We Think About The Challenges That Face Us?**
- **How STEM-H Is Defined And Actualized**
- **New Mexico STEM Ecosystem**
 - **The K-12 STEM System**
 - **The Higher Education STEM-H System**
 - **The Workforce STEM-H System**
- **What Do STEM Coalitions Look Like In Other States?**
- **How Could New Mexico Build A Sustainable STEM-H Coalition?**

Executive Summary

New Mexicans have long understood the critical role that science plays in our lives. The Sun Dagger site at Fajada Butte in Chaco Canyon was used to celebrate the summer solstice over a thousand years ago. In more recent times, the Trinity Site, the Very Large Array, the Los Alamos National Laboratory, and the Sandia National Laboratory have become world-renown sites of “Big Science” in our state.

While New Mexico’s place in science’s history is clear, our future is much more in doubt. Too few of our children and young adults have the skills or interest to excel in science, technology, engineering and mathematics – the critical STEM fields. The competition for good jobs in the STEM world is fierce and by every measure both New Mexico and New Mexicans are struggling to keep up.

In 2017, a dedicated group of New Mexicans came together to promote a sense of urgency around STEM education issues and to build consensus for a path forward. The NM STEM Coalition produced a series of reports that called for the development of a statewide STEM roadmap, a better understanding of the New Mexico STEM ecosystem, and a communication and public awareness plan to ensure that stakeholders and the public were more aware of the importance of STEM education.

The NM STEM Coalition also recognized that we need an organizational structure beyond ad-hoc committees and passionate stakeholders if our state is to make systematic progress in improving STEM education and strengthening the STEM workforce.

The purpose of this report is to take the work of the NM STEM Coalition a step further by examining the current STEM ecosystem across New Mexico, providing an overview of current and future job demands in STEM including healthcare, reviewing data on STEM performance and outcomes, and proposing how investments could be made to improve long-term, systematic and statewide STEM efforts.

The scope of work for this report ended with the request for identifying opportunities for action. President Truman (who relied heavily on the scientific expertise of New Mexicans) said *“Progress occurs when courageous, skillful leaders seize the opportunity to change things for the better.”* I believe that the data in this report show that opportunities for action abound in New Mexico and await our courage and skill to seize them.

Acknowledgements

One of the best things about working on a report like this is learning about all of the impressive work that other individuals and organizations are doing. I want to thank Jenny Parks , Kathy Keith, Gwen Perea Warniment, Zach Leonard, Patricia Sullivan, Selena Connealy, Jennifer Case Nevarez, and Steve Lucero who served as the STEM Coalition Steering Committee.

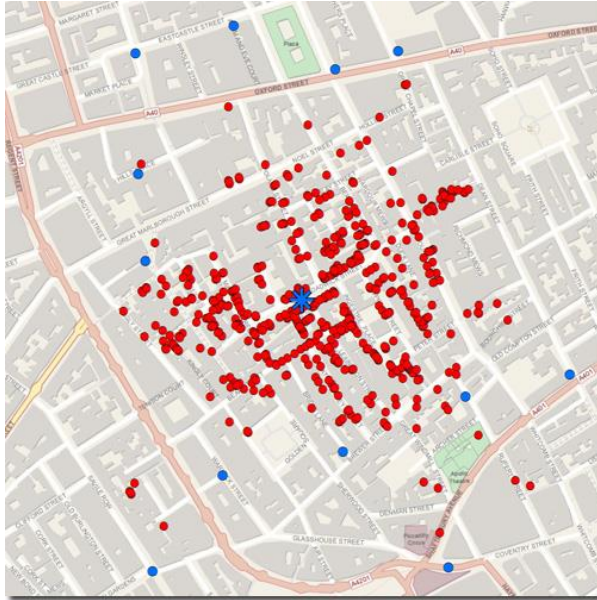
Celina Bussey (Secretary of New Mexico Department of Workforce Solutions) introduced me to Rachel Moskowitz (Chief of the Economic Research & Analysis Bureau) and Mark Flaherty (Economist) who both shared their extraordinary understanding of STEM-H occupations and industries nationally and in New Mexico. Rachel kept me from getting lost in all of the different coding systems used in labor market analyses. Mark's article about STEM and STEM-Related Occupations in New Mexico published in the Winter 2018 edition of the NMDWS Regional Review is an outstanding analysis of New Mexico's future workforce needs and I appreciate his willingness to share his conceptual frameworks and data.

David Abbey (Director of the Legislative Finance Committee), Charles Sallee (Deputy Director For Program Evaluation), and Travis McIntyer (Program Evaluator) were gracious enough to share the data set they had developed for their 2016 report entitled, *"Science, Technology, Engineering and Math (STEM): Degree Production and Employment Outcomes."* The LFC had worked with the NM Higher Education Department and the NM Workforce Solutions Department to conduct a pipeline analyses that followed individuals as they moved across three large systems: high school, higher education, and the workforce. This is the best kind of data to have and the most difficult to obtain and I deeply appreciate their willingness to share that information.

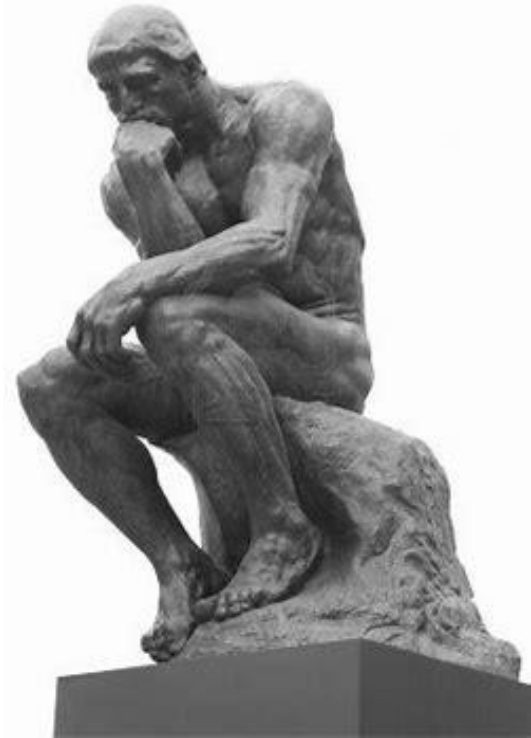
Beata Thorstensen (Data Administrator in Rio Rancho Public School District) helped me understand the current state of New Mexico's K-12 standards and assessment system. Beata has also followed the National Assessment Of Educational Progress (NAEP) data for years and her data visualizations about how New Mexico compares to other states are some of the most provocative charts in this report.

The quality of these individuals' collaboration, support and data are excellent. Any errors in analysis or interpretation presented here are mine alone.

How Might We Think About The Challenges We Face?



Dr. John Snow and the mapping of the 1854 London Cholera Outbreak.



“Visualizations act as a campfire around which we gather to tell stories.”

—Al Shalloway

A Map Of The New Mexico STEM-H Ecosystem

Threats: Lack of Statewide Vision And Alignment, Current Inventories Of Resources, Workforce Gaps and Needs

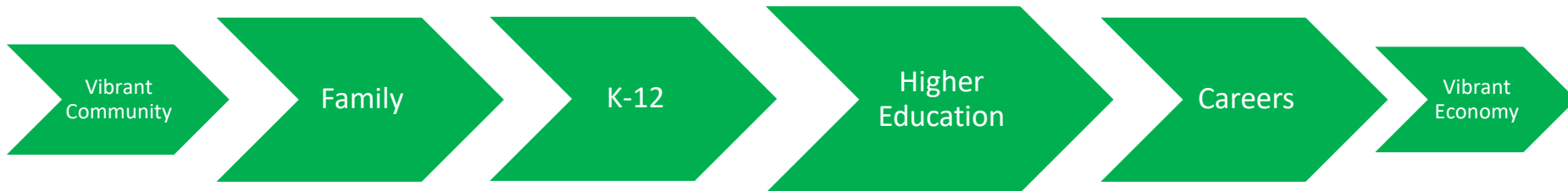
Threats: Low Proficiency & Dropouts; Lack of Educational Equity

Threats: Low Expectations, Little Family Support

Threats: Inadequate Teacher Training & Support; Fragmented Standards, Curriculum & Assessments

Threats: Wages, Labor Force Participation, More Attractive Jobs and Quality of Life

Threats: Lack of Coordinated Support Efforts At Key Transition Points



Teachers, Curriculum, Frameworks, Assessments

Scholarships, Dual Credit, Early College Efforts

Internships, Grow Your Own Partnerships

Out Of School STEM-H Experiences

Policy Actions, Advocacy Actions, Activities Alignment Actions

Threats

STEM Pathway

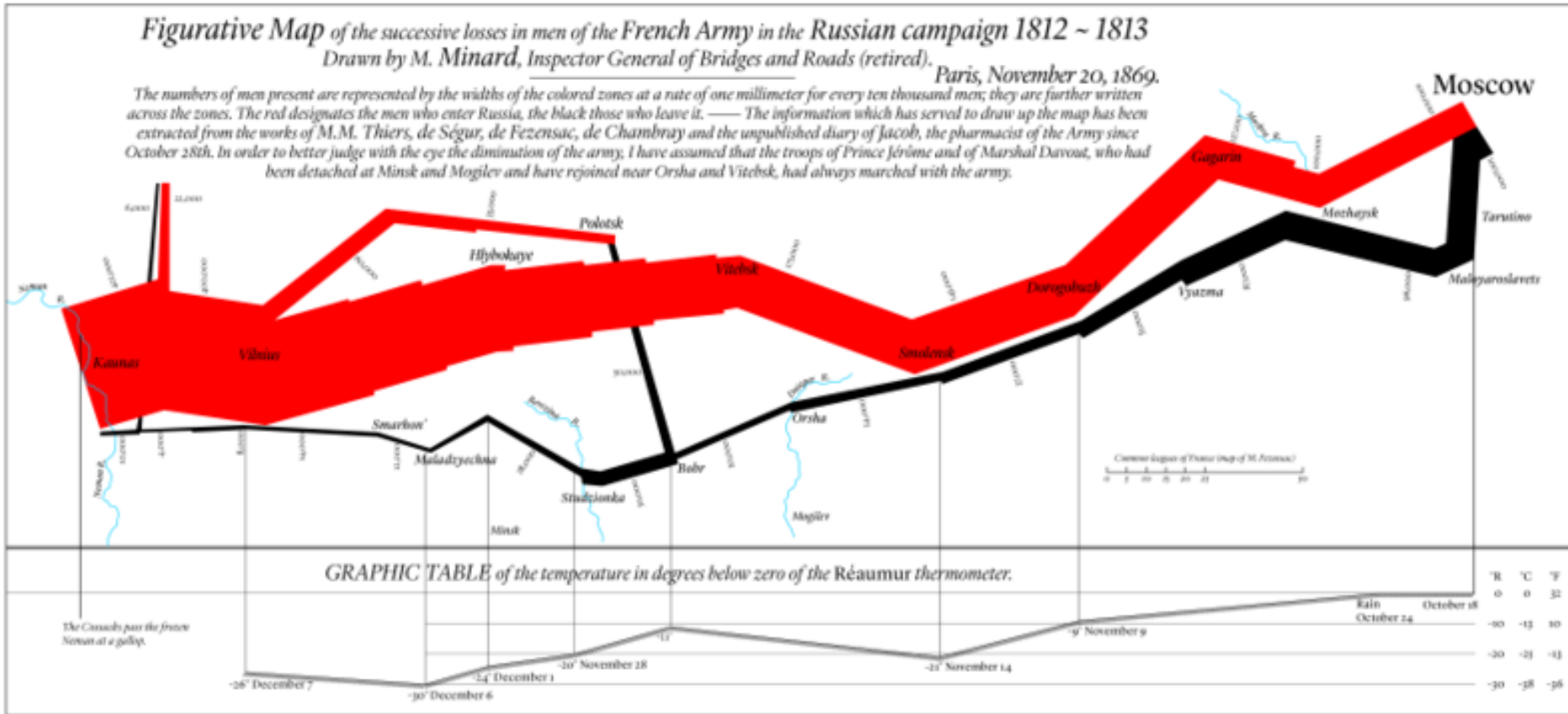
Opportunities

Charles Minard's Map Of Napoleon's March To Moscow (Drawn In 1869)

Figurative Map of the successive losses in men of the French Army in the Russian campaign 1812 ~ 1813

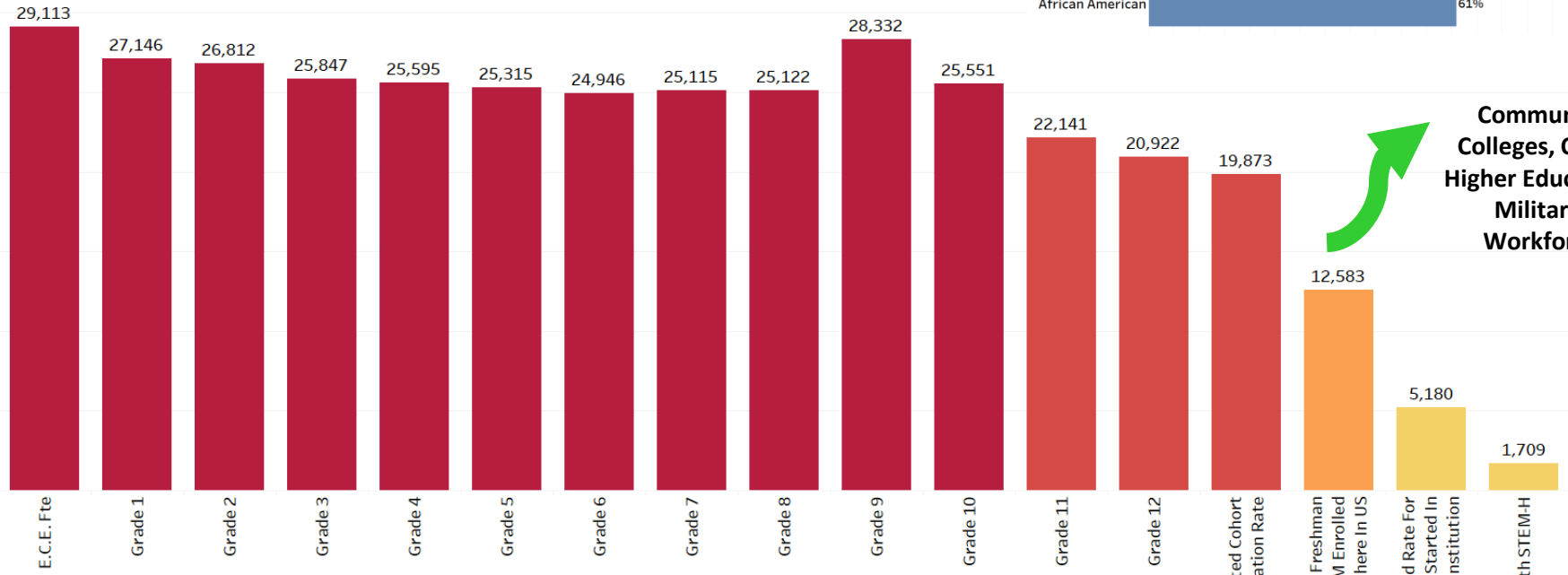
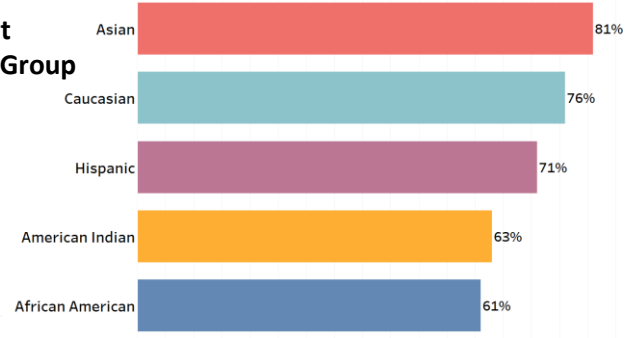
Drawn by M. Minard, Inspector General of Bridges and Roads (retired). Paris, November 20, 1869.

The numbers of men present are represented by the widths of the colored zones at a rate of one millimeter for every ten thousand men; they are further written across the zones. The red designates the men who enter Russia, the black those who leave it. — The information which has served to draw up the map has been extracted from the works of M.M. Thiers, de Ségur, de Fezensac, de Chambray and the unpublished diary of Jacob, the pharmacist of the Army since October 28th. In order to better judge with the eye the diminution of the army, I have assumed that the troops of Prince Jérôme and of Marshal Davout, who had been detached at Minsk and Mogilev and have rejoined near Orsha and Vitebsk, had always marched with the army.



Our People Are Our Most Precious And Most Wasted Resource

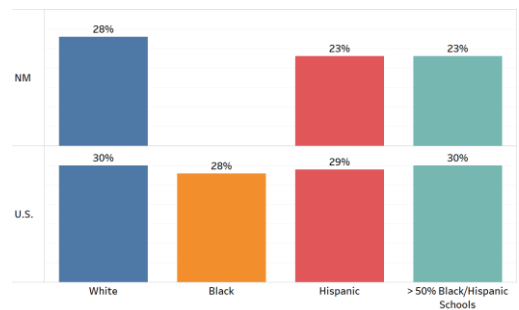
NM 2016 Cohort Graduation Rates By Group



Community Colleges, Other Higher Education, Military, Workforce



% Of 4th Graders By How Much Science Instruction They Receive Per Week

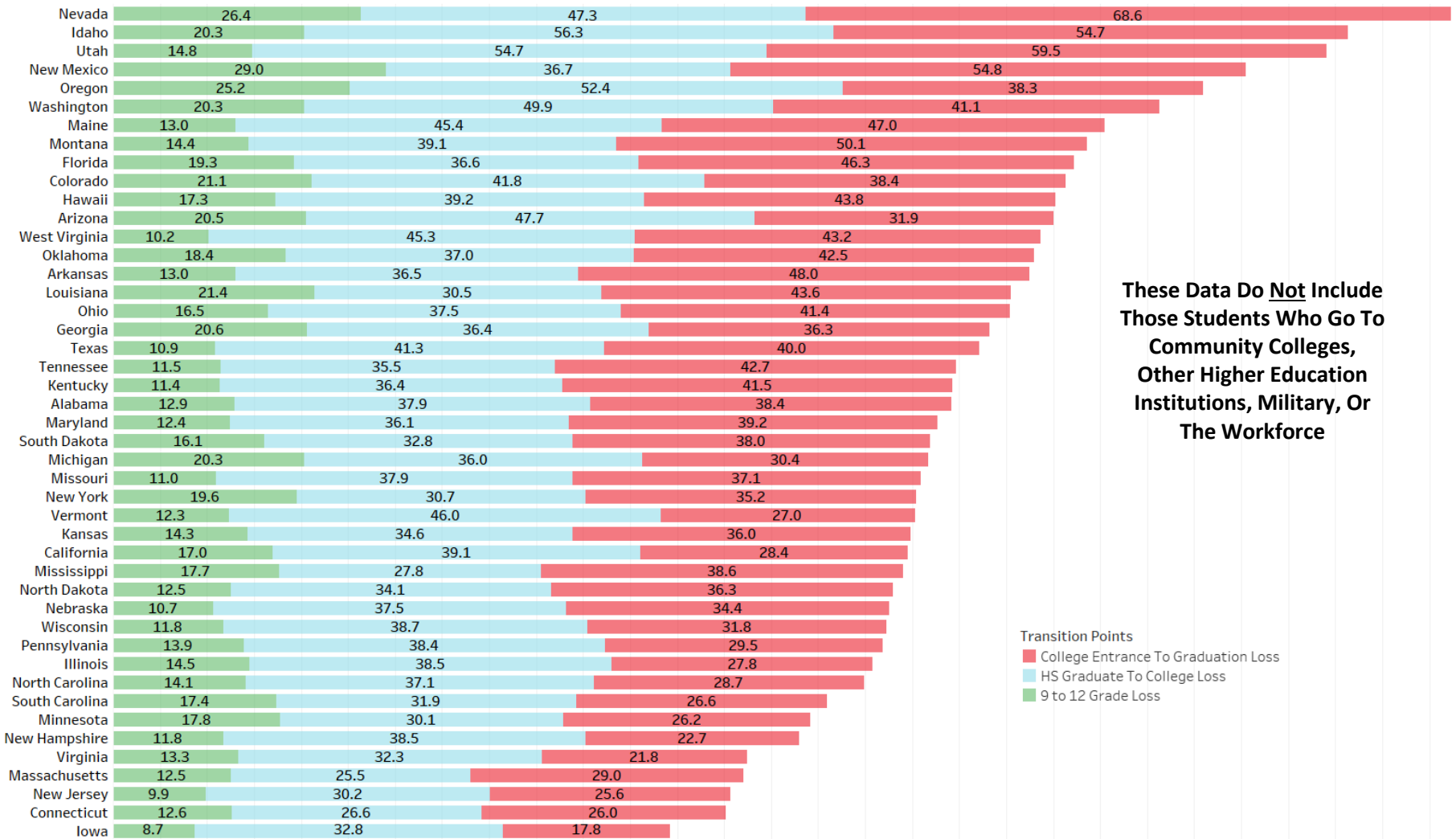


% Of 8^h Graders Whose Math Teachers Have An Undergraduate Major In Math

14.3% Habitual Truancy Rate

Prison (est. 7,000 Inmates in NM Prisons)

Consider How Many Students We Lose At Each Stage Of The Education Pipeline

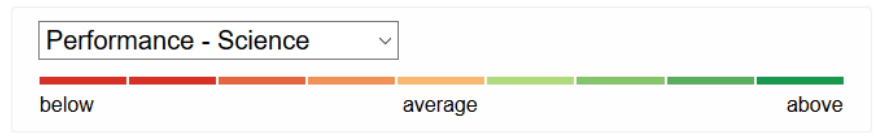
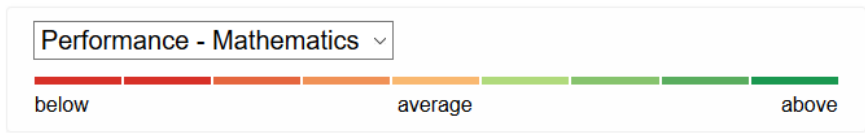
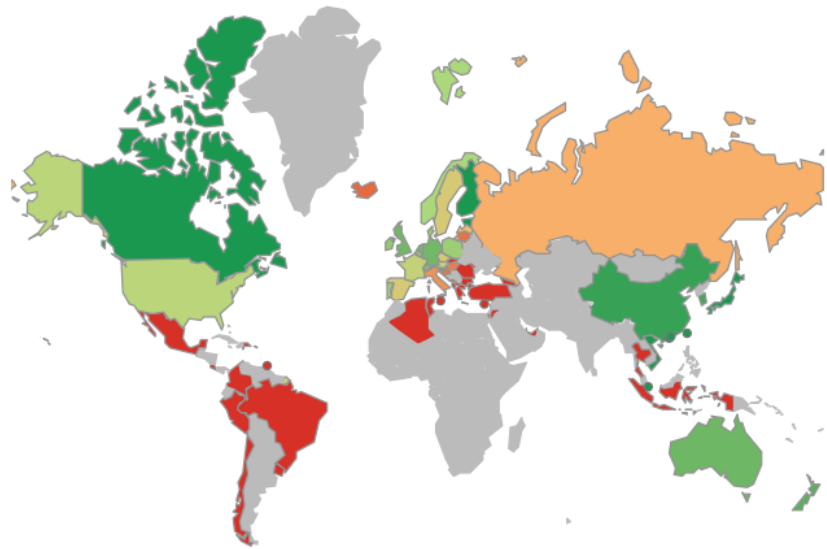
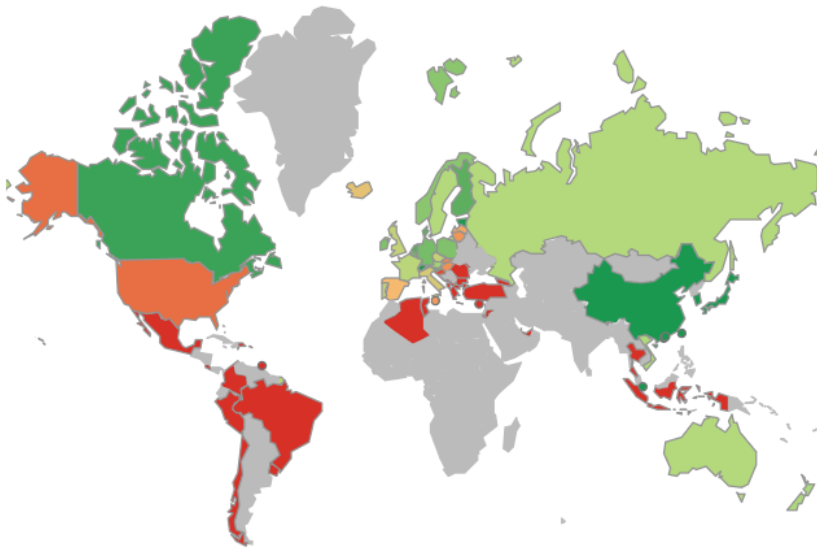


These Data Do Not Include Those Students Who Go To Community Colleges, Other Higher Education Institutions, Military, Or The Workforce

Transition Points
■ College Entrance To Graduation Loss
■ HS Graduate To College Loss
■ 9 to 12 Grade Loss

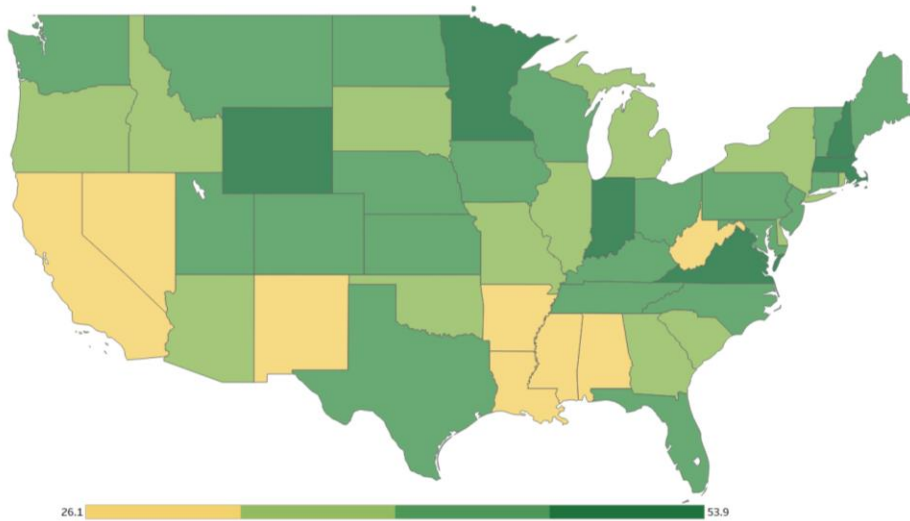
Source & Notes: These data come from the public high school 4-year adjusted cohort rate for school year 2015-2016, NCES; Percent of high school graduates doing directly to college anywhere in the United States in 2014, National Student Clearinghouse; Total completion rate for six-year outcomes across state lines for students who started at a four-year public institution in Fall 2010 by origin state. The percentage of loss at each transition was computed by subtracting the success rate from 100%. States with missing data from any point are excluded from this chart.

In 2015, The United States Lagged Behind Other Countries In Student Assessments In Mathematics And Science

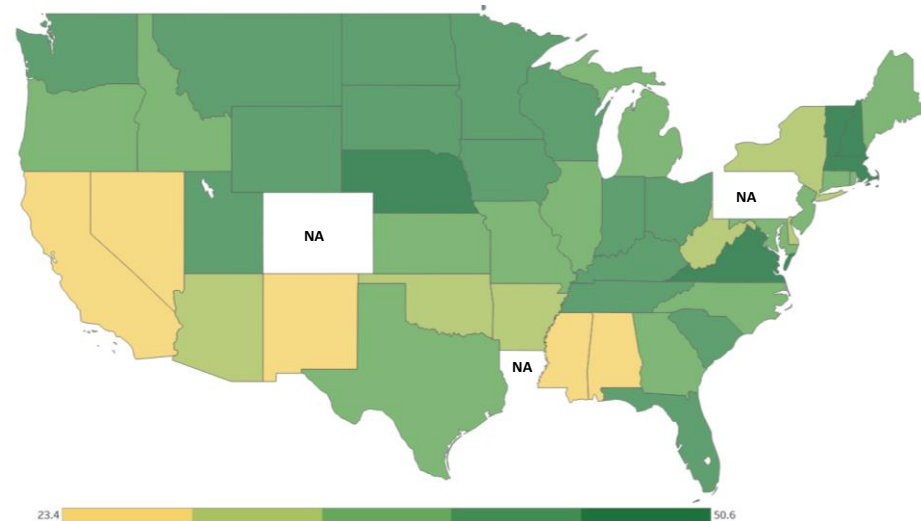


Source & Notes: <https://www.compareyourcountry.org/pisa>. The Program For International Student Assessment (PISA) measures 15-year old students' reading, mathematics and science literacy every three years.

In 2015, New Mexico Lagged Behind Other States In 4th Grade Student Assessments In Mathematics And Science



The Percent Of 4th Graders At Or Above Proficient In Mathematics



The Percent Of 4th Graders At Or Above Proficient In Science

Source & Notes: <https://www.nationsreportcard.gov>. The National Assessment Of Educational Progress (NAEP) 4th Grade Assessments In Mathematics And Science In 2015.

Key Take Away

New Mexico Is In A Global Race For All The Benefits That A Vibrant STEM-H Ecosystem Can Bring And Yet We Squander Our Most Precious Resource – Our People – At Every Step Of The Journey

How STEM-H Is Defined And Actualized

STEM-H is the acronym that commonly refers to Science, Technology, Engineering, Mathematics – Health. But understanding how STEM-H is or is not defined in policy and practice is useful.

Throughout this working paper, I use the definitions relevant to that particular part of the STEM-H ecosystem. In K-12 education, we primarily talk about math and science assessments, standards, curriculum; student achievement; and teacher credentials. In higher education, the most useful definition is Classification of Instructional Programs (CIP) codes which provide a taxonomy of instructional programs, certificates and degrees. When we talk about careers, occupations and industries, the North American Industry Classification System (NAICS), the 2010 Standard Occupational Classification (SOC), and the U.S. Census Occupation codes (OCC) are most useful, even if they are somewhat bewildering.

In the STEM-H literature, there is often talk about how the arts fit into STEM, the critical role of entrepreneurship, and high-tech industries. One of the best resources I found was the 2013 Brookings report entitled, “The Hidden STEM Economy” by Jonathan Rothwell which argued that we mainly focus on supporting workers with at least a B.A. degree and often overlook a strong potential workforce of talented individuals with less than a B.A. The most important lesson to keep in mind about STEM-H definitions is that they can both help us think more precisely about the challenges we face and expand our vocabulary to better map out the opportunities that lay before us.

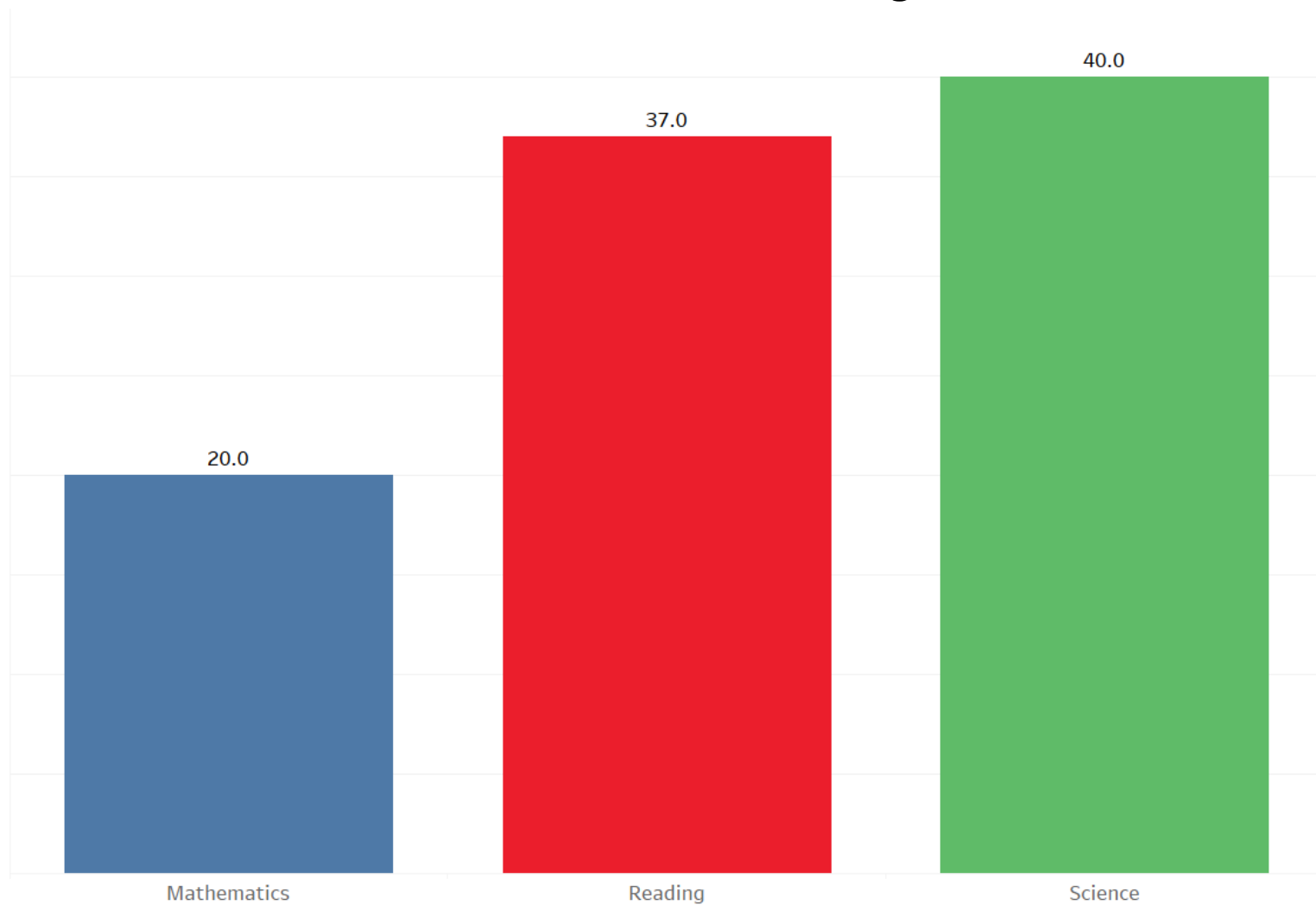
The K-12 STEM Ecosystem

New Mexico's New Science Standards And Assessments Need To Be Fully Implemented

Academic Area	Based On Assessments	Grades Tested	Number of Students Tested	Frameworks
Reading	Partnership for Assessment of Readiness For College and Careers English Language Arts; Standards Based Assessment Spanish Reading; New Mexico Alternative Performance Assessment Reading (students with severe cognitive disabilities); IStation Reading (K-2)	K to 11	296,516	Common Core State Standards (Assessments Implemented in NM in 2014-15) New Mexico Standards Of Excellence (Assessments Implemented in NM in 2005)
Mathematics	Partnership for Assessment of Readiness For College and Careers Math; New Mexico Alternative Performance Assessment Math (students with severe cognitive disabilities)	3 to 11	218,350	Common Core State Standards (Assessments Implemented in NM in 2014-15)
Science	Standards Based Assessment Science; New Mexico Alternative Performance Assessment Science (students with severe cognitive disabilities)	4, 7, 11	72,894	New Mexico Standards Of Excellence (Assessments Implemented in 2005)

Source & Notes: NM PED ACC_Webfiles_2017_Proficiencies_All_ByStateByDistrictBySchool. Data includes 1) SBA Spanish Reading; 2) SBA Science; 3) NMAPA Science, Math, and Reading; 4) PARCC ELA and Math; and 5) IStation Reading. Data is not shown for groups with fewer than 10 students.

The Percentage Of New Mexico Public School Students Who Are Proficient And Above In Mathematics, Reading, and Science



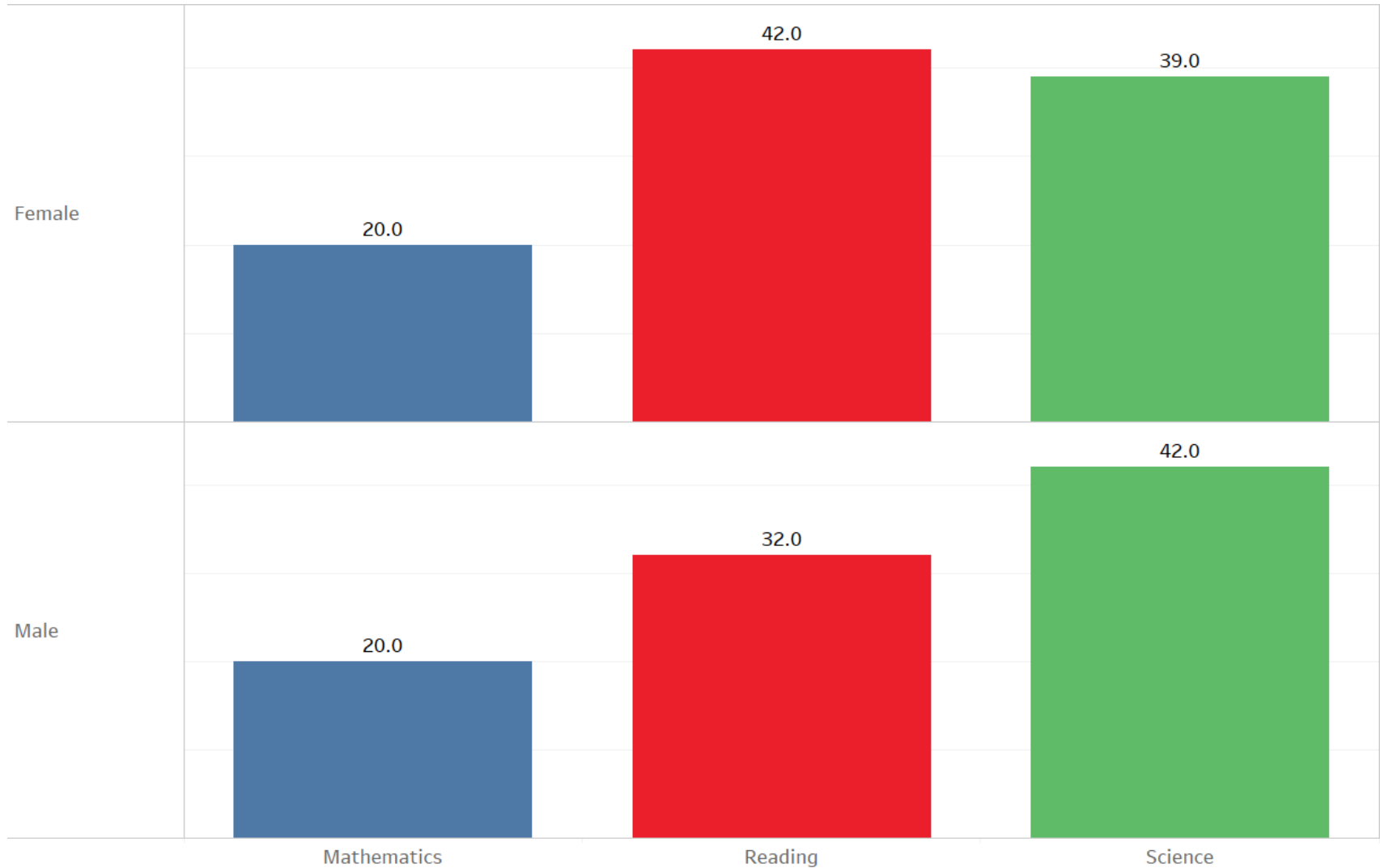
Source & Notes: NM PED ACC_Webfiles_2017_Proficiencies_All_ByStateByDistrictBySchool. Data includes 1) SBA Spanish Reading; 2) SBA Science; 3) NMAPA Science, Math, and Reading; 4) PARCC ELA and Math; and 5) IStation Reading. Data is not shown for groups with fewer than 10 students.

The Percentage Of New Mexico Public School Students Who Are Proficient And Above In Mathematics, Reading, and Science By Race/Ethnicity



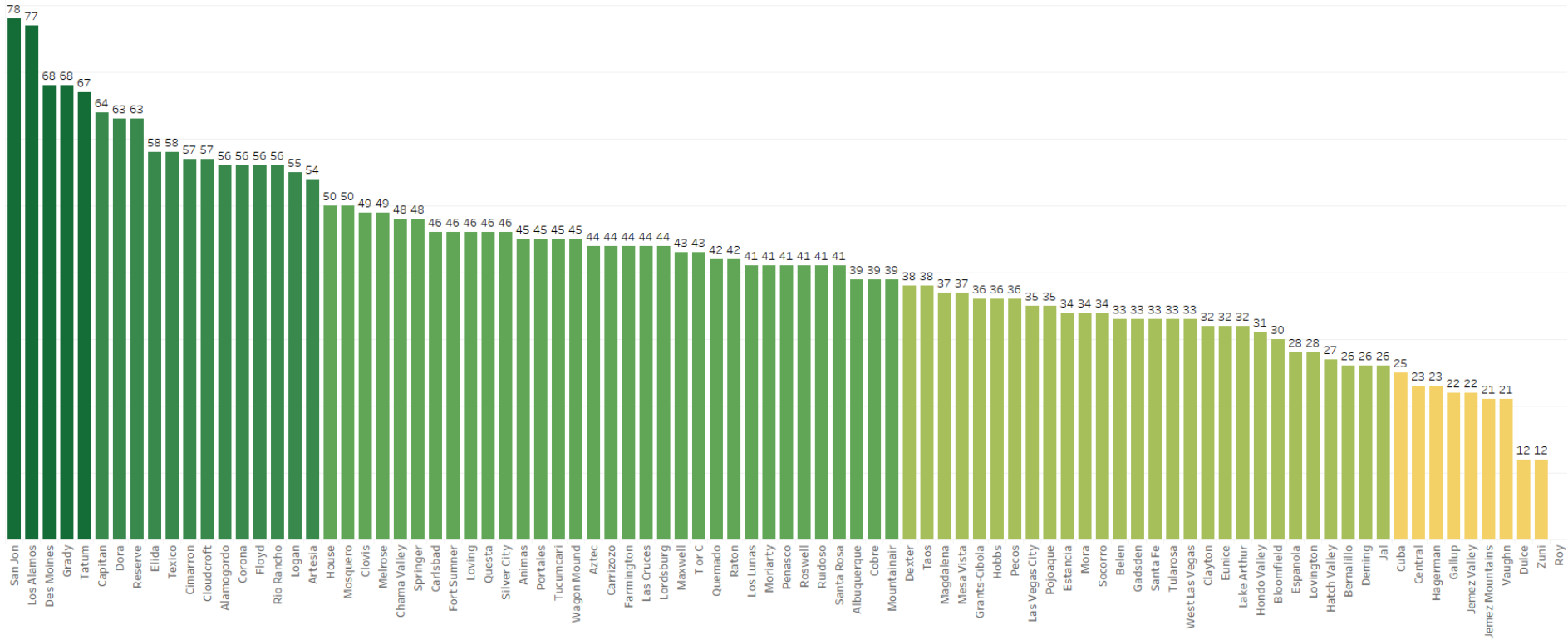
Source & Notes: NM PED ACC_Webfiles_2017_Proficiencies_All_ByStateByDistrictBySchool. Data includes 1) SBA Spanish Reading; 2) SBA Science; 3) NMAPA Science, Math, and Reading; 4) PARCC ELA and Math; and 5) IStation Reading. Data is not shown for groups with fewer than 10 students.

The Percentage Of New Mexico Public School Students Who Are Proficient And Above In Mathematics, Reading, and Science By Gender



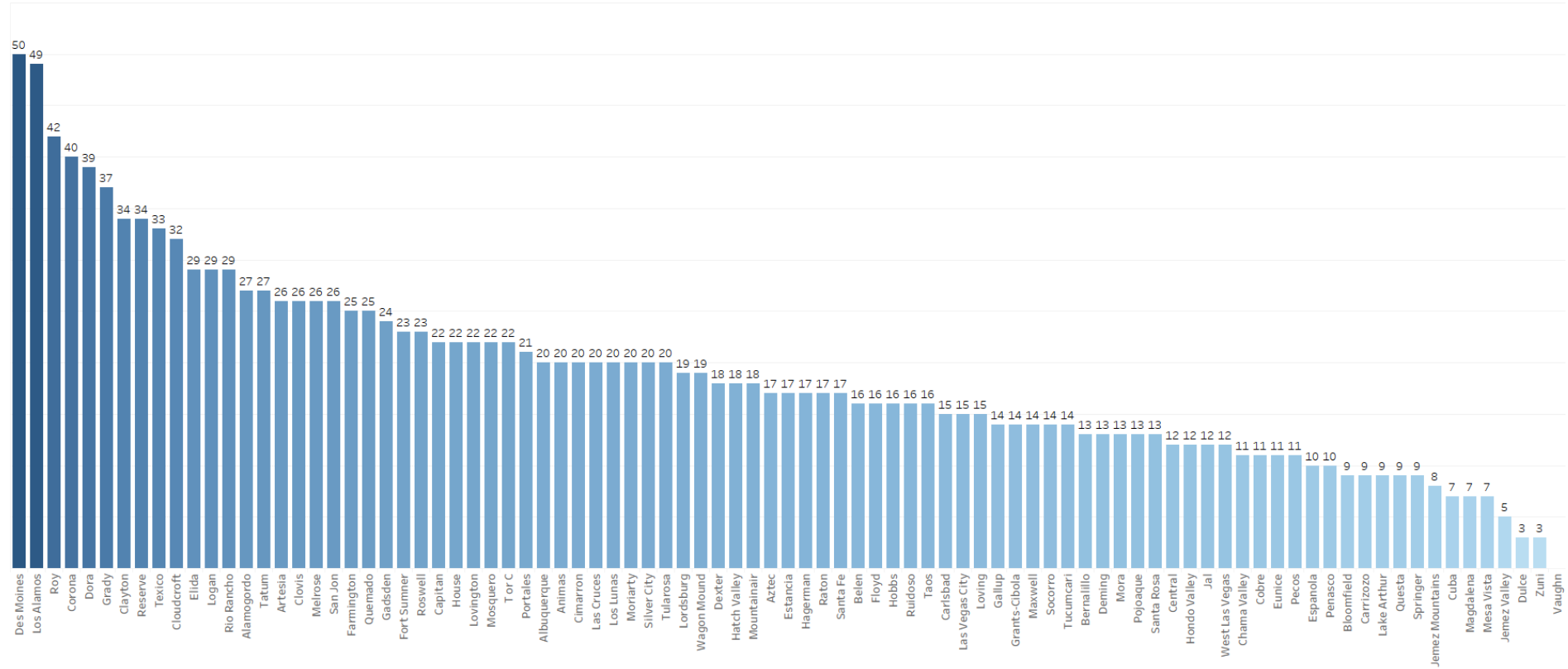
Source & Notes: NM PED ACC_Webfiles_2017_Proficiencies_All_ByStateByDistrictBySchool. Data includes 1) SBA Spanish Reading; 2) SBA Science; 3) NMAPA Science, Math, and Reading; 4) PARCC ELA and Math; and 5) IStation Reading. Data is not shown for groups with fewer than 10 students.

The Percent Of Students Proficient And Above In Science By District Varies By Ethnicity And Location



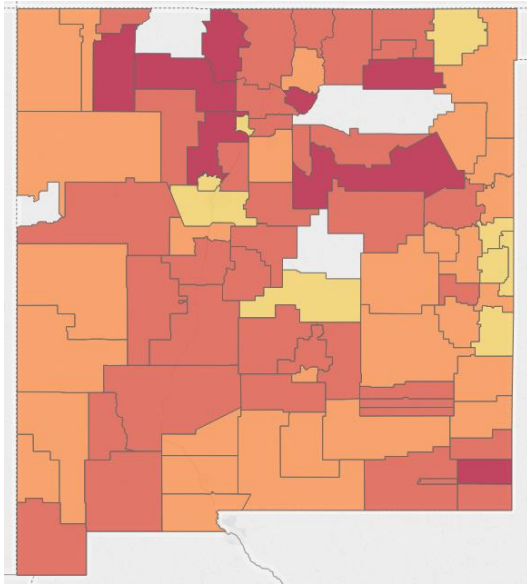
Source & Notes: NM PED ACC_Webfiles_2017_Proficiencias_All_ByStateByDistrictBySchool. Data includes 1) SBA Spanish Reading; 2) SBA Science; 3) NMAPA Science, Math, and Reading; 4) PARCC ELA and Math; and 5) IStation Reading. Data is not shown for groups with fewer than 10 students.

The Percent Of Students Proficient And Above In Math By District Varies By Ethnicity And Location

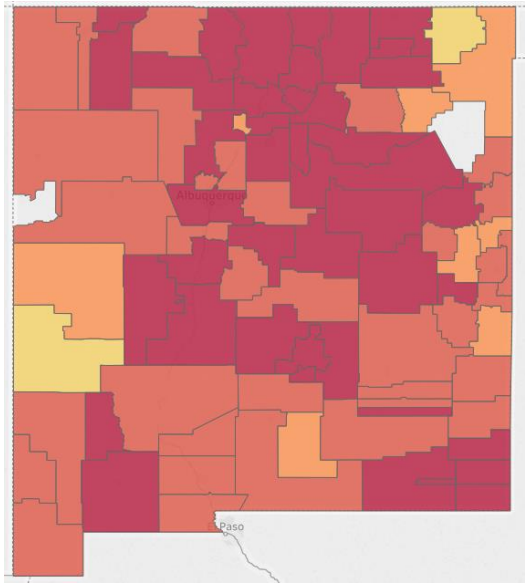


Source & Notes: NM PED ACC_Webfiles_2017_Proficiencias_All_ByStateByDistrictBySchool. Data includes 1) SBA Spanish Reading; 2) SBA Science; 3) NMAPA Science, Math, and Reading; 4) PARCC ELA and Math; and 5) IStation Reading. Data is not shown for groups with fewer than 10 students.

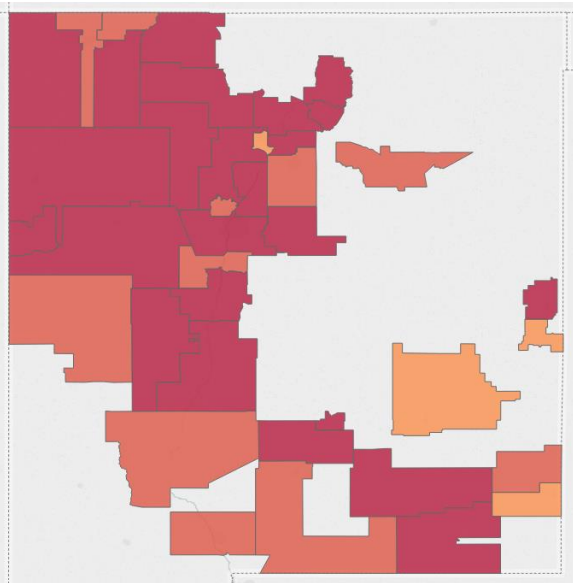
Percent Of Students Proficient Or Above In Math, by Ethnic Group



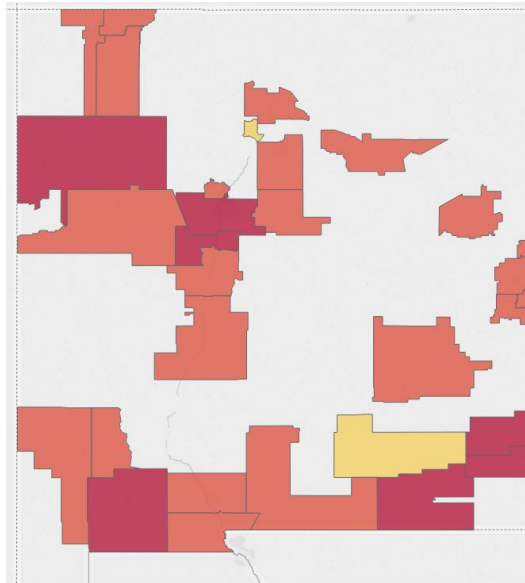
Caucasian



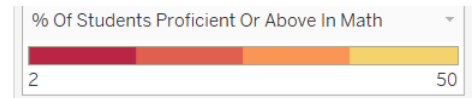
Hispanic



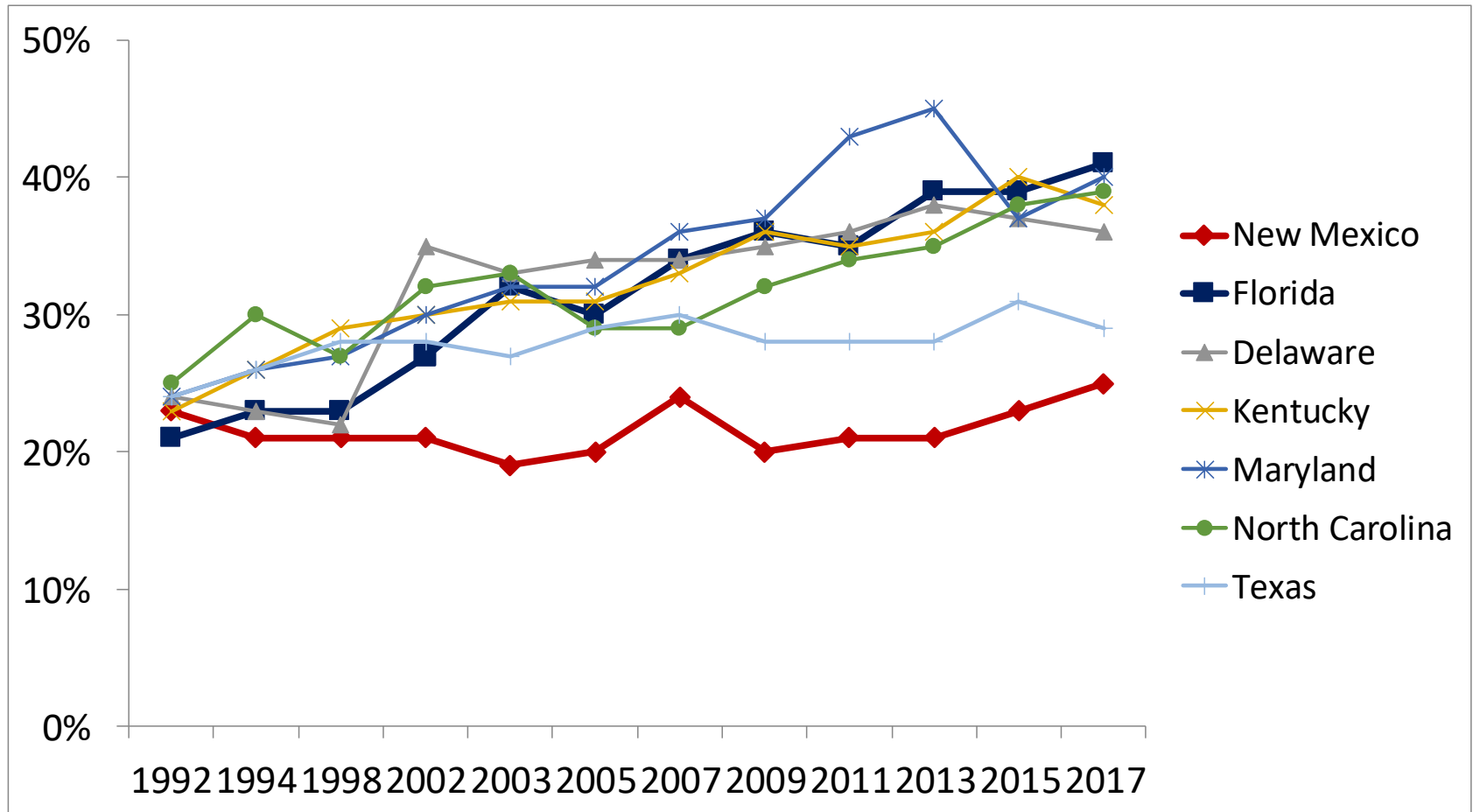
Native American



African American

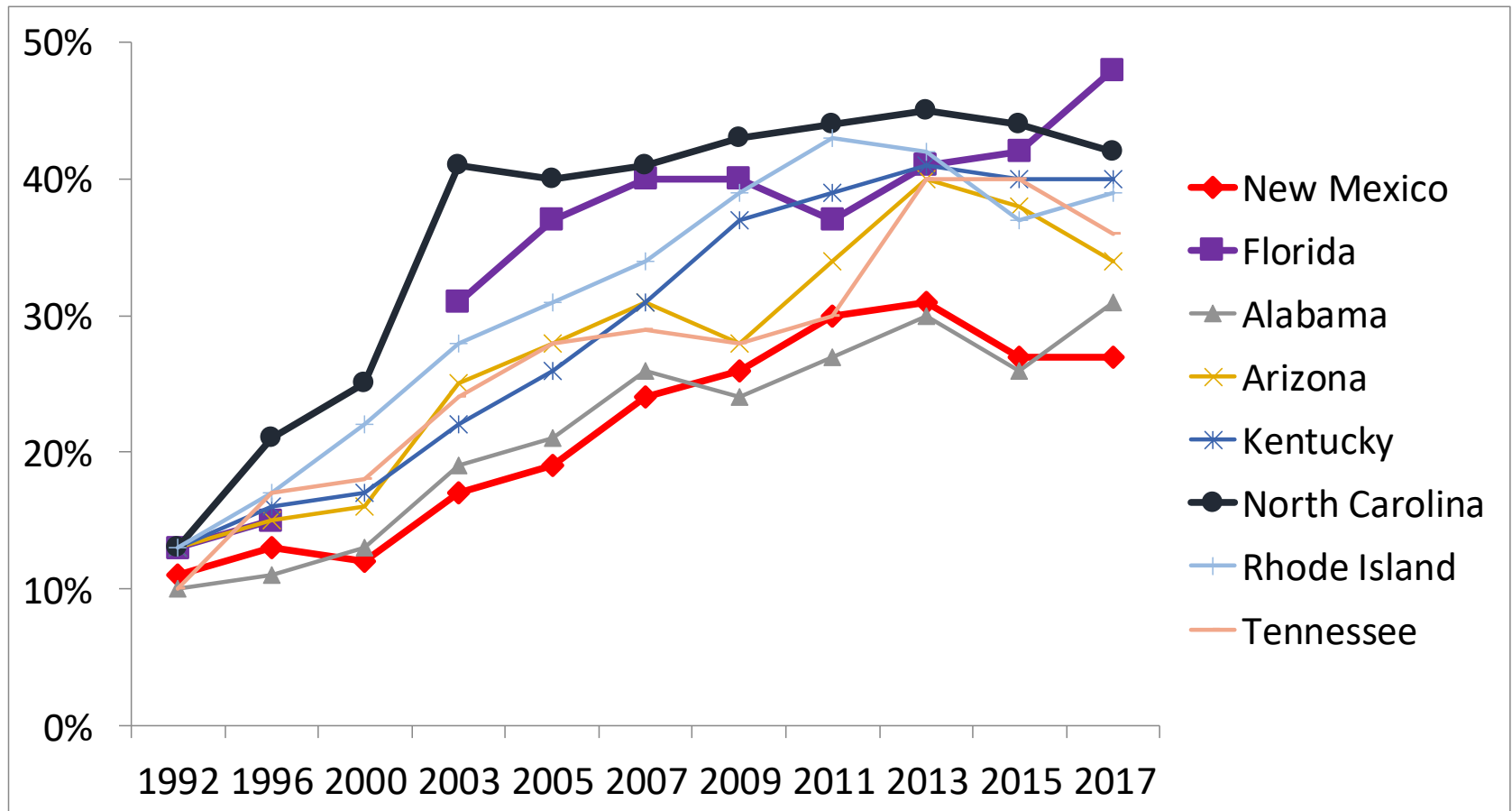


If Other States Can Improve Their 4th Graders Performance In Reading, Why Do We Still Lag Behind?



Source: Beata Thorstensen's Analysis Of Student Achievement Comparisons
 NAEP Grade 4 Reading Students At or Above Proficiency: Selected States That Were Within Two Points of NM in 1992 and Where They Are Now + Florida

New Mexico' 4th Graders Have Improved In Mathematics. Can We Do The Same In Science?



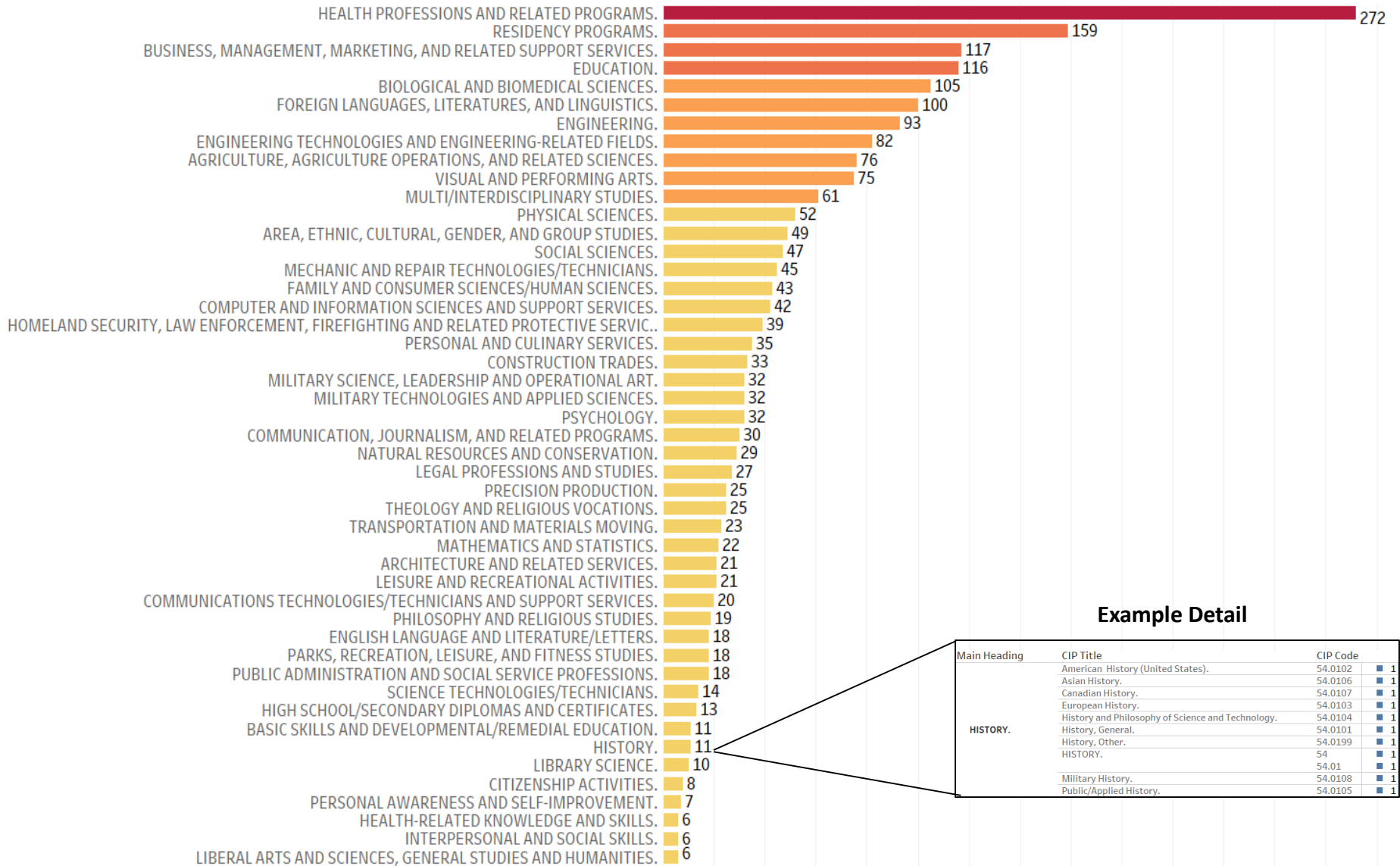
Source: Beata Thorstensen's Analysis Of Student Achievement Comparisons Of NAEP Grade 4 Math Students At or Above Proficiency: Selected States That Were Within Two Points of NM in 1992 and Where They Are Now. Florida Data Were Unavailable For Year 2000

Key Take Aways

New Mexico's K-12 Education System Is Failing To Ensure That All Of Our Children Reach High Levels Of Proficiency In Reading, Mathematics And Science. The Disparities Are Particularly Brutal For Minority Children And Those Living In Rural Areas. Other States Have Proved That Improvements Can Be Made. New Mexico Has The Opportunity To Implement The New Science Standards And Improve Science In The Same Way It Improved Mathematics.

The Higher Education STEM-H Ecosystem

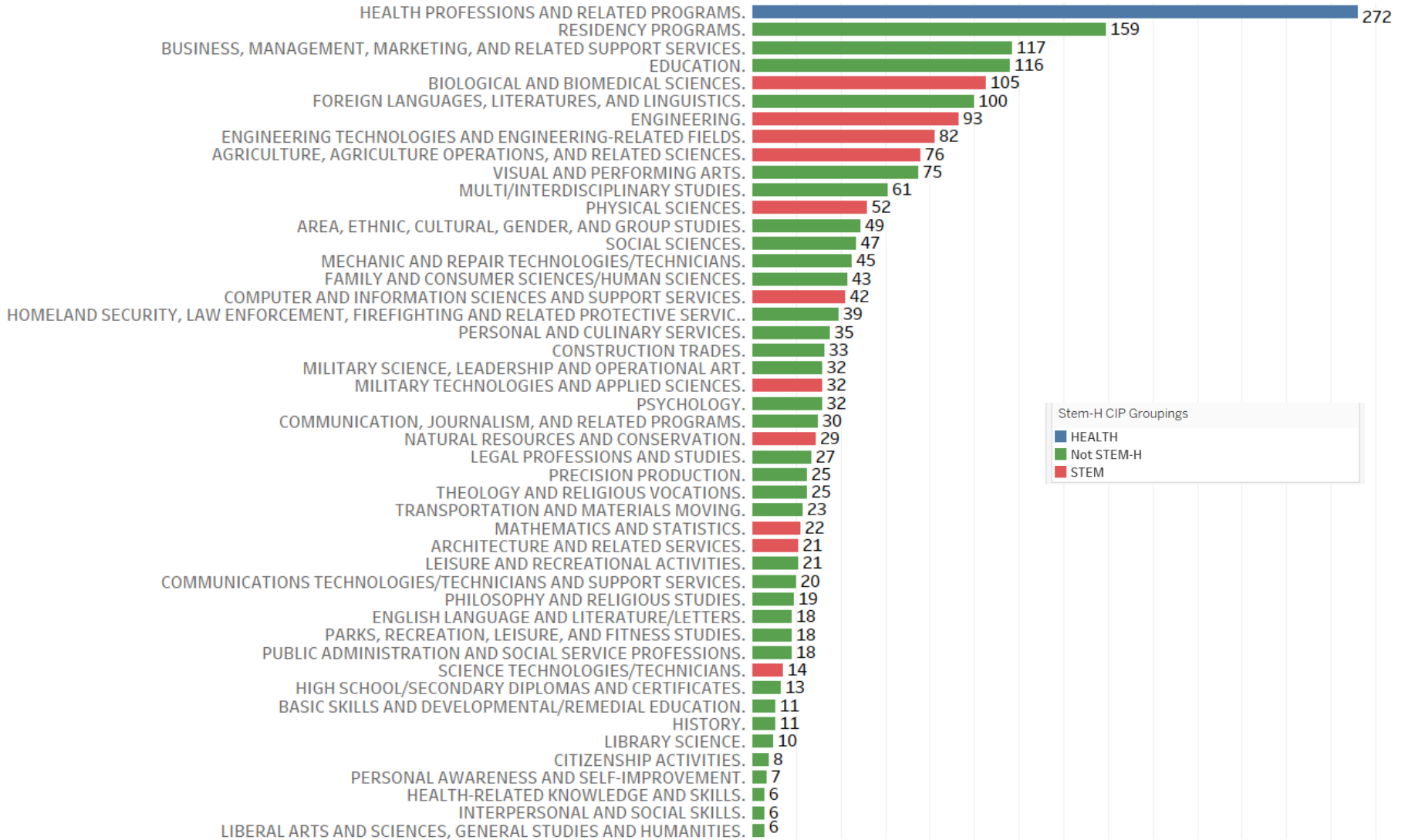
CIP Instructional Main Headings By Number Of CIP Titles



Example Detail

Main Heading	CIP Title	CIP Code	
HISTORY.	American History (United States).	54.0102	1
	Asian History.	54.0106	1
	Canadian History.	54.0107	1
	European History.	54.0103	1
	History and Philosophy of Science and Technology.	54.0104	1
	History, General.	54.0101	1
	History, Other.	54.0199	1
	HISTORY.	54	1
		54.01	1
	Military History.	54.0108	1
	Public/Applied History.	54.0105	1

CIP Instructional Main Headings By Number Of CIP Titles By STEM-H Classification

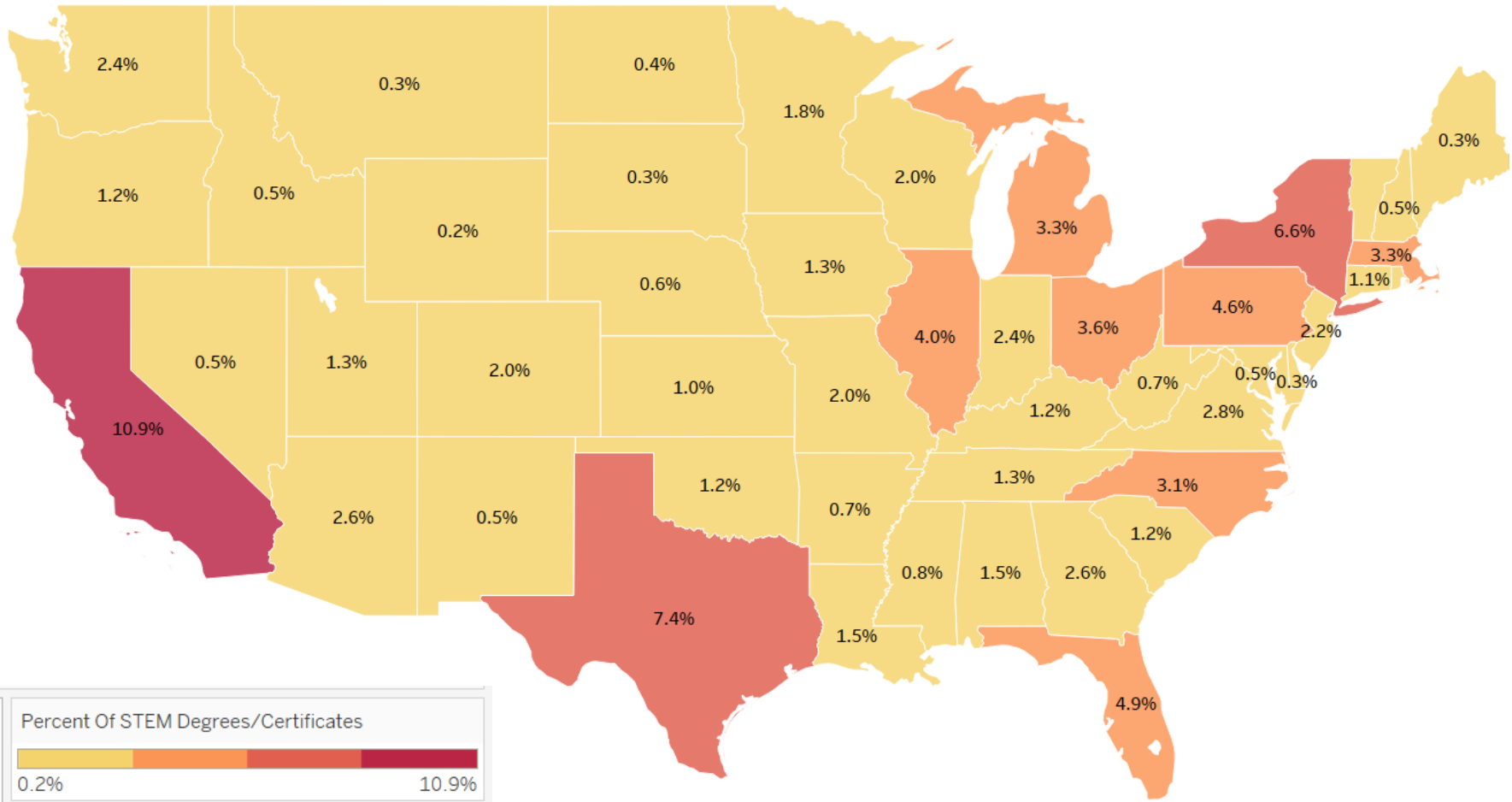


	Appliance Installation and Repair Technology/Technician.	47.0106
	Autobody/Collision and Repair Technology/Technician.	47.0603
	Automobile/Automotive Mechanics Technology/Technician.	47.0604
	Communications Systems Installation and Repair Technology.	47.0103
	Computer Installation and Repair Technology/Technician.	47.0104
	Electrical/Electronics Equipment Installation and Repair, General.	47.0101
	Electrical/Electronics Maintenance and Repair Technology, Other.	47.0199
MECHANIC AND REPAIR TECHNOLOGIES/TECHNICIANS.	Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/T..	47.0201
	Heavy Equipment Maintenance Technology/Technician.	47.0302
	Heavy/Industrial Equipment Maintenance Technologies, Other.	47.0399
	Heavy/Industrial Equipment Maintenance Technologies.	47.03
	Industrial Electronics Technology/Technician.	47.0105
	Industrial Mechanics and Maintenance Technology.	47.0303
	Precision Systems Maintenance and Repair Technologies, Other.	47.0499
	Security System Installation, Repair, and Inspection Technology/Technician.	47.011
	Vehicle Maintenance and Repair Technologies.	47.06
		30.01
	Biological and Physical Sciences.	30.0101
	Biopsychology.	30.1001
	Human Biology.	30.27
		30.2701
	Human Computer Interaction.	30.3101
	Marine Sciences.	30.32
MULTI/INTERDISCIPLINARY STUDIES.		30.3201
	Natural Sciences.	30.18
		30.1801
	Nutrition Sciences.	30.19
		30.1901
	Science, Technology and Society.	30.15
		30.1501
	Sustainability Studies.	30.33
		30.3301
	Biology Teacher Education.	13.1322
	Chemistry Teacher Education.	13.1323
	Computer Teacher Education.	13.1321
	Earth Science Teacher Education.	13.1337
EDUCATION.	Educational Assessment, Evaluation, and Research, Other.	13.0699
	Health Teacher Education.	13.1307
	Mathematics Teacher Education.	13.1311
	Physics Teacher Education.	13.1329
	Science Teacher Education/General Science Teacher Education.	13.1316
	Technology Teacher Education/Industrial Arts Teacher Education.	13.1309
	Building Construction Technology.	46.0415
CONSTRUCTION TRADES.	Electrical and Power Transmission Installation/Installer, General.	46.0301
	Electrical and Power Transmission Installers, Other.	46.0399
	Electrical and Power Transmission Installers.	46.03
	Electrician.	46.0302
	Lineworker.	46.0303
	Accounting Technology/Technician and Bookkeeping.	52.0302
BUSINESS, MANAGEMENT, MARKETING, AND RELATED SUPPORT SERVICES.	Business Statistics.	52.1302
	E-Commerce/Electronic Commerce.	52.0208
	Management Sciences and Quantitative Methods, Other.	52.1399
	Criminalistics and Criminal Science.	43.0111
HOMELAND SECURITY, LAW ENFORCEMENT, FIREFIGHTING AND RELATED PROTECTIVE SERVICES.	Fire Science/Fire-fighting.	43.0203
	Fire Systems Technology.	43.0204
	Law Enforcement Record-Keeping and Evidence Management.	43.0115
	Precision Production, Other.	48.99
PRECISION PRODUCTION.		48.9999
	Tool and Die Technology/Technician.	48.0507
FAMILY AND CONSUMER SCIENCES/HUMAN SCIENCES.	Human Nutrition.	19.0504
SOCIAL SCIENCES.	Geographic Information Science and Cartography.	45.0702
TRANSPORTATION AND MATERIALS MOVING.	Aeronautics/Aviation/Aerospace Science and Technology, General.	49.0101
VISUAL AND PERFORMING ARTS.	Game and Interactive Media Design.	50.0411

Why Aren't These CIP Codes Considered STEM-H?

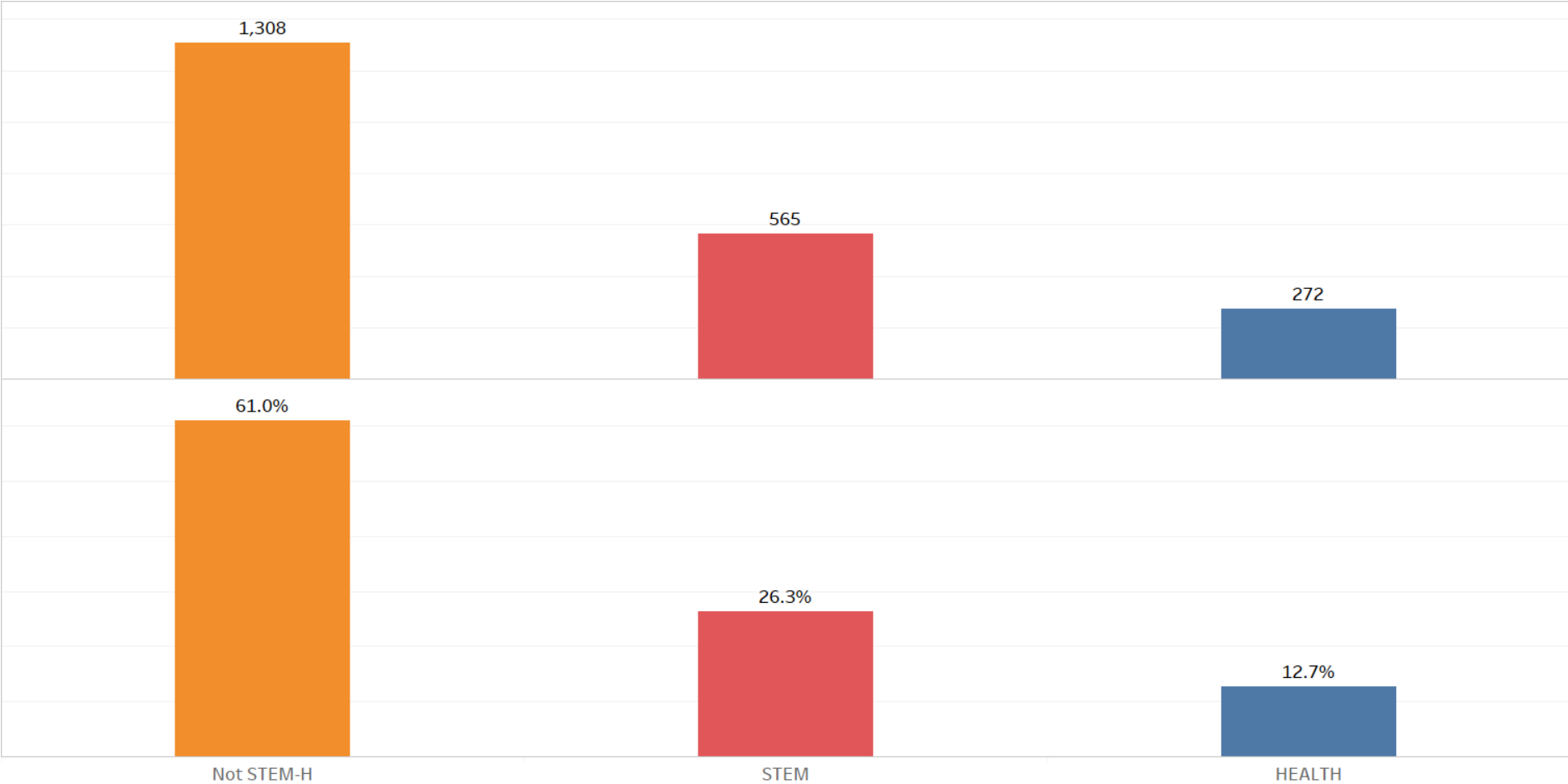
Source: <https://nces.ed.gov/ipeds/cipcode/resources>.

The Percentage Of The Approximately 741,600 STEM Degrees/Certificates Produced Nationally By State In 2016

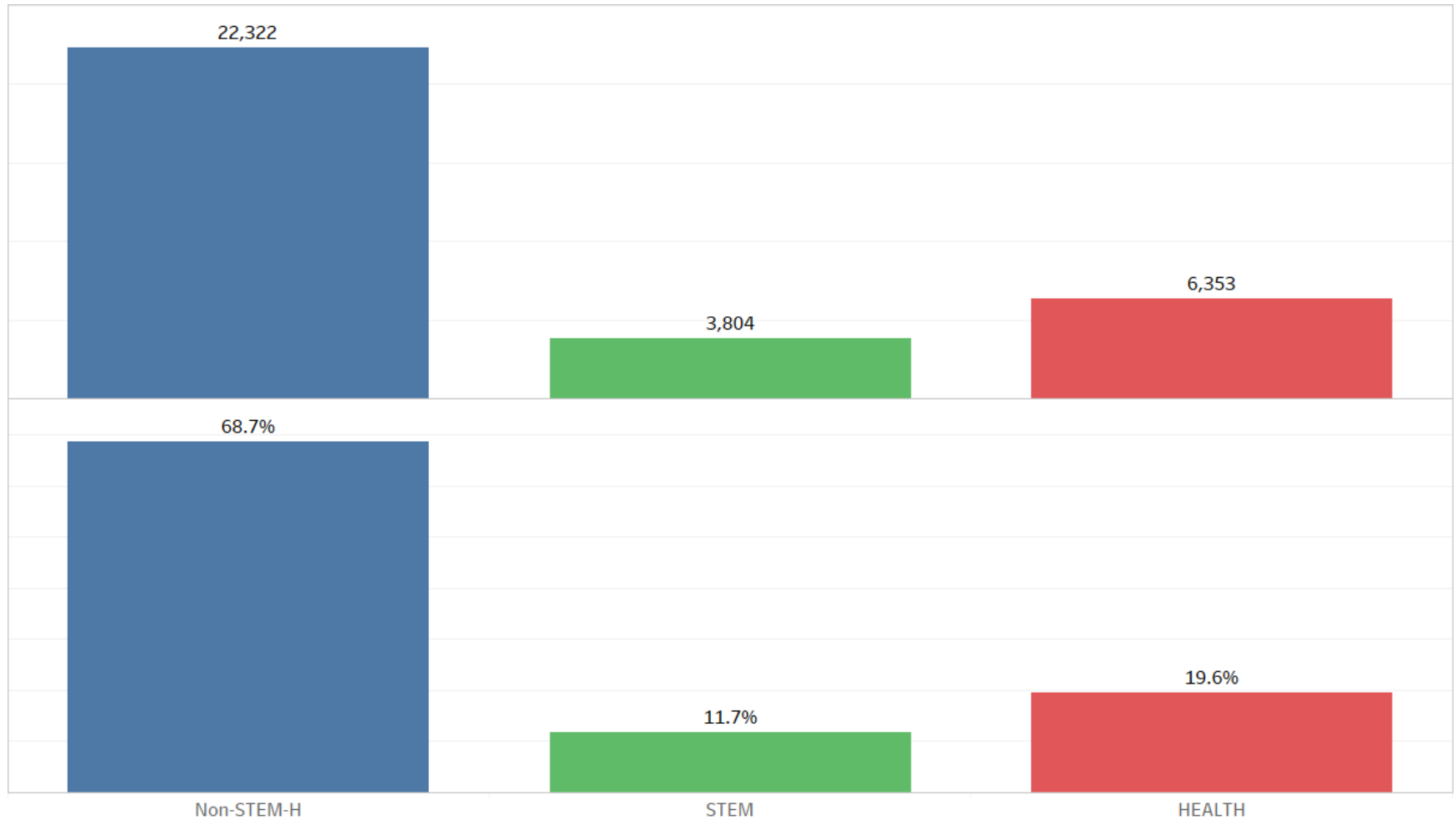


Source: <https://nces.ed.gov/ipeds/cipcode/resources>.

Approximately 39% Of IPEDS 2,100 CIP Titles Are Classified As STEM Or Health By Complete College America



The Number And Percentages Of Degrees/Certificates For All New Mexico Higher Education Institutions Included In IPEDS By STEM Grouping



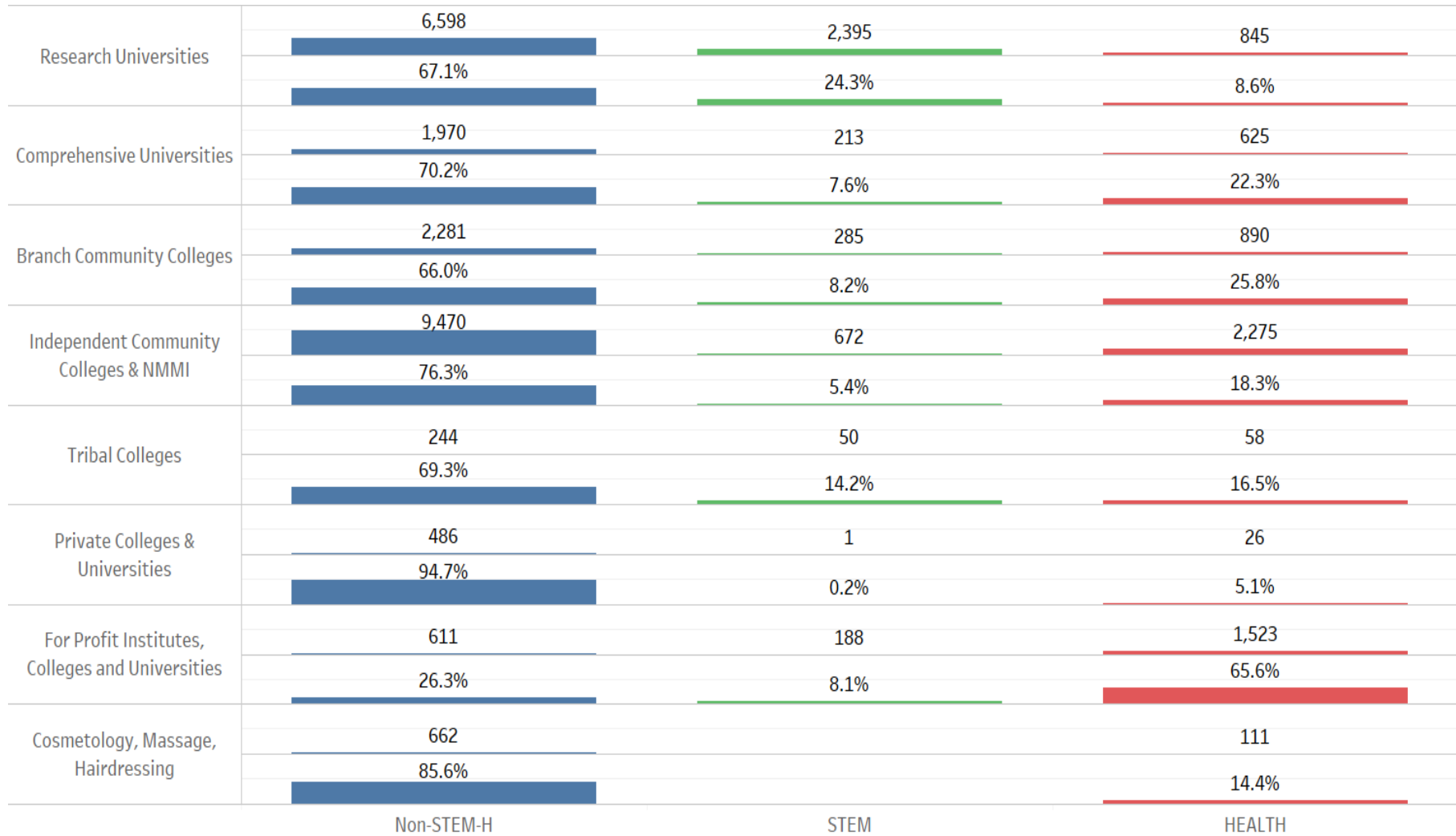
Source: <https://nces.ed.gov/ipeds/cipcode/resources>.

Research Universities	New Mexico Institute of Mining and Technology	363
	New Mexico State University-Main Campus	3,541
	University of New Mexico-Main Campus	5,934
Comprehensive Universities	Eastern New Mexico University-Main Campus	1,036
	New Mexico Highlands University	915
	Northern New Mexico College	217
	Western New Mexico University	640
Branch Community Colleges	Eastern New Mexico University-Roswell Campus	732
	Eastern New Mexico University-Ruidoso Campus	113
	New Mexico State University-Alamogordo	181
	New Mexico State University-Carlsbad	130
	New Mexico State University-Dona Ana	1,506
	New Mexico State University-Grants	97
	University of New Mexico-Gallup Campus	223
	University of New Mexico-Los Alamos Campus	55
	University of New Mexico-Taos Campus	135
	University of New Mexico-Valencia County Campus	284
Independent Community Colleges & NMMI	Central New Mexico Community College	8,052
	Clovis Community College	791
	Luna Community College	179
	Mesalands Community College	231
	New Mexico Junior College	398
	New Mexico Military Institute	112
	San Juan College	1,755
	Santa Fe Community College	899
Tribal Colleges	Institute of American Indian and Alaska Native Culture	49
	Navajo Technical University	216
	Southwestern Indian Polytechnic Institute	87
Private Colleges & Universities	Santa Fe University of Art and Design	116
	Southwest University of Visual Arts-Albuquerque	41
	St. John's College	123
	University of the Southwest	233
For Profit Institutes, Colleges and Universities	Brookline College-Albuquerque	188
	Brown Mackie College-Albuquerque	254
	Carrington College-Albuquerque	381
	ITT Technical Institute-Albuquerque	177
	National American University-Albuquerque	48
	National American University-Albuquerque West	63
	Pima Medical Institute-Albuquerque	600
	Pima Medical Institute-Albuquerque West	96
	Southwest Acupuncture College-Albuquerque	18
	Southwest Acupuncture College-Santa Fe	16
	Southwestern College	56
University of Phoenix-New Mexico	425	
Cosmetology, Massage, Hairdressing	Aveda Institute-New Mexico	113
	De Wolff College Hair Styling and Cosmetology	30
	Massage Therapy Training Institute	57
	Olympian Academy of Cosmetology	417
	Toni & Guy Hairdressing Academy-Albuquerque	59
	Universal Therapeutic Massage Institute	54
	Vogue College of Cosmetology-Santa Fe	43

**The New Mexico
Higher Education
Institutions Included
In The
2015-2016 IPEDS
Provisional
Database**

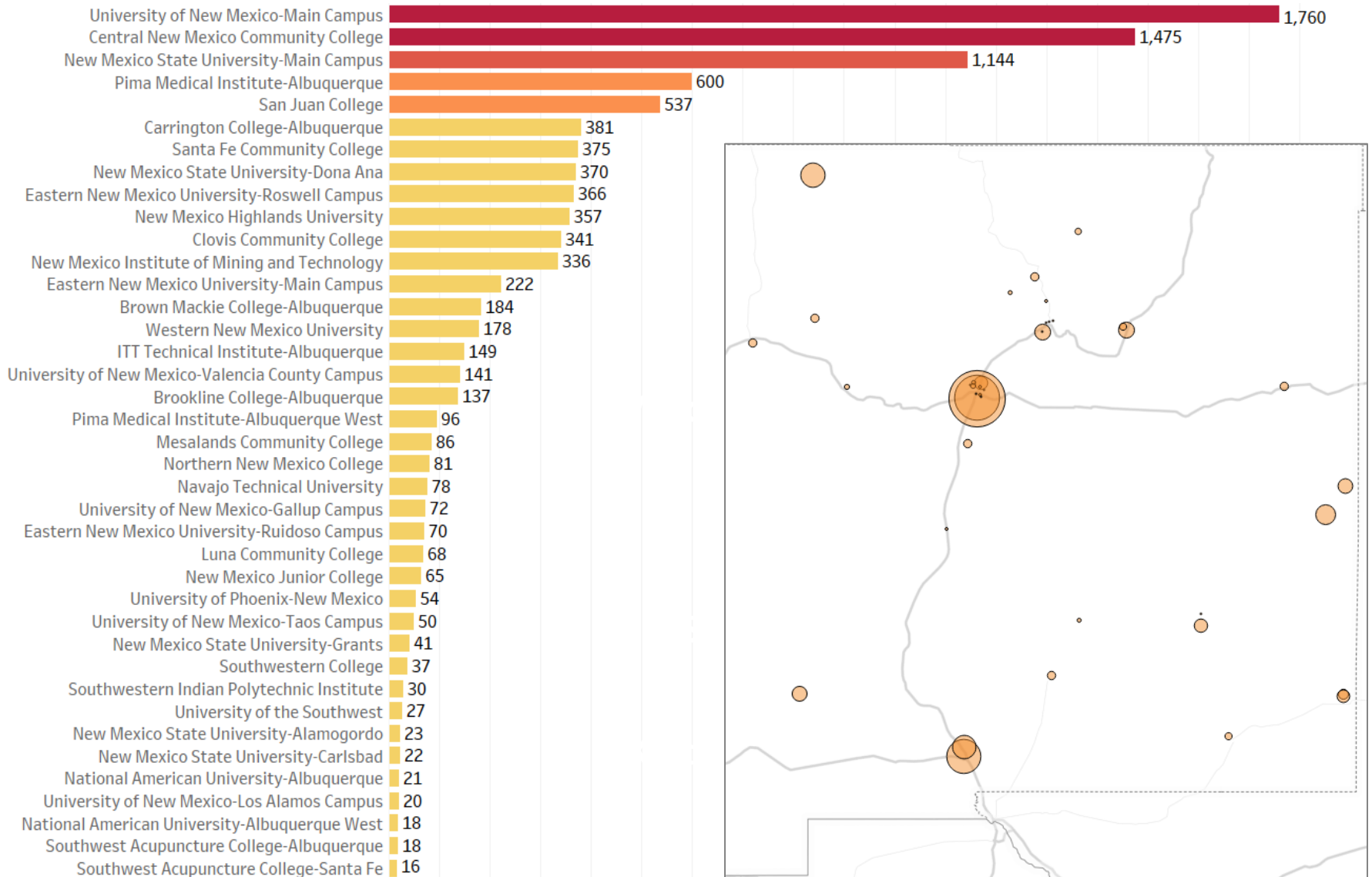
Source: <https://nces.ed.gov/ipeds/cipcode/resources>.

The Number And Percentages Of Degrees/Certificates For All New Mexico Higher Education Institutions Included In IPEDS By College And STEM Grouping



Source: <https://nces.ed.gov/ipeds/cipcode/resources>.

Number Of STEM-H Degrees/Certificates By New Mexico Higher Education Institutions



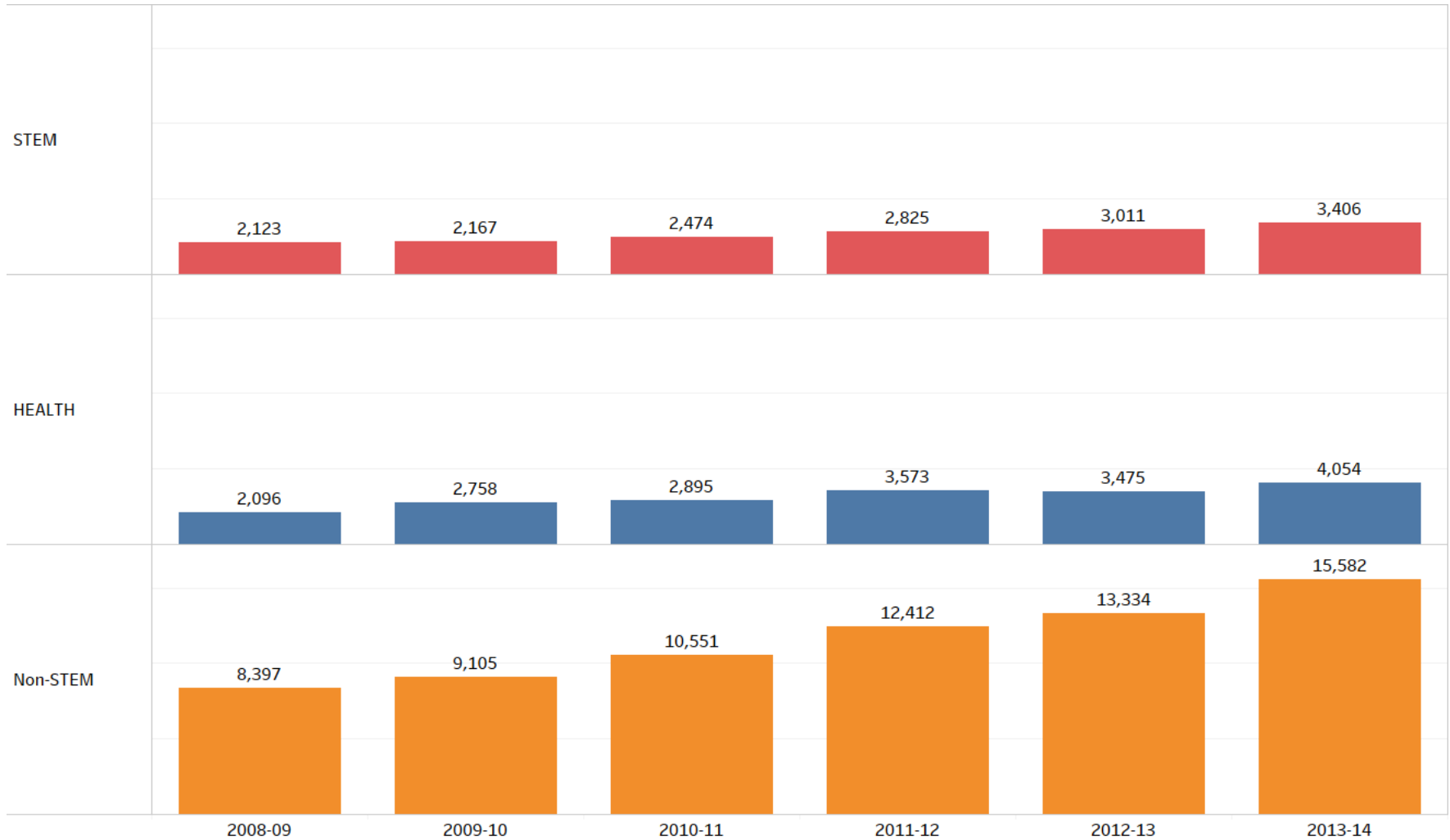
Source: <https://nces.ed.gov/ipeds/cipcode/resources>.

Key Take Aways

Higher Education Thinks About STEM-H Using CIP Categories. This Is A Good Start But We Can Think More Creatively And Precisely About How STEM-H Degrees And Certificates Can Be Supported In New Mexico. It Is Also Clear That Health Is A Major Segment Of The New Mexico Ecosystem.

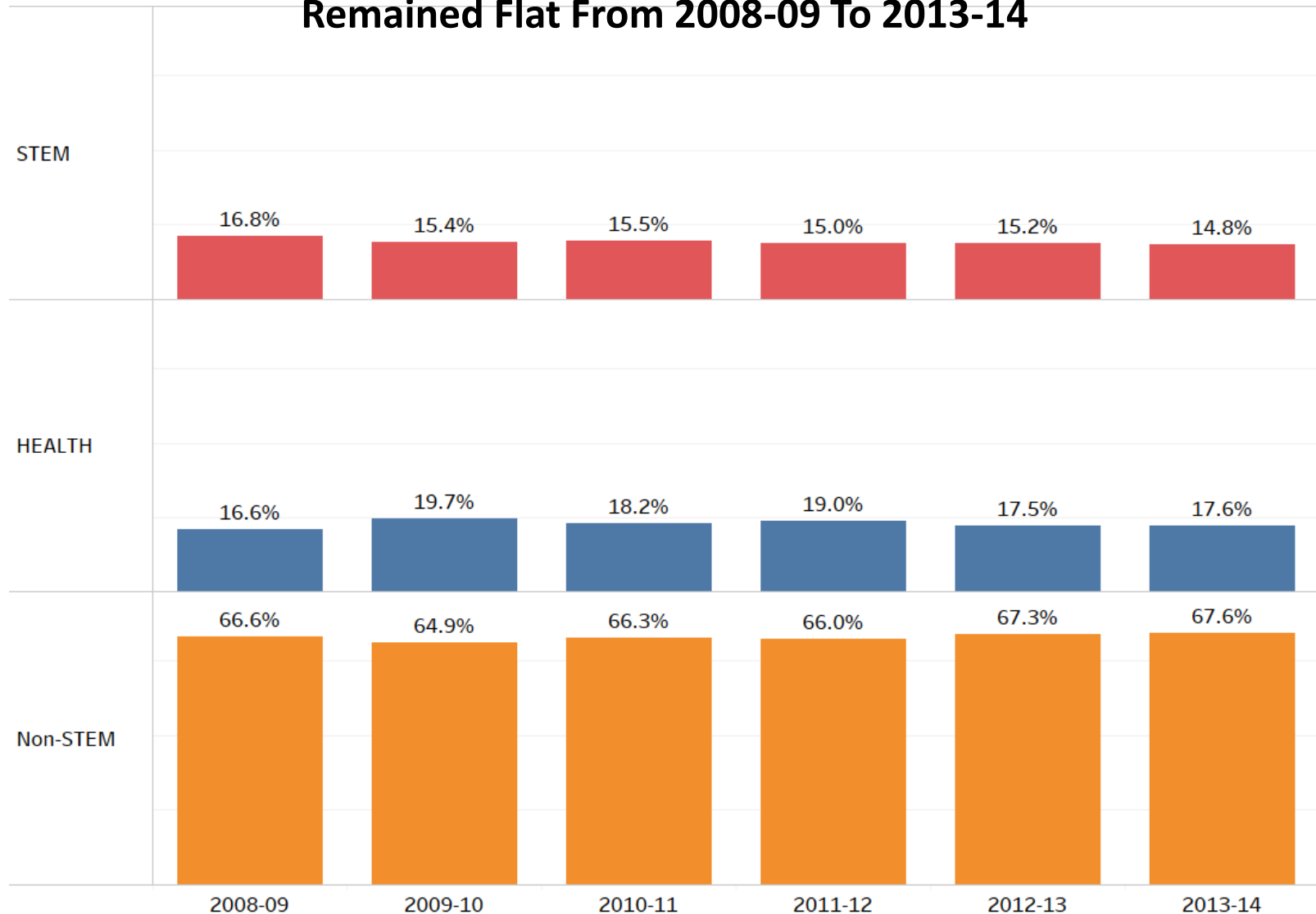
New Mexico's STEM-H Pipeline

The Number Of STEM-H Degrees/Certificates Produced By New Mexico Public Higher Education Institutions Has Increased From 2008-09 To 2013-14



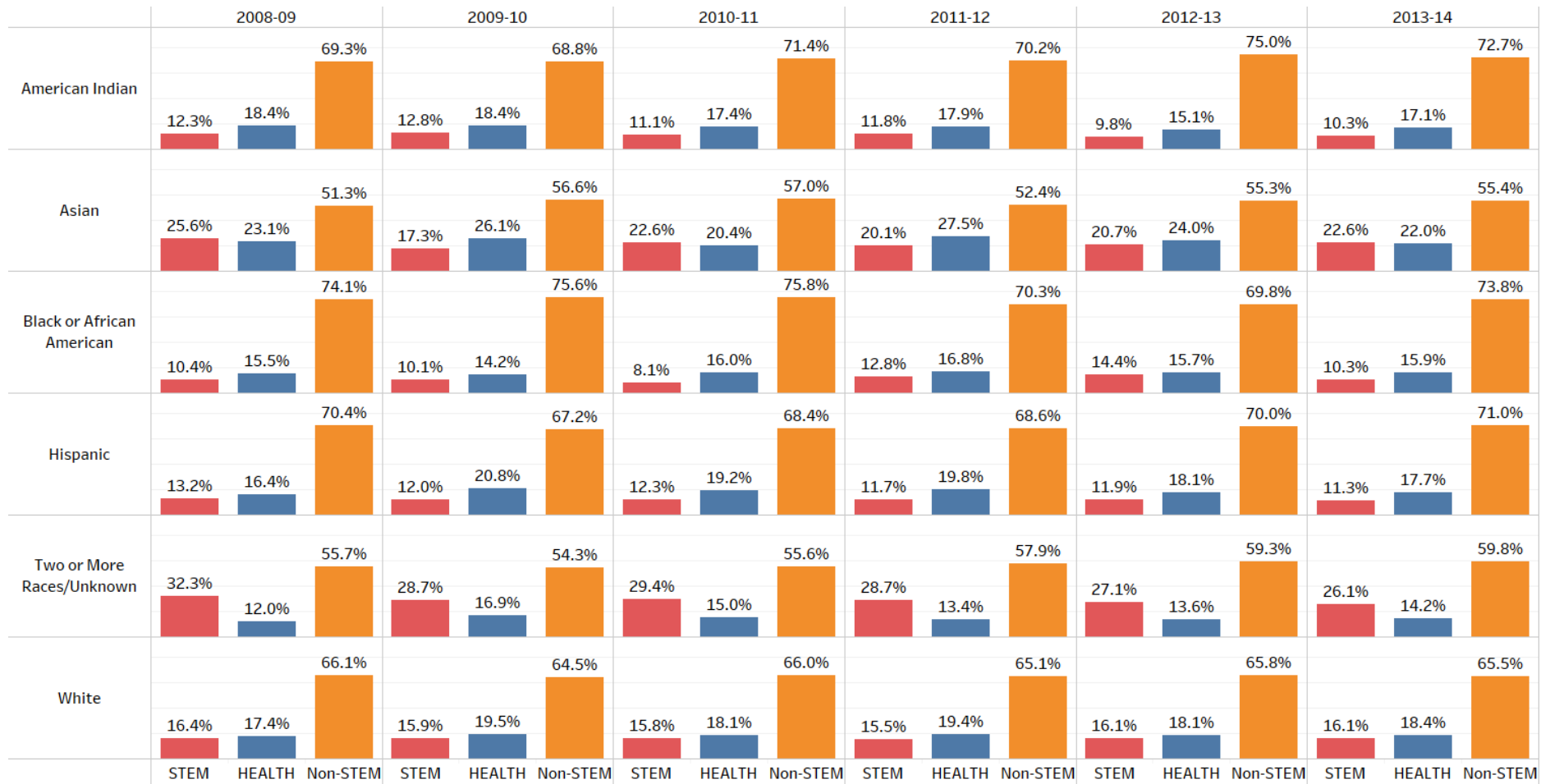
Source: New Mexico STEM Pipeline Data Set developed by the LFC, HED and WSD, 2016.

But The Percentage Of STEM And Health Degrees/Certificates Of All Awards Produced By New Mexico Public Higher Education Institutions Has Declined Or Remained Flat From 2008-09 To 2013-14



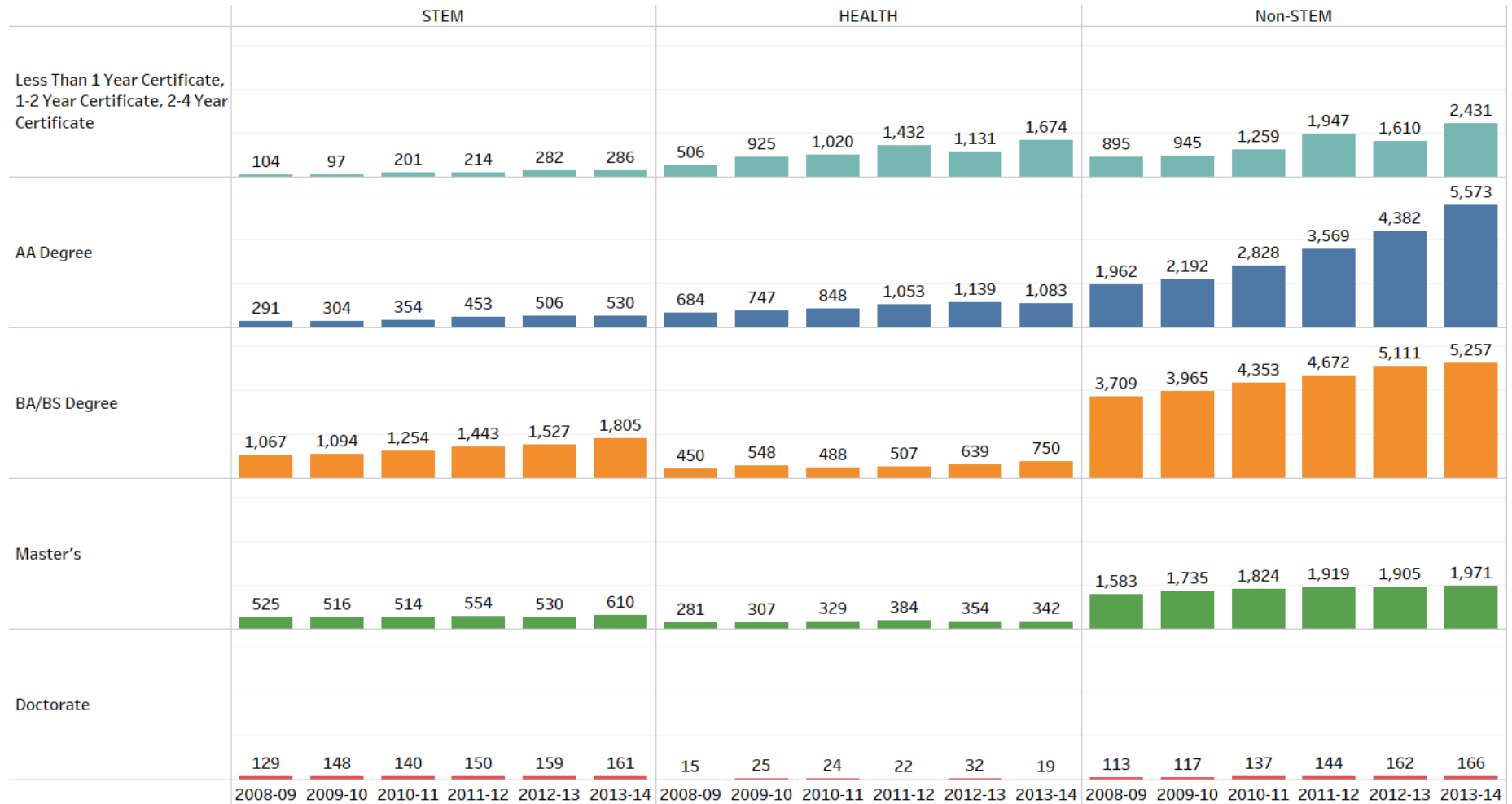
Source: New Mexico STEM Pipeline Data Set developed by the LFC, HED and WSD, 2016.

The Percentage Of Degrees/Certificates By STEM Grouping By Ethnicity Has Remained Flat From 2008-09 To 2013-14



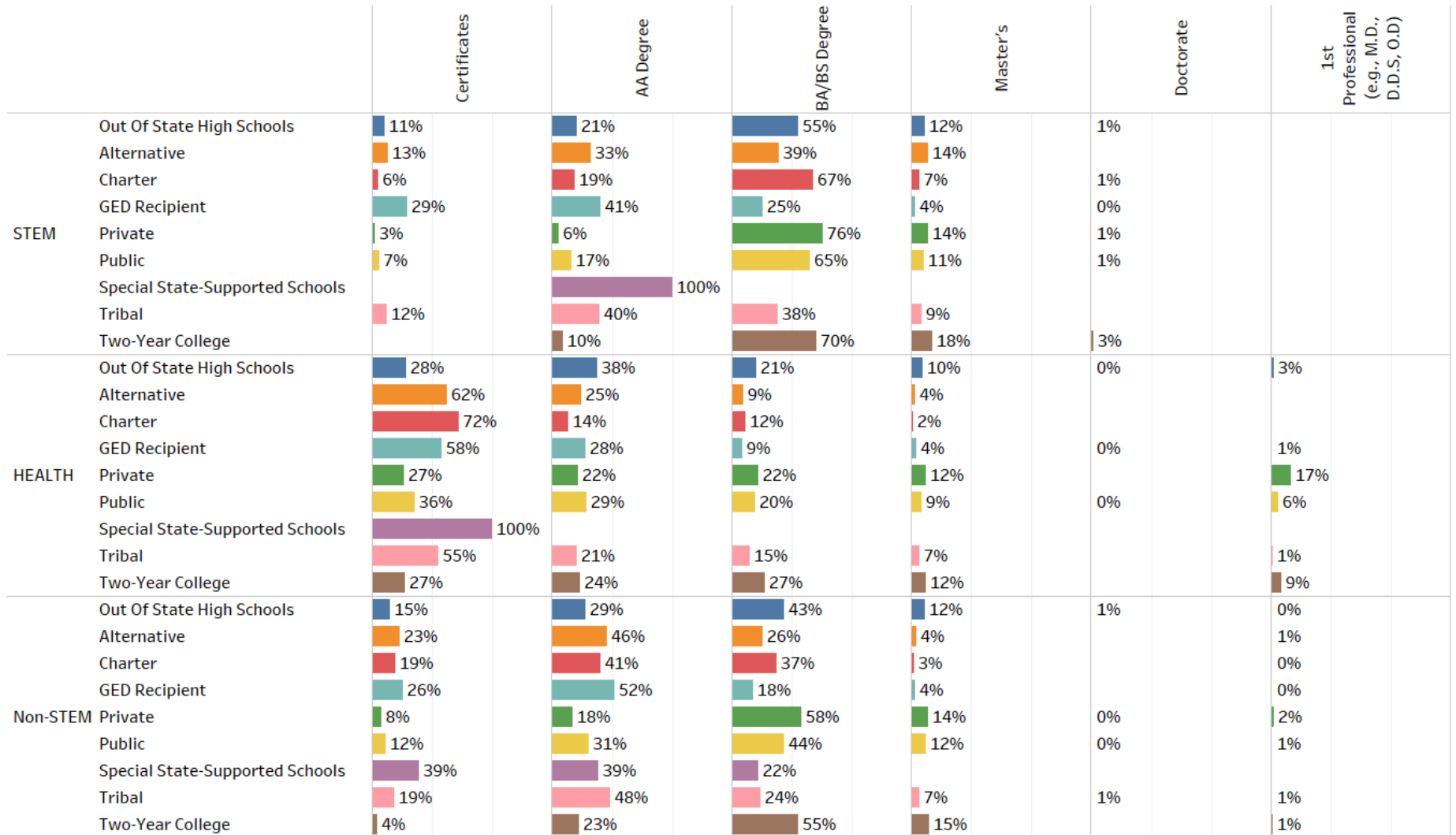
Source: New Mexico STEM Pipeline Data Set developed by the LFC, HED and WSD, 2016.

The Number Of Degrees/Certificates By Award Level And By STEM Grouping From 2008-09 To 2013-14



Source: New Mexico STEM Pipeline Data Set developed by the LFC, HED and WSD, 2016.

The Percentage Of Degrees/Certificates By Award Level, STEM Grouping And Type Of High School



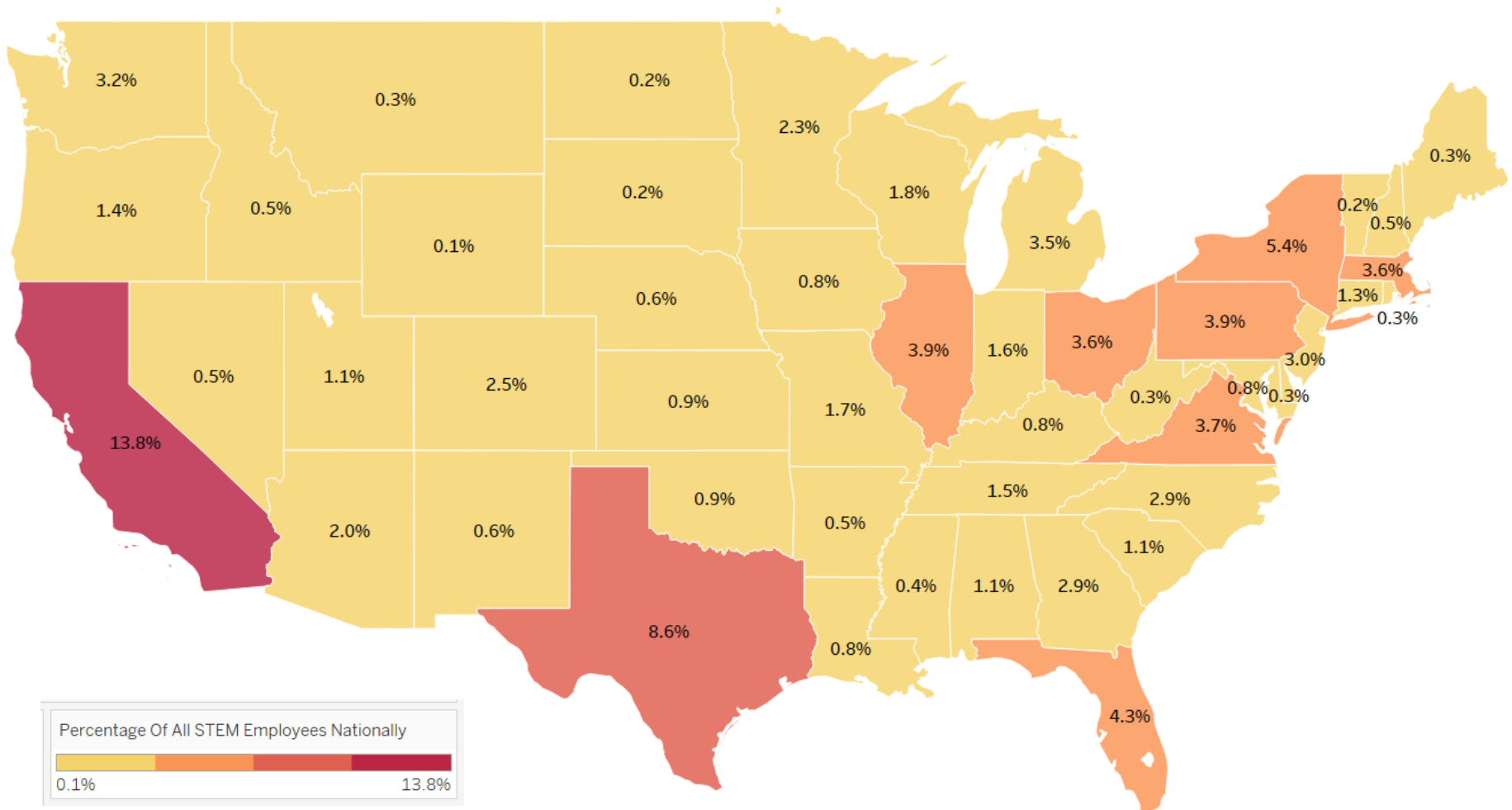
Source: New Mexico STEM Pipeline Data Set developed by the LFC, HED and WSD, 2016.

Key Take Aways

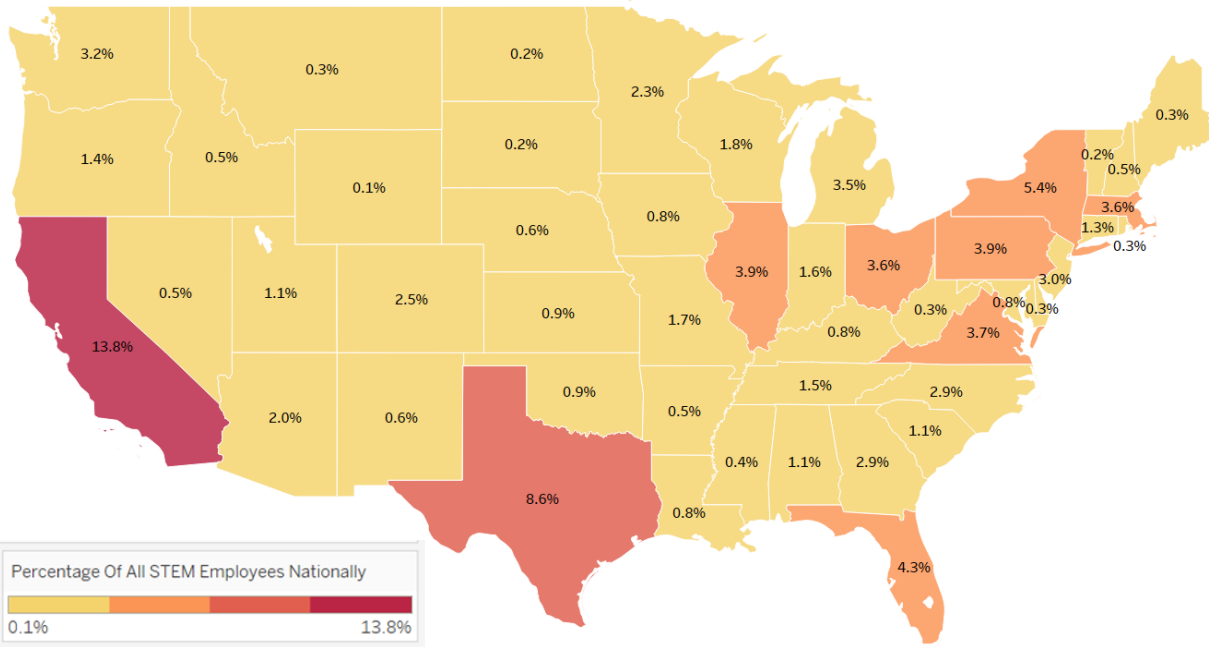
Although The Number Of STEM-H Degrees And Certificates Increased Between 2008 and 2014, The Percentage Of STEM-H Degrees And Certificates As Part Of All Degrees And Certificates Has Declined. The Data Indicate That New Mexico's Efforts To Increase STEM-H Training In Higher Education Need To Be Strengthened.

New Mexico STEM-H Workforce Ecosystem

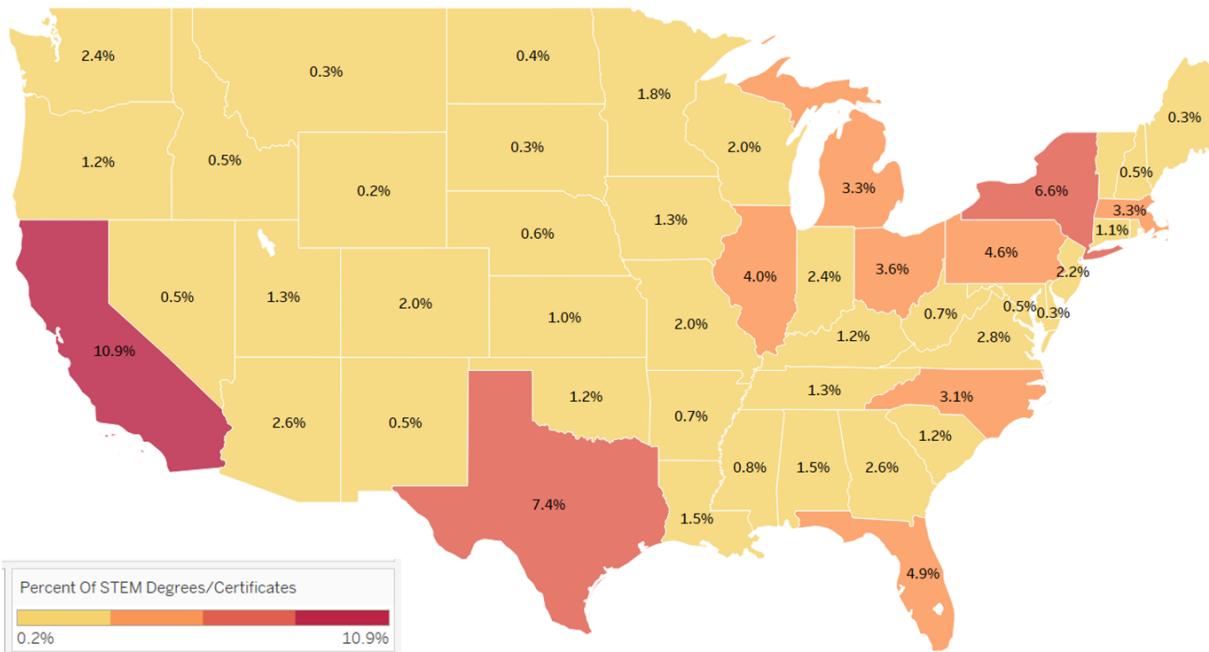
The Percentage Of The Approximately 877,000 STEM Employees By State In 2016



Source: U.S. Bureau of Labor Statistics. <https://www.bls.gov/oes/additional.htm>.

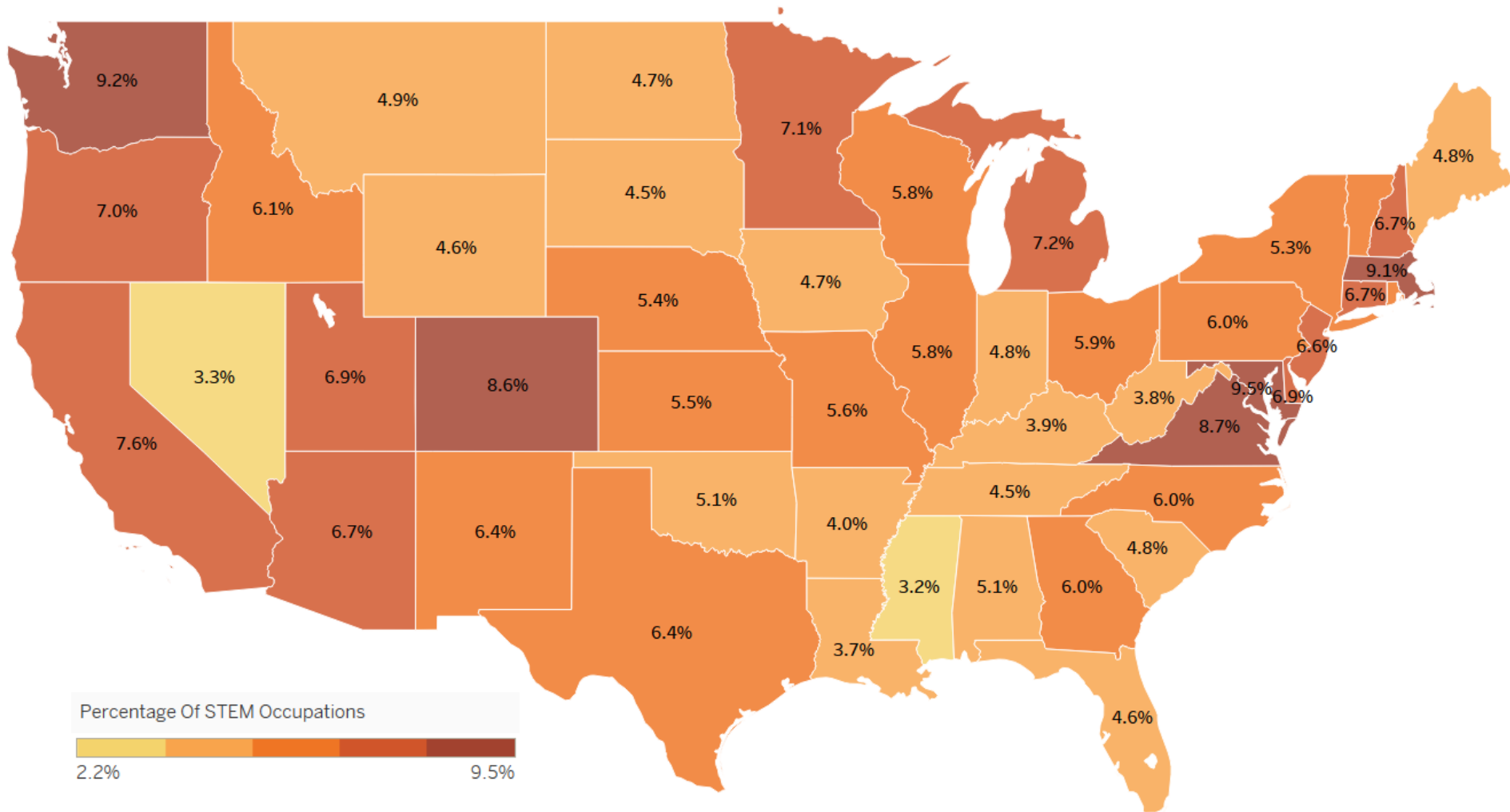


**The Percentage of STEM
Employed By State**



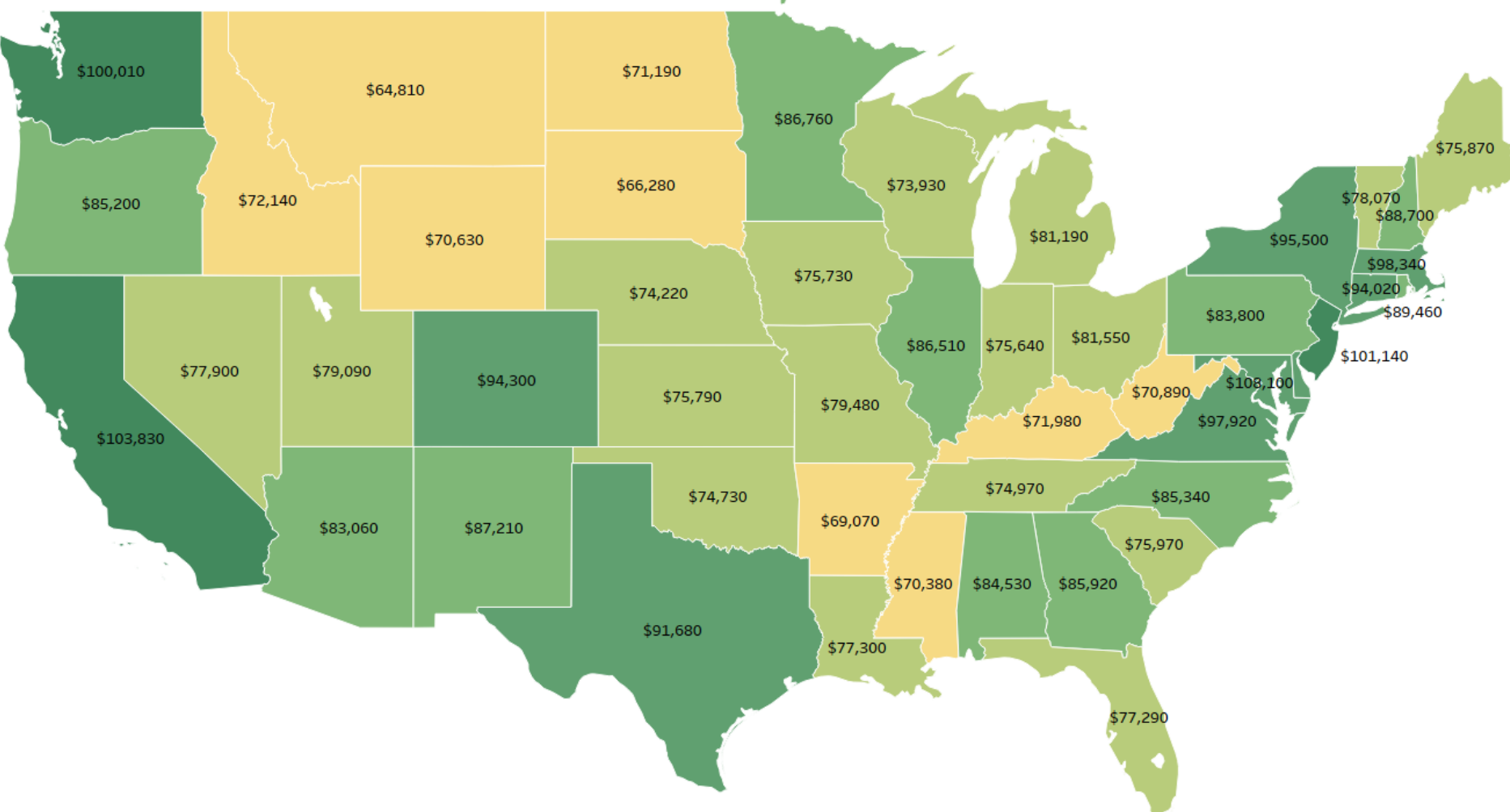
**The Percentage of STEM
Degrees/Certificates
Produced By State**

Percent Of STEM Occupations Within Each State In 2016



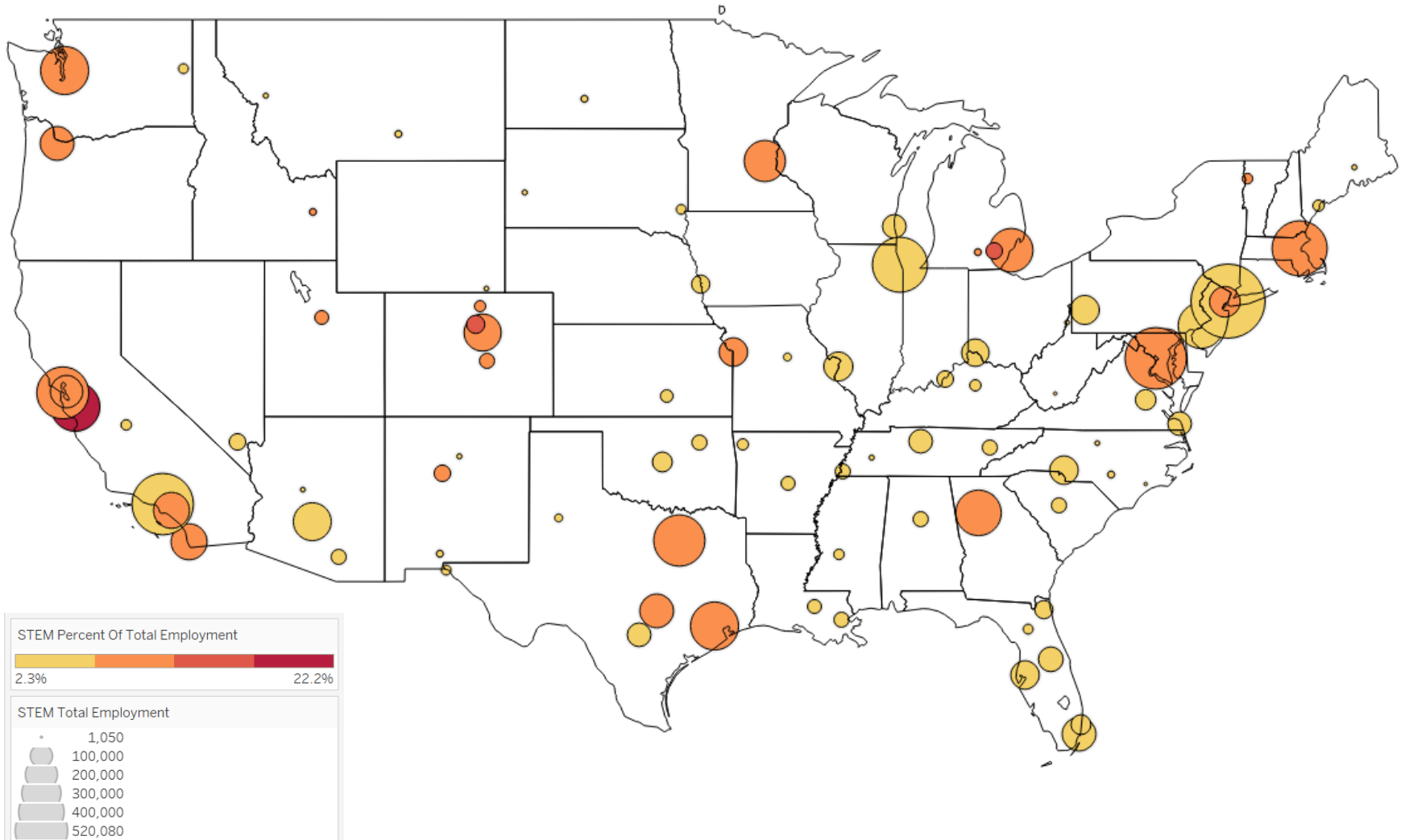
Source: U.S. Bureau of Labor Statistics. <https://www.bls.gov/oes/additional.htm>.

Average Annual Salary For STEM Occupations By State In 2016



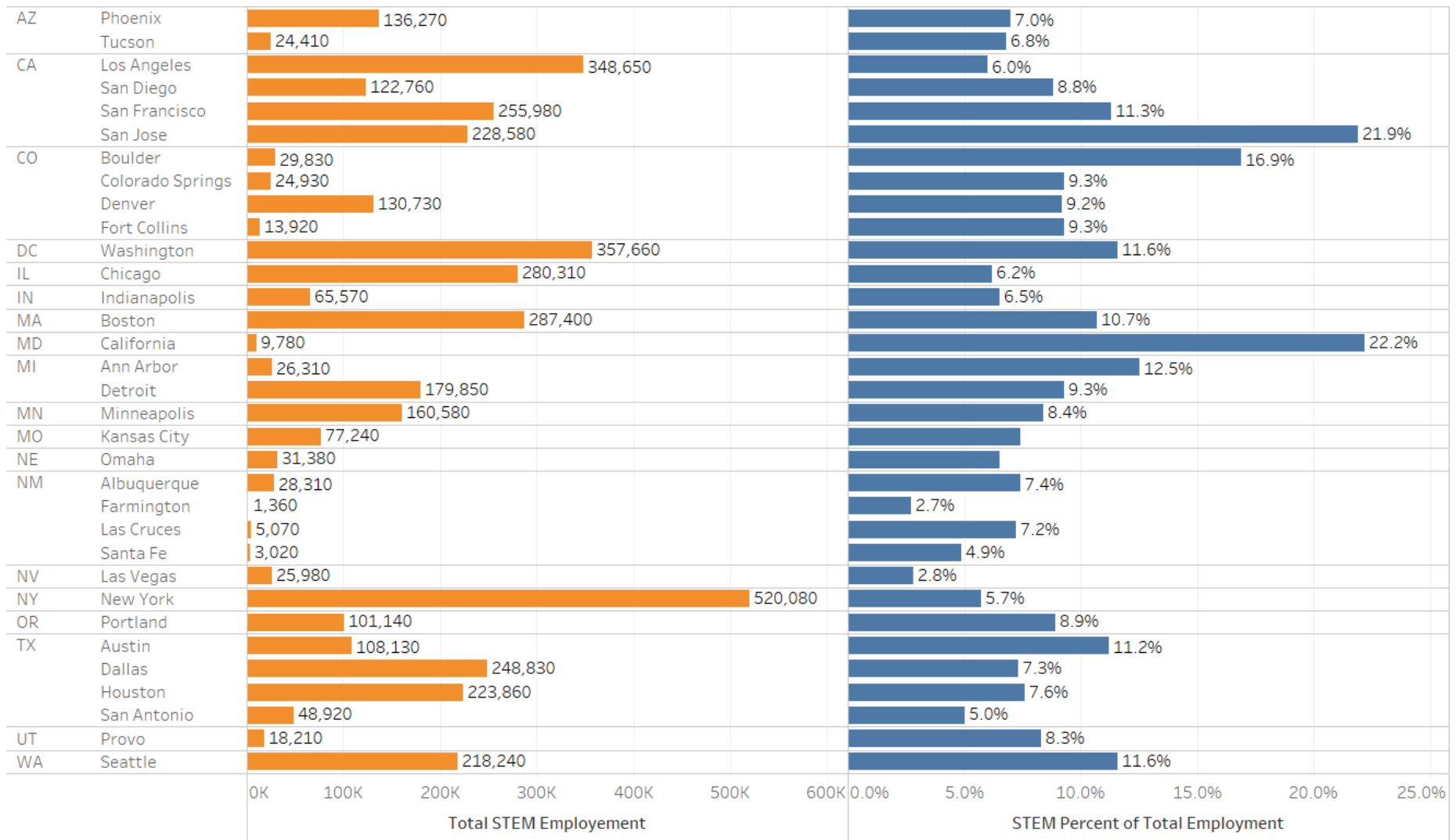
Source: U.S. Bureau of Labor Statistics. <https://www.bls.gov/oes/additional.htm>.

Number Of STEM Employees And STEM Percentage Of Total Employment By Selected Cities In 2016



Source: U.S. Bureau of Labor Statistics. <https://www.bls.gov/oes/additional.htm>.

Number Of STEM Employees And STEM Percentage Of Total Employment By Selected States And Cities In 2016



Source: U.S. Bureau of Labor Statistics. <https://www.bls.gov/oes/additional.htm>.

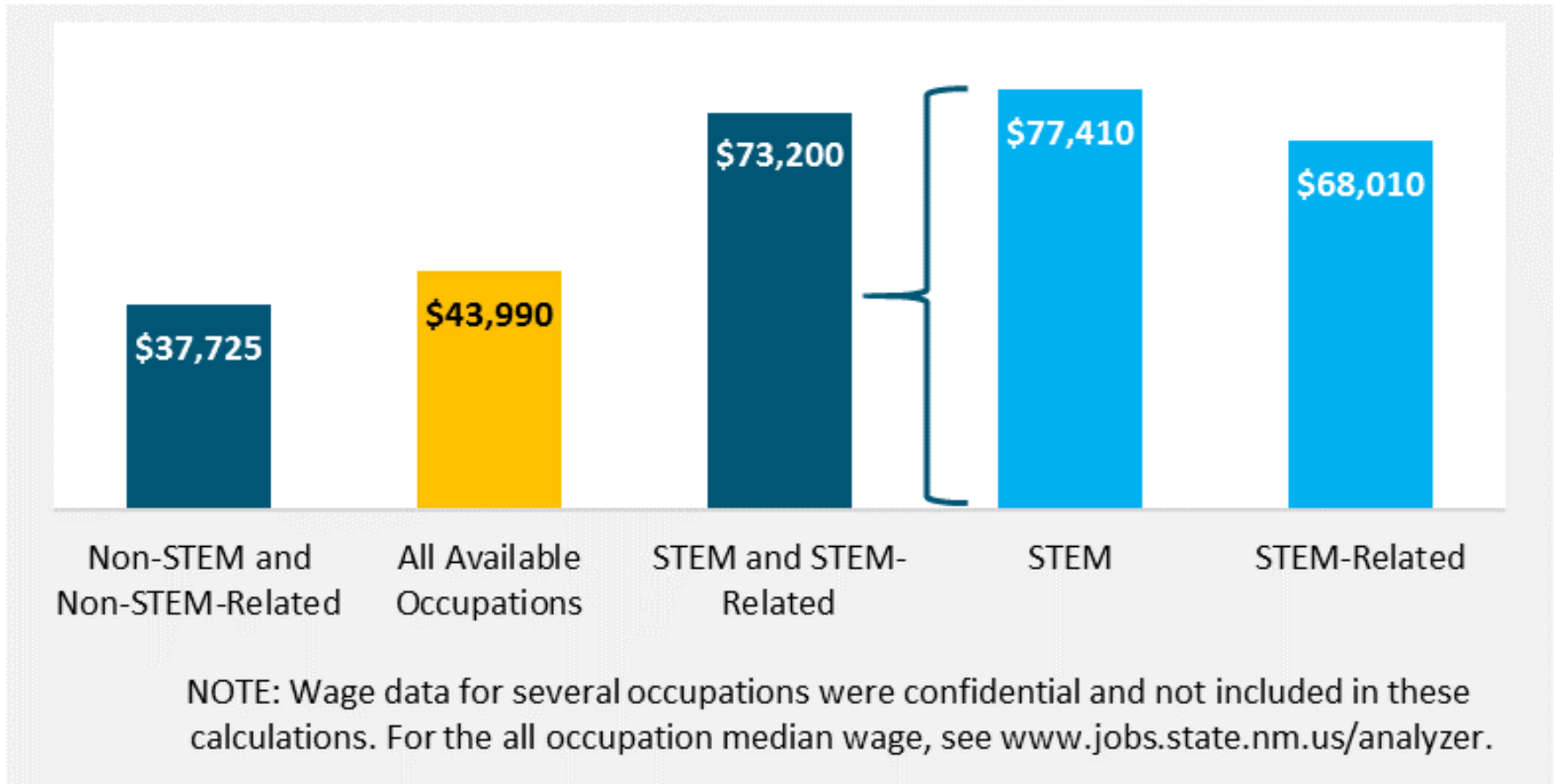
Key Take Aways

New Mexico Is A Small State In A Large Nation. Our Percentage Of STEM-H Jobs And Our STEM-H Salaries Are Competitive But We Need To Think More Strategically About How To Make Sure New Mexico Students Have Systematic Opportunities To Connect With New Mexico Careers.

STEM & STEM-Related Occupations And Task Related Categories In New Mexico

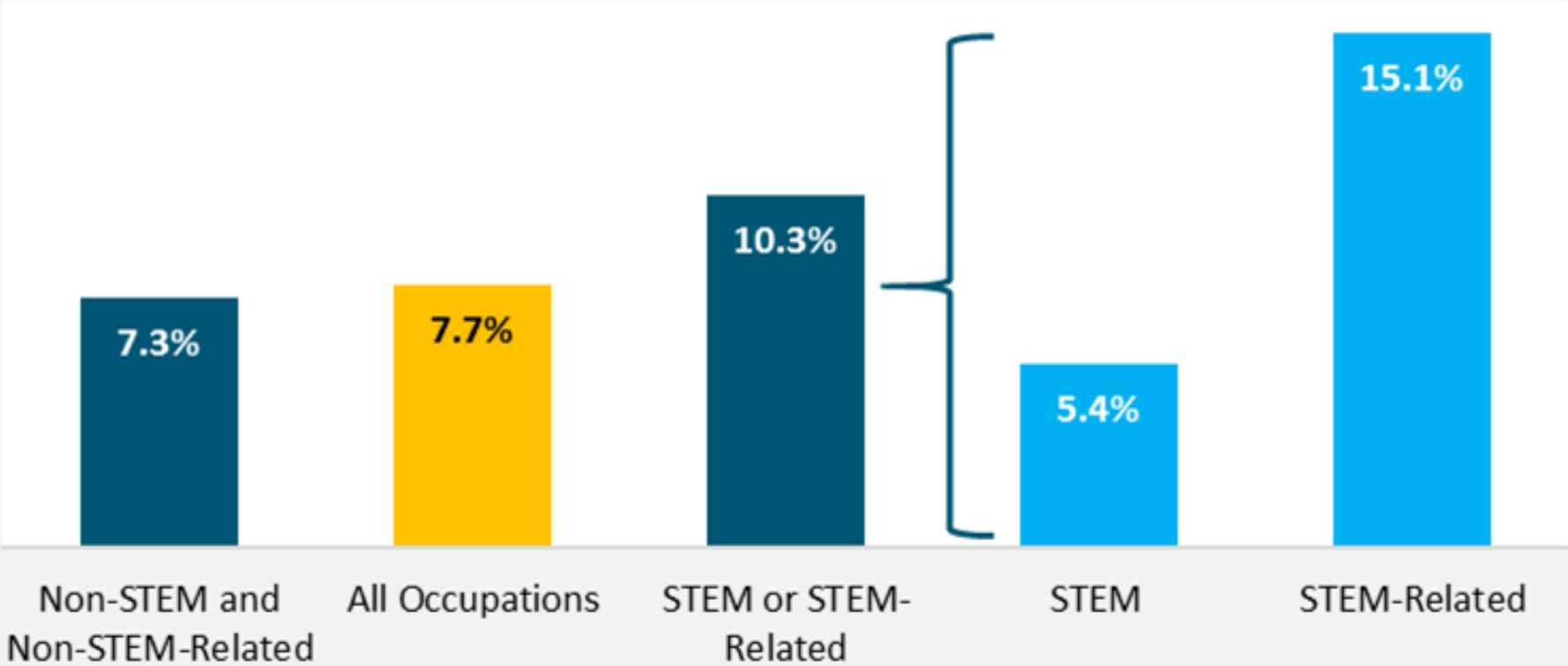
STEM & STEM Related Occupations		Task Related Category					Total	Percent
		Research, Development, Design, or Practitioner	Technologist or Technician	Postsecondary Teachers	Managerial	Sales		
STEM Occupation	Life & Physical Science, Engineering, Mathematics, Information Technology (LPERMIT)	28,620	13,200	1,370	1,460	1,230	45,880	44.9%
	Social Science	1,980		590			2,570	2.5%
	LPERMIT & Social	450					450	0.4%
STEM-Related Occupation	Architecture	520					520	0.5%
	Health	29,150	17,720	1,540	1,930		50,340	49.3%
STEM & STEM-Related	LPERMIT & Architecture		580		1,830		2,410	2.4%
	Total	60,720	30,920	3,500	3,390	1,230	102,170	
	Percent	59.4%	30.3%	3.4%	3.3%	1.2%		

Median Wages In New Mexico In 2016



Source: Mark Flaherty (Winter, 2018). STEM and STEM-Related Occupations, NM Department Of Workforce Solutions

Projected Employment Growth In New Mexico 2014-2024



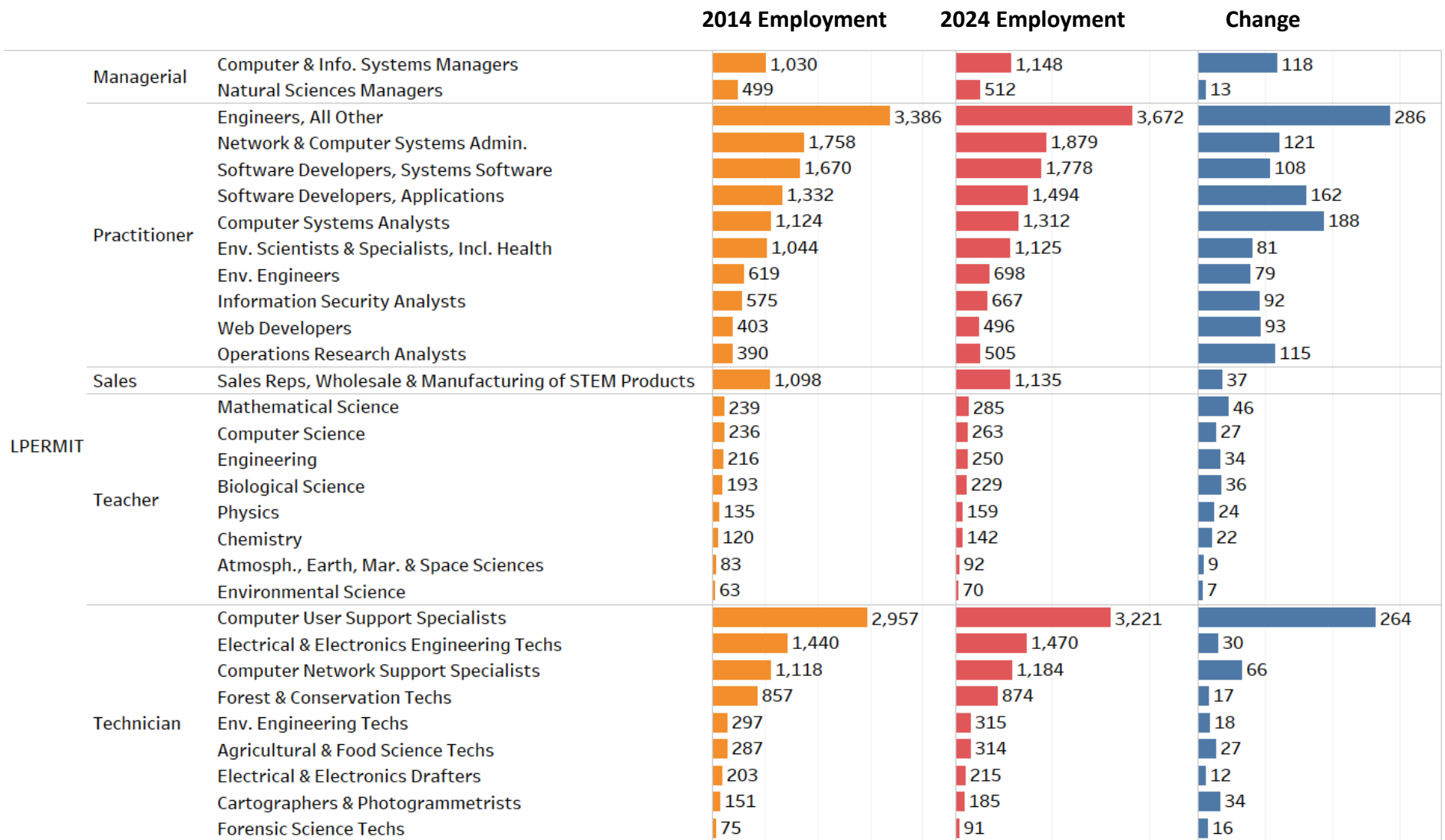
NOTE: STEM-related includes occupations in the STEM and STEM-related joint domain.

Source: Mark Flaherty (Winter, 2018). STEM and STEM-Related Occupations, NM Department Of Workforce Solutions

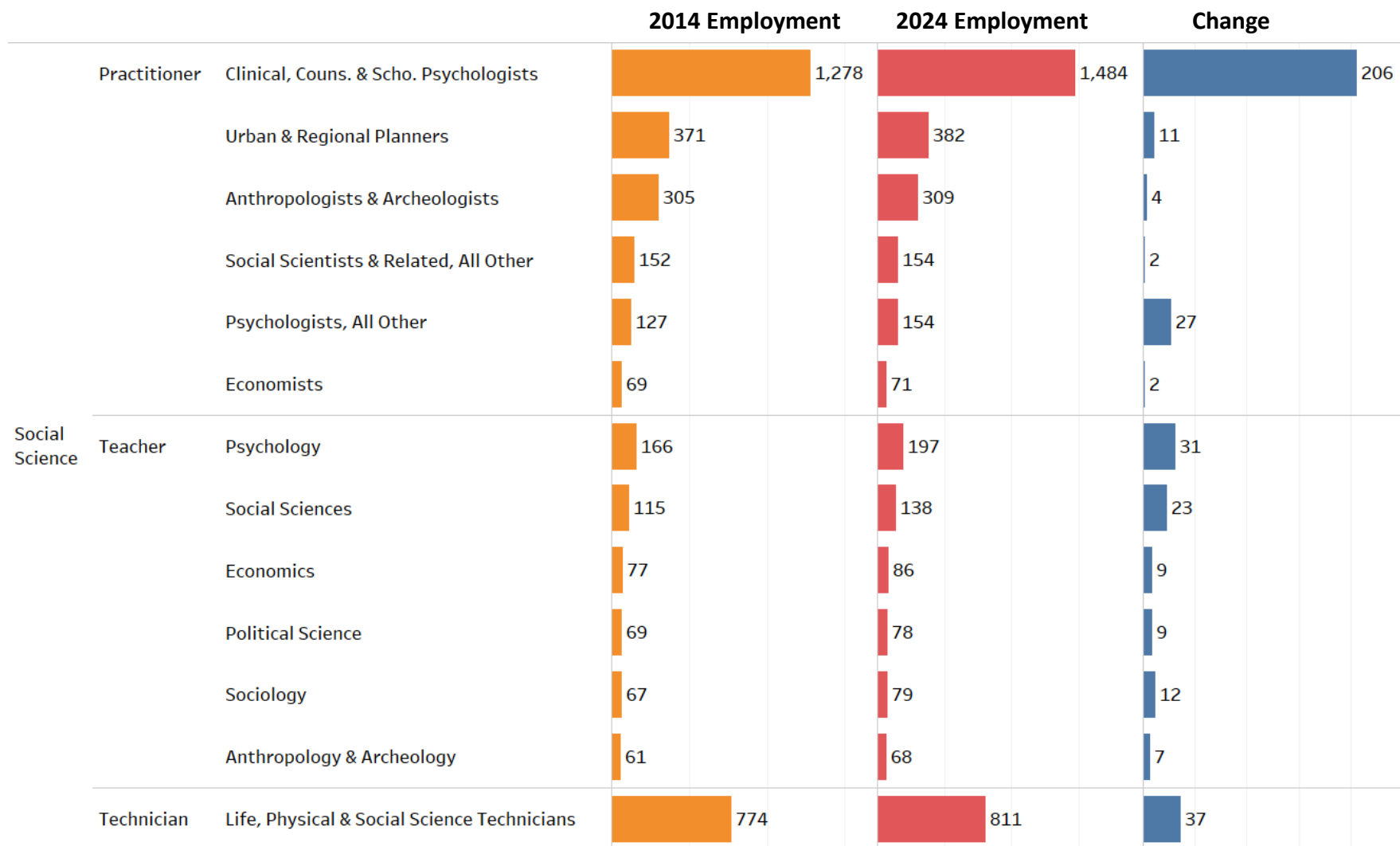
The Health Occupations By Projected Employment Growth In New Mexico From 2014 To 2024

		2014 Employment	2024 Employment	Change	
Health	Manager	Medical & Health Services Managers	2,215	2,554	339
	Practitioner	Registered Nurses	16,334	19,095	2,761
		Pharmacists	1,730	1,889	159
		Physicians & Surgeons, All Other	1,713	1,946	233
		Physical Therapists	1,241	1,645	404
		Speech-Language Pathologists	1,071	1,335	264
		Dentists, General	966	1,096	130
		Nurse Practitioners	920	1,214	294
		Respiratory Therapists	727	867	140
		Occupational Therapists	675	860	185
		Physician Assistants	579	713	134
	Teacher	Health Specialties Teachers, Postsecondary	1,216	1,482	266
		Nursing Instructors & Teachers, Postsecondary	267	326	59
Technician	Pharmacy Technicians	2,473	2,855	382	
	Licensed Practical & Licensed Vocational Nurses	2,210	2,346	136	
	Emergency Medical Technicians & Paramedics	1,521	1,800	279	
	Medical Records & Health Information Technicians	1,419	1,602	183	
	Dental Hygienists	1,109	1,261	152	
	Medical & Clinical Laboratory Technologists	1,021	1,235	214	
	Medical & Clinical Laboratory Technicians	812	950	138	
	Health Technologists & Technicians, All Other	650	816	166	
	Healthcare Practitioners & Technical Workers, All Other	643	747	104	
	Opticians, Dispensing	465	575	110	

The Life & Physical Sciences, Engineering, Mathematics, and Information Technology (LPERMIT) Occupations By Projected Employment Growth In New Mexico From 2014 To 2014



The Social Sciences Occupations By Projected Employment Growth In New Mexico From 2014 To 2024

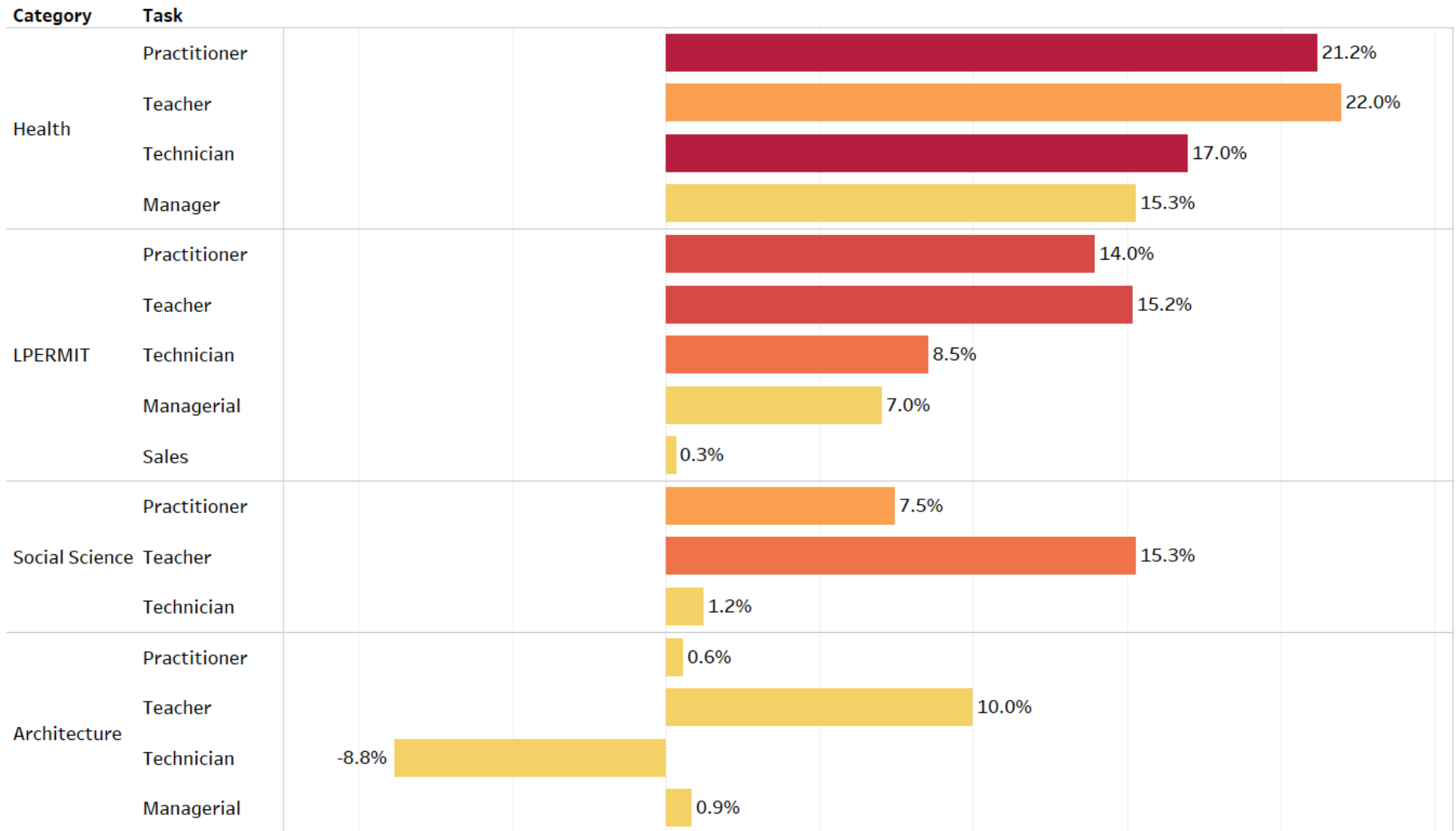


The Architecture Occupations By Projected Employment Growth In New Mexico From 2014 To 2024

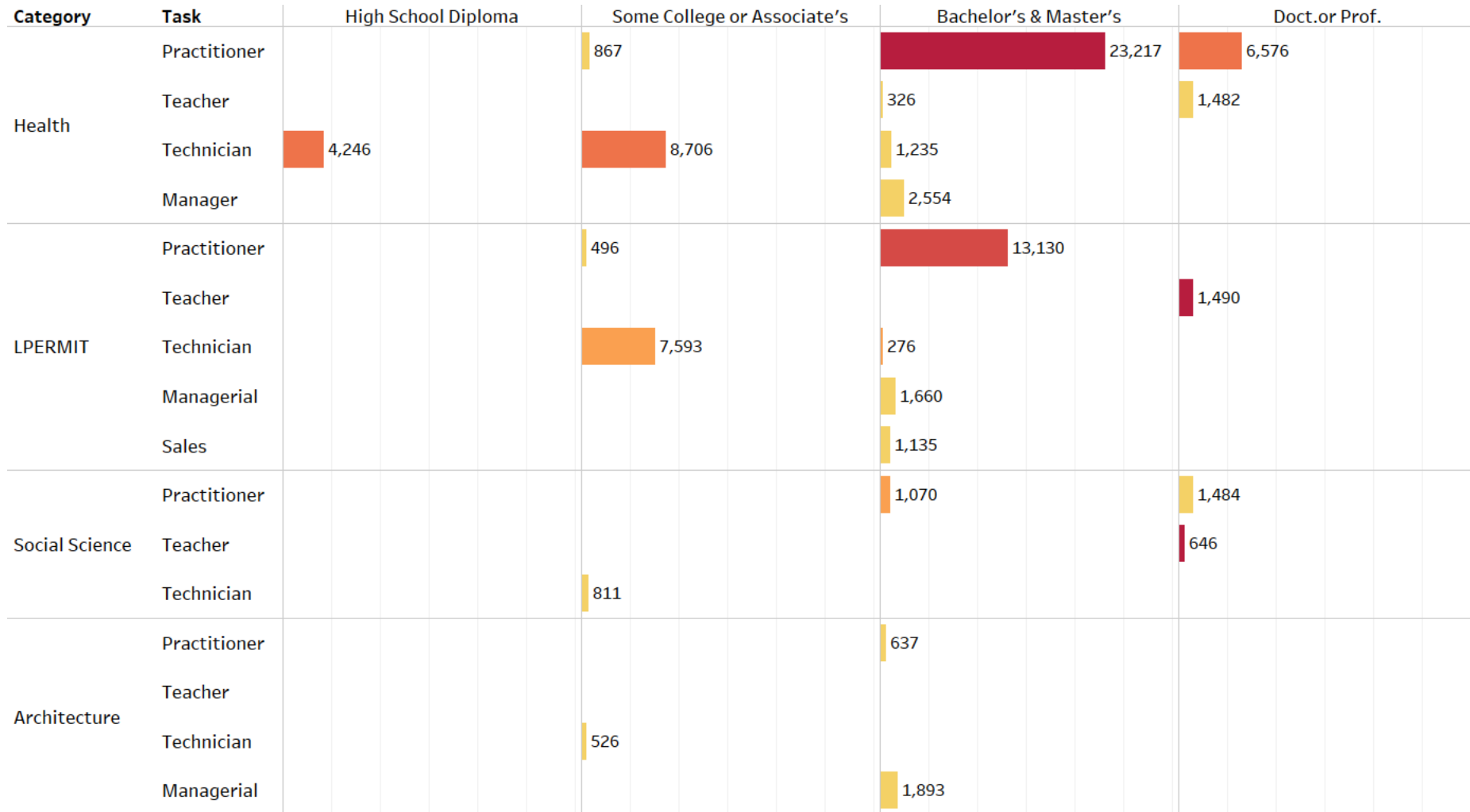


Source: Mark Flaherty (Winter, 2018). STEM and STEM-Related Occupations, NM Department Of Workforce Solutions

The STEM & STEM-Related Occupations By Average Percent Of Projected Employment Growth In New Mexico From 2014 To 2014



The STEM & STEM-Related Occupations By Number Of Projected Employment In 2024 In New Mexico By Educational Requirements



The STEM & STEM-Related Occupations By Percent Of Projected Employment In 2024 In New Mexico By Educational Requirements

Category	Task	High School Diploma	Some College or Associate's	Bachelor's & Master's	Doct.or Prof.	Grand Total
Health	Practitioner		1.06%	28.29%	8.01%	37.36%
	Teacher			0.40%	1.81%	2.20%
	Technician	5.17%	10.61%	1.51%		17.29%
	Manager			3.11%		3.11%
LPERMIT	Practitioner		0.60%	16.00%		16.61%
	Teacher				1.82%	1.82%
	Technician		9.25%	0.34%		9.59%
	Managerial			2.02%		2.02%
	Sales			1.38%		1.38%
Social Science	Practitioner			1.30%	1.81%	3.11%
	Teacher				0.79%	0.79%
	Technician		0.99%			0.99%
Architecture	Practitioner			0.78%		0.78%
	Teacher					
	Technician		0.64%			0.64%
	Managerial			2.31%		2.31%
Grand Total		5.17%	23.15%	57.44%	14.23%	100.00%

Source: Mark Flaherty (Winter, 2018). STEM and STEM-Related Occupations, NM Department Of Workforce Solutions

The STEM & STEM-Related Occupations By Average Salary In 2016

Category	Task	High School Diploma	Some College or Associate's	Bachelor's & Master's	Doct. or Prof.
Health	Manager			\$98,060	
	Practitioner		\$53,140	\$87,532	\$148,503
	Teacher			\$65,950	\$135,740
	Technician	\$34,363	\$50,183	\$47,740	
LPERMIT	Managerial			\$105,225	
	Practitioner		\$54,960	\$88,361	
	Sales			\$81,675	
	Teacher				\$82,966
	Technician		\$52,370	\$56,290	
Social Science	Practitioner			\$70,137	\$64,470
	Teacher				\$83,488
	Technician		\$66,680	\$37,470	
Architecture	Managerial			\$140,960	
	Practitioner			\$57,960	
	Teacher				\$79,190
	Technician		\$51,620		

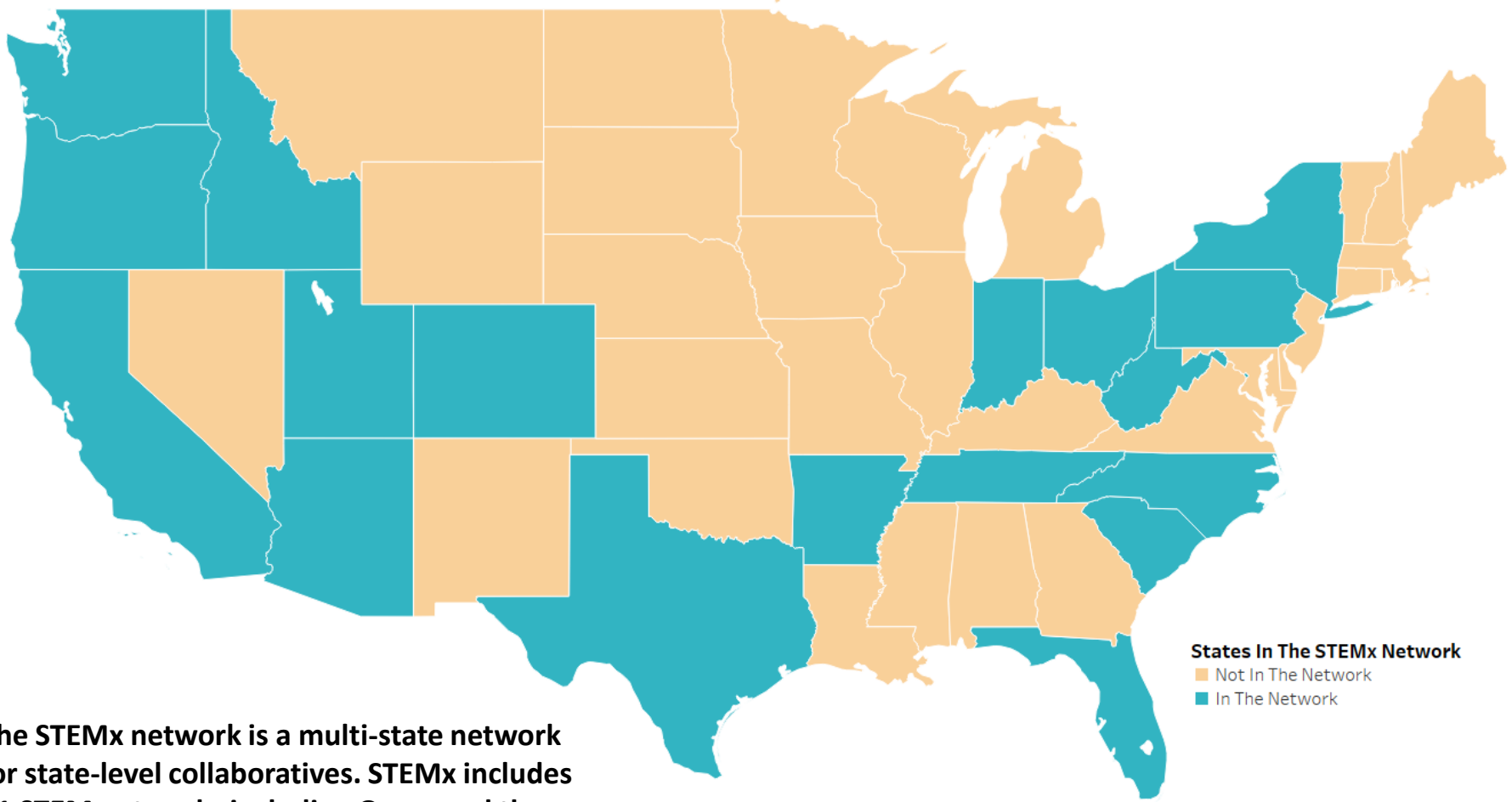
Key Take Aways

Mark Flaherty's Analysis Provides Us With A Powerful And Precise Framework For Understanding What New Mexico's STEM-H Future Is Likely To Be. It Is Critical To Understand That STEM-H Occupations Include Life and Physical Sciences, Engineering, Mathematics, Technology, Social Sciences, Education, Architecture And Health. It Is Also Critical To Understand That The Jobs In Those Occupations Include Practitioners, Technicians, Managers And Sales.

These Are The Jobs We Are Likely To Have. What About The Jobs We Want To Have Or Those That Haven't Been Invented Yet. How Do We Prepare For Those?

What Do STEM Coalitions Look Like In Other States?

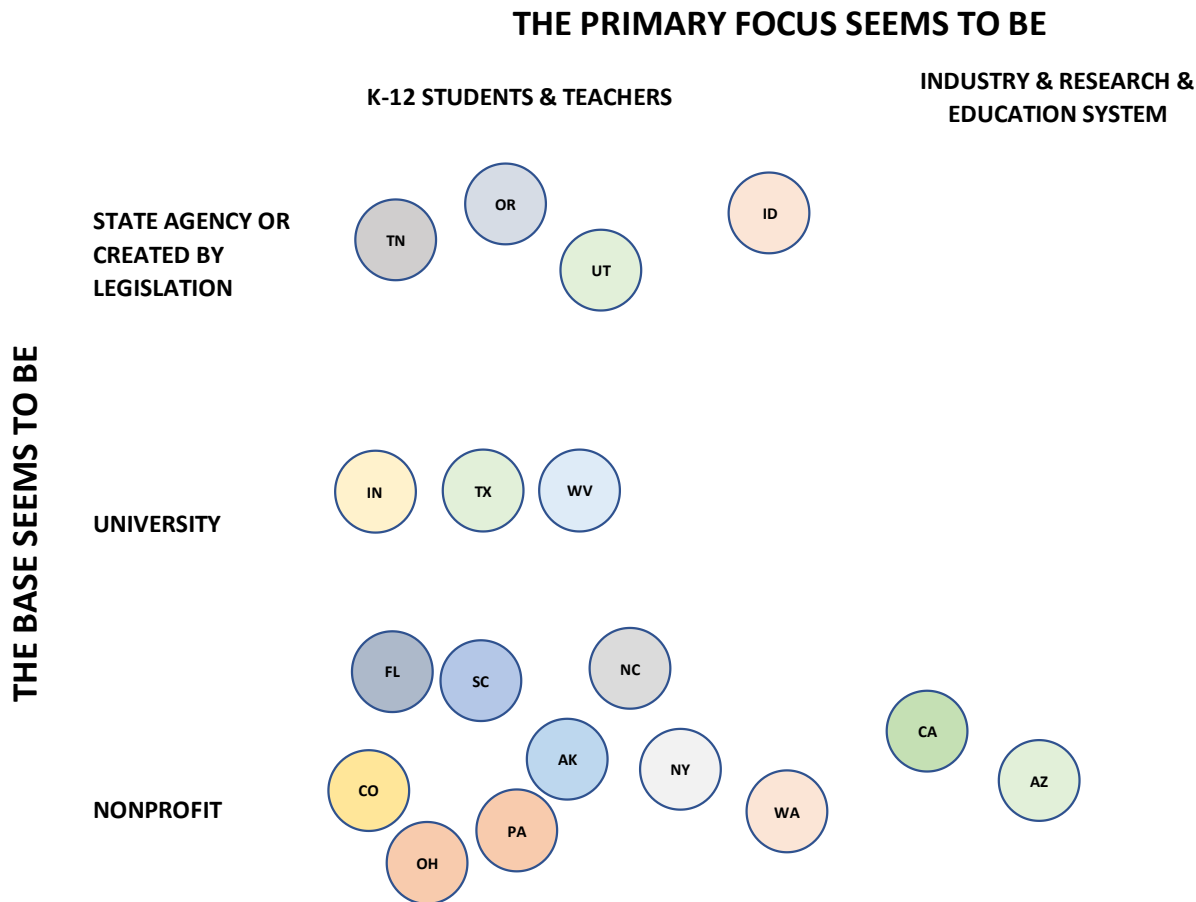
What Can New Mexico Learn From The States In The STEMx Network?



The STEMx network is a multi-state network for state-level collaboratives. STEMx includes 21 STEM networks including Guam and the Virgin Islands which are not included on this map.

Source: www.stemx.us

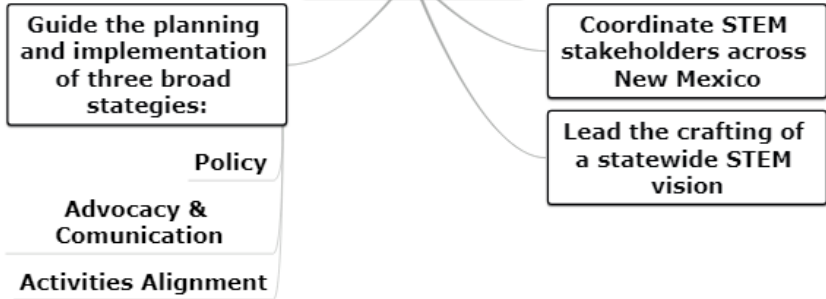
What Do STEM Networks Look Like In Other States?



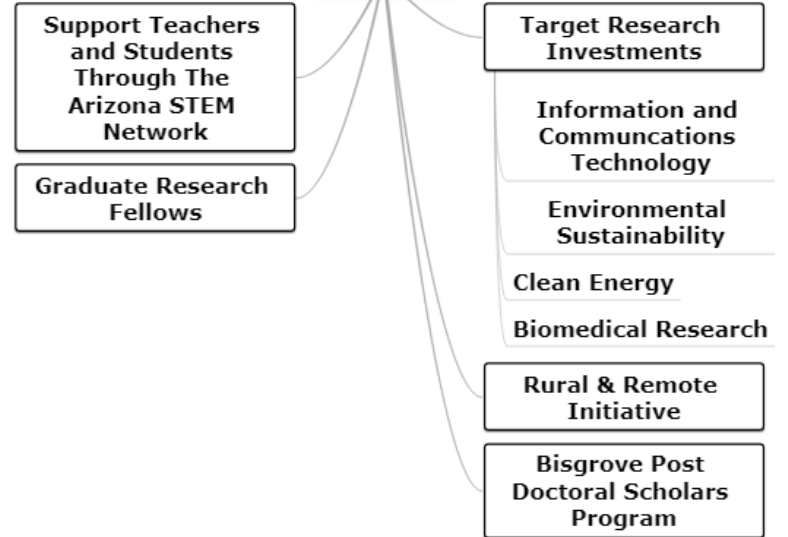
- Networks Have Partnerships Across The Education to Career Continuum.
- Networks Focus On STEM Broadly But Many Do Seem To Have A Primary Focus.
- Networks Have Evolved In Structure And Mission Over Time.
- Networks Are Funded In A Number Of Different Ways.
- What Should New Mexico's Network Focus On?
- Where Should New Mexico's Statewide Collaborative be Based?
- How Should New Mexico's Statewide Collaborative Be Funded?

STATE STEM COALITION COMPARISON MAPS

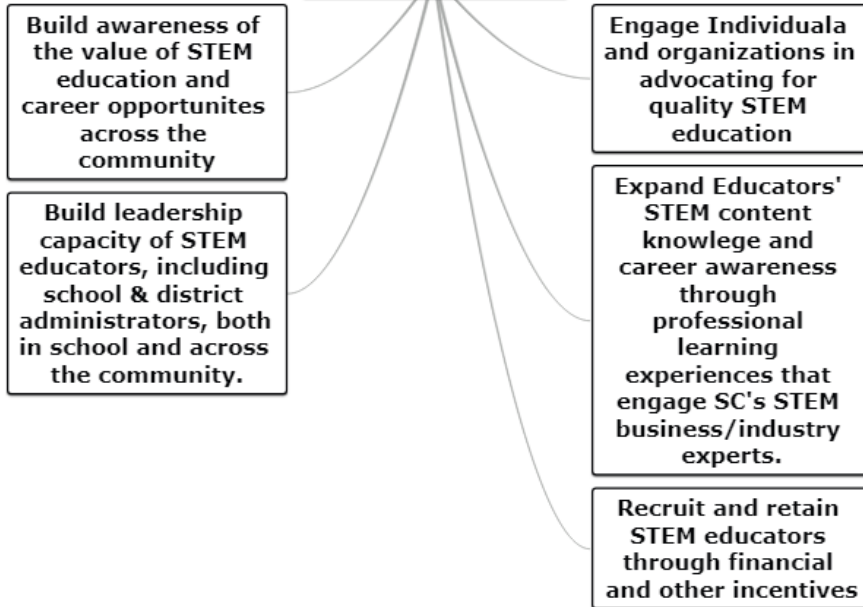
New Mexico



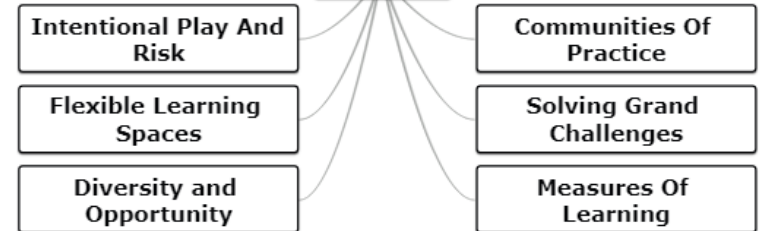
Arizona



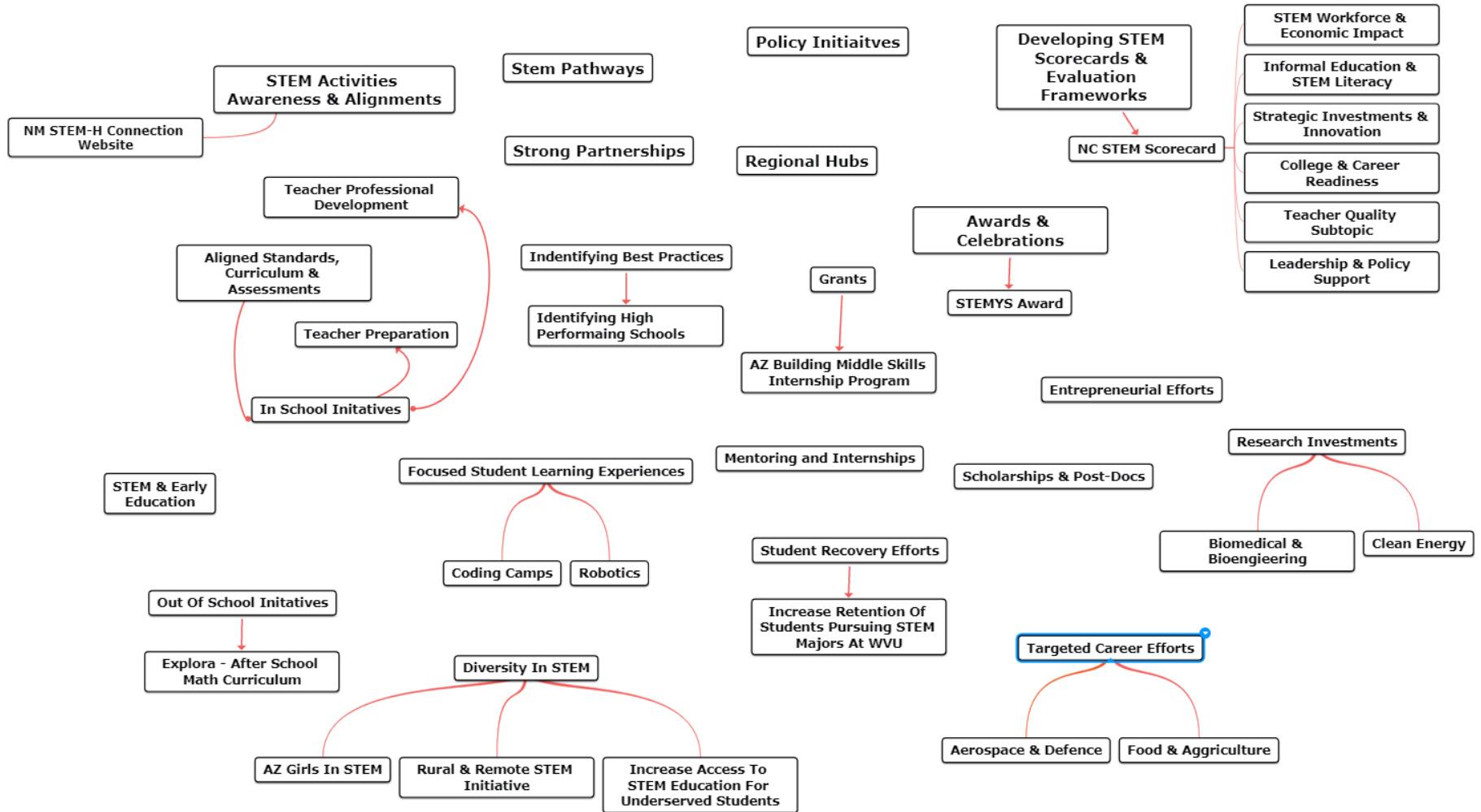
South Carolina



Florida



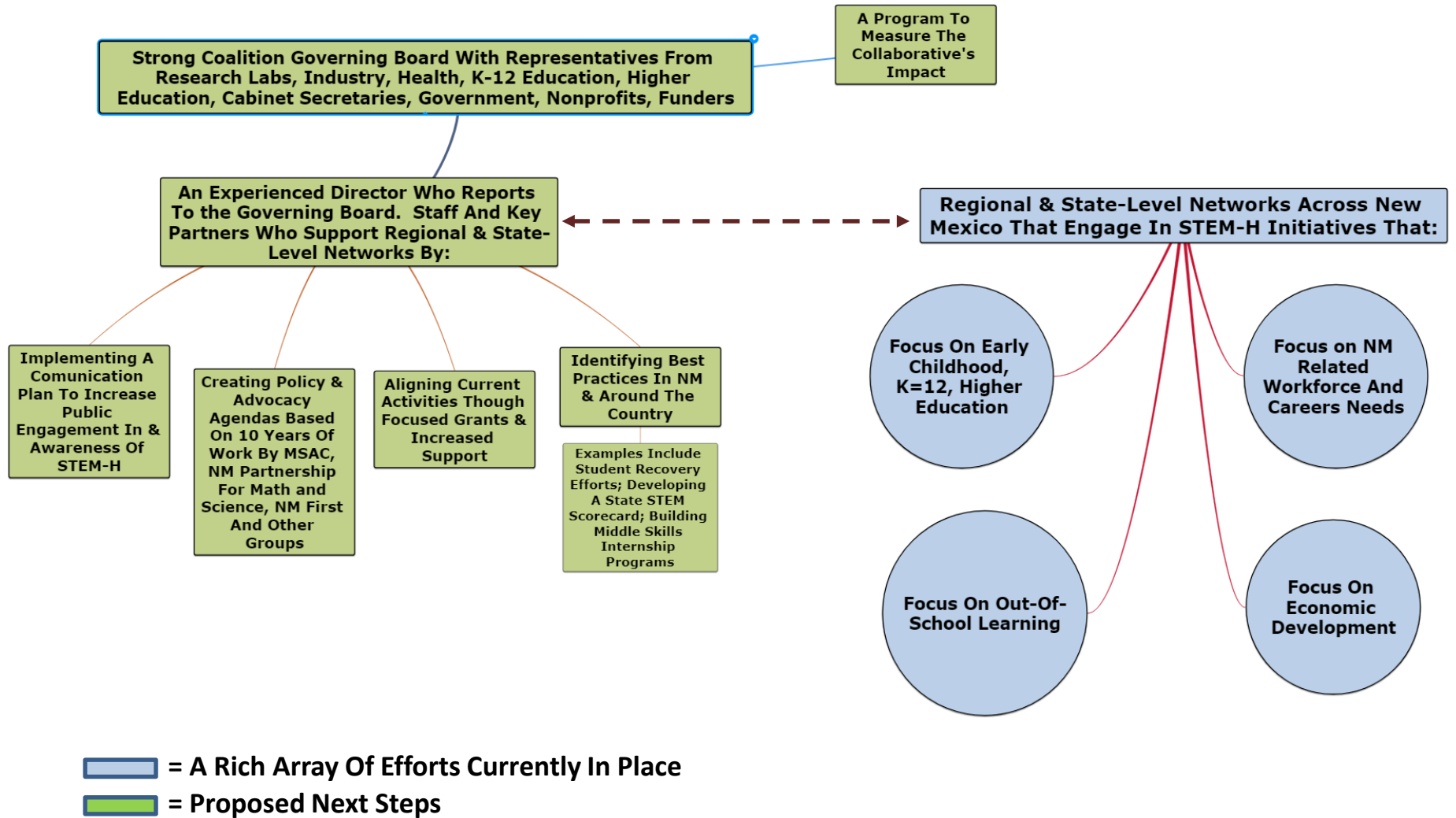
AN ILLUSTRATED SAMPLING OF STEM INITIATIVES FROM NEW MEXICO AND ACROSS THE COUNTRY



How Could New Mexico Build A Statewide STEM-H Coalition?

What If???

A Proposed Structure For New Mexico's Statewide STEM-H Collaborative



Key Findings

- **STEM and STEM-related careers and industries are clearly one of the most important pathways to individual fulfillment, healthy families, vibrant communities, a thriving economy, and a strong and secure nation.**
- **It is important to visualize this pathway is a race crowded with competitors, a journey filled with obstacles, or any other metaphor that helps us understand we can not take the destination for granted.**
- **New Mexico's most precious resource is its diverse people and yet we squander that wealth in so many ways starting at birth and continuing to adulthood.**
- **We must commit ourselves to ensuring that all of our students reach higher levels of proficiency in reading, mathematics, science and the other disciplines essential to becoming an educated citizen in the fullest sense of the words. In addition, we need to cultivate their curiosity about the world and enhance their sense of the STEM and STEM-related opportunities that lay before them.**
- **We can think more clearly and creatively about which higher education programs are related to STEM and STEM-related careers and industries and how those programs can be supported and expanded.**
- **We can think more clearly and creatively about the STEM and STEM-related careers and industries that currently exist in New Mexico and how we envision our future.**
- **We can help New Mexicans better understand the challenges we face. Many other countries, other states and other communities are more populous, better organized, more inviting and more committed to winning the STEM race than we are.**
- **We can help New Mexicans better understand the resources we have. Our state's diverse people, rich cultural histories, physical beauty, and natural resources are unparalleled. We have the intellectual capital and institutions to help lead the world in science, technology, engineering, math, health, art, culture and more. And we have vibrant, albeit a bit random, STEM communities of practice across New Mexico. The challenge now is to marshal our resources in ways that respects local creativity and energy and still moves all of New Mexico forward.**

Final Thoughts

“We set sail on this new sea because there is new knowledge to be gained, and new rights to be won, and they must be won and used for the progress of all people... We choose to go to the moon in this decade and do the other things, not because they are easy, but because they are hard, because that goal will serve to organize and measure the best of our energies and skills, because that challenge is one that we are willing to accept, one we are unwilling to postpone, and one which we intend to win, and the others, too. ” J.F. Kennedy, 1962