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NASA ADVISORY COUNCIL STEM ENGAGEMENT COMMITTEE

NATIONAL STEM UPDATE

OCTOBER 29, 2019

MIKE KINCAID & ROB LASALVIA
NASA'S OFFICE OF STEM ENGAGEMENT

FEDERAL STEM EDUCATION 5-YEAR STRATEGIC PLAN

Committee on STEM Education (CoSTEM)

- Co-chaired by NASA & NSF
 - Jim Bridenstine & France Cordova
- Coordinates STEM activities and programs
- Monitors overlap in federal STEM programs across agencies
- Develops strategic plan every five years

Federal Coordination in STEM Education (FC-STEM)

- Co-chaired by NASA & NSF
 - Mike Kincaid & Karen Marrongelle
- Develops and coordinates five-year plan
- Communicates priorities across agencies
- Develops implementation structure

FC-STEM MEMBERS:



STEM EDUCATION ADVISORY PANEL:

Advises and evaluates CoSTEM's progress in meeting its goals. Established in 2018 by NASA, NSF, NOAA and the Dept. of Education with 18 panel members selected in 2018.

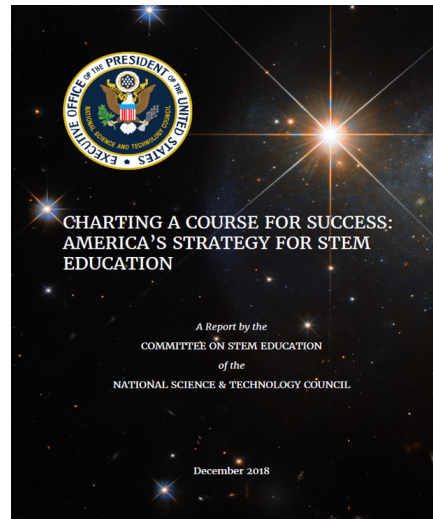
STEM ENGAGEMENT 5-YR STRATEGIC PLAN

VISION:

- A future where all Americans will have lifelong access to high-quality STEM education.
- The United States will be the global leader in STEM literacy, innovation and employment.

ASPIRATIONAL GOALS:

- Build Strong Foundations for STEM Literacy
- Increase Diversity, Equity, and Inclusion in STEM
- Prepare the STEM Workforce for the Future



<https://www.nasa.gov/sites/default/files/atoms/files/stem-education-strategic-plan-2018.pdf>



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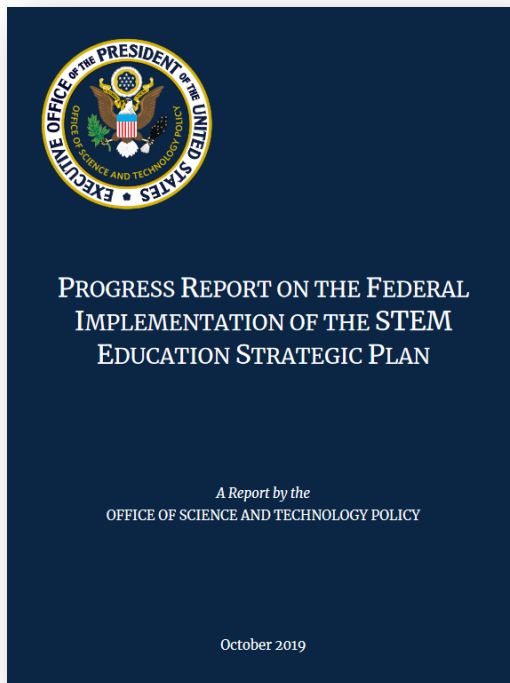
GOALS FOR AMERICAN STEM EDUCATION																	
★ Build Strong Foundations for STEM Literacy ★																	
★ Increase Diversity, Equity, and Inclusion in STEM ★																	
★ Prepare the STEM Workforce for the Future ★																	
Pathways	Objectives	DOC	DoD	DOE	DHS	DOI	DOL	DOS	DOT	ED	EPA	HHS	NASA	NSF	SI	USDA	
Develop and Enrich Strategic Partnerships	Foster STEM Ecosystems that Unite Communities	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Increase Work-Based Learning and Training through Educator-Employer Partnerships	●	●	●	●	●	●			●	●	●	●	●	●	●	●
	Blend Successful Practices from Across the Learning Landscape	●	●	●	●		●	●		●	●			●	●	●	●
Engage Students where Disciplines Converge	Advance Innovation and Entrepreneurship Education	●	●	●				●		●	●	●		●			●
	Make Mathematics a Magnet	●	●							●				●			●
	Encourage Transdisciplinary Learning	●	●	●	●	●		●		●	●	●	●	●	●	●	●
Build Computational Literacy	Promote Digital Literacy and Cyber Safety	●	●		●			●		●		●		●			●
	Make Computational Thinking An Integral Element of All Education	●	●	●	●	●				●		●		●	●	●	●
	Expand Digital Platforms for Teaching and Learning	●		●	●			●		●				●	●	●	●

NASA'S CHOSEN OBJECTIVES

1. Foster STEM ecosystems that unite communities
2. Increase work-based learning and training through educator-employer partnerships
3. Encourage transdisciplinary learning

CoSTEM ANNUAL PROGRESS REPORT

- CoSTEM's Annual Progress Report released by OSTP on **October 17**
 - Provides an overview of CoSTEM's **activities over the past year**, along with an overview of **federal STEM investments in STEM education**



	FY 2018 Enacted	FY 2019 Enacted	FY 2020 President's Budget
Total Number of STEM Education Investments	124	123	95
Total Value of STEM Education Investments	\$3,056 M	\$3,185 M	\$2,648 M



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SELECTED FINDINGS FROM THE NATIONAL SURVEY OF SCIENCE AND MATH EDUCATION



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BACKGROUND

- 6th in a series of NSF funded studies (started in 1977)
- National Survey (probability sample) looks at variety of topics that impact K-12 students:
 - Teacher Preparedness
 - Access to Opportunity
 - Instructional Dosage
 - Use of Effective Practices
 - Experience
- 2018 version added computer science
- Report Produced by Horizon Research, Inc

*Banilower, E. R., Smith, P. S., Malzahn, K. A., Plumley, C. L., Gordon, E. M., & Hayes, M. L. (2018).
Report of the 2018 NSSME+. Chapel Hill, NC: Horizon Research, Inc.*



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CHARACTERISTICS OF TEACHERS

	Percent of Teachers		
	Elementary	Middle	High
Sex			
Female	94	71	57
Male	6	28	43
Race/Ethnicity			
White	88	91	91
Black or African-American	8	8	5
Hispanic or Latino	9	7	6
Asian	2	2	5
American Indian/Alaskan Native	1	2	2
Native Hawaiian/Other Pacific Islander	1	0	0

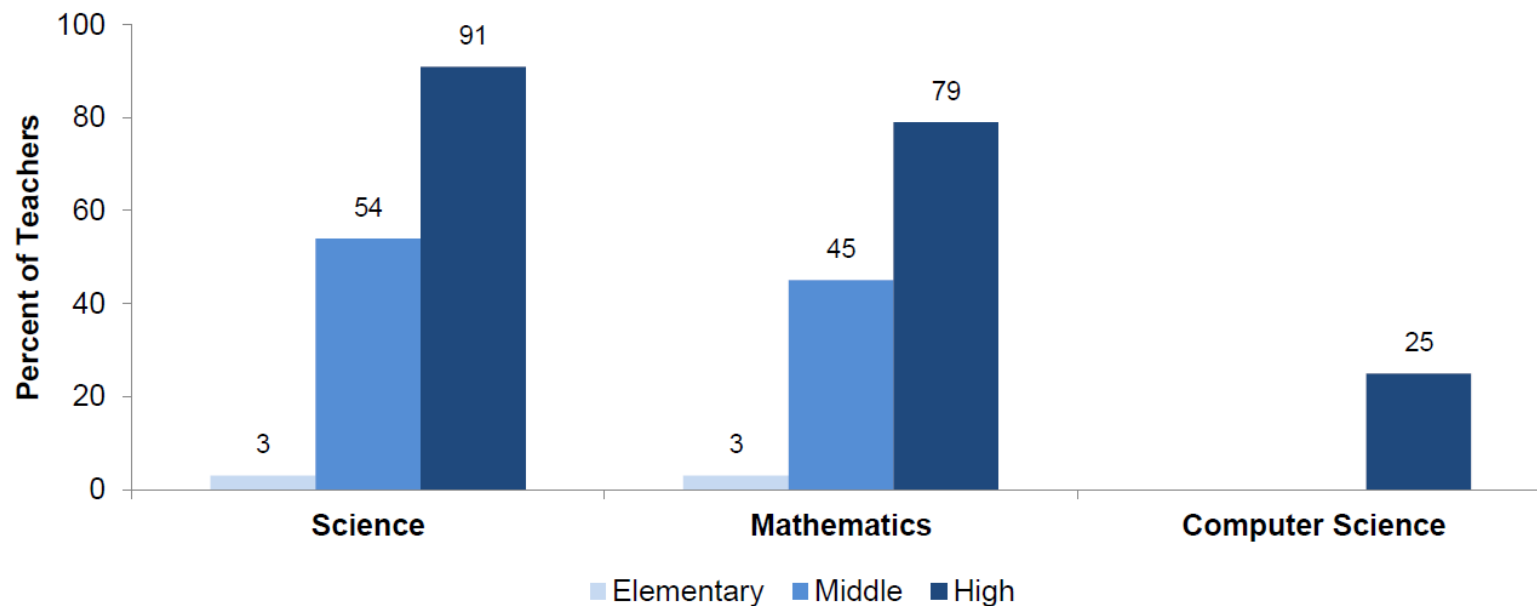
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TEACHER PREPAREDNESS – DEGREES IN STEM

Teachers With a Degree in Their Field, by Subject and Grade Range



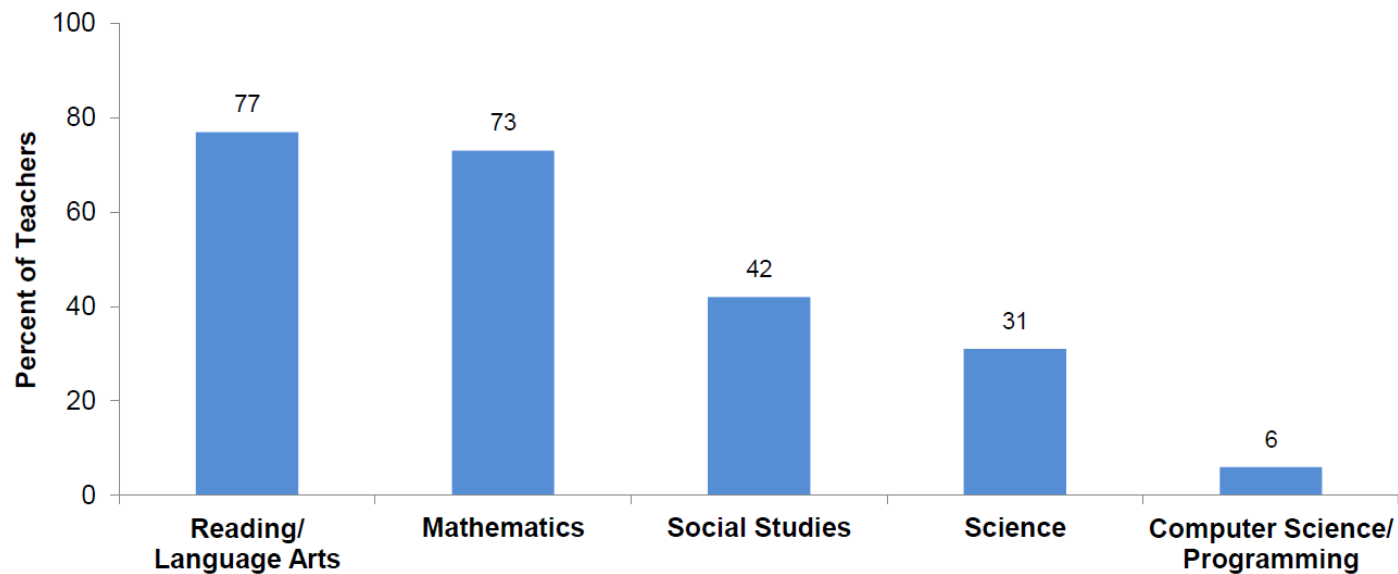
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ELEMENTARY TEACHER PREPARATION

**Self-Contained Elementary Teachers[†] Considering Themselves
Very Well Prepared to Teach Each of a Number of Subjects**



[†] Includes only teachers assigned to teach multiple subjects to a single class of students in grades K–6.

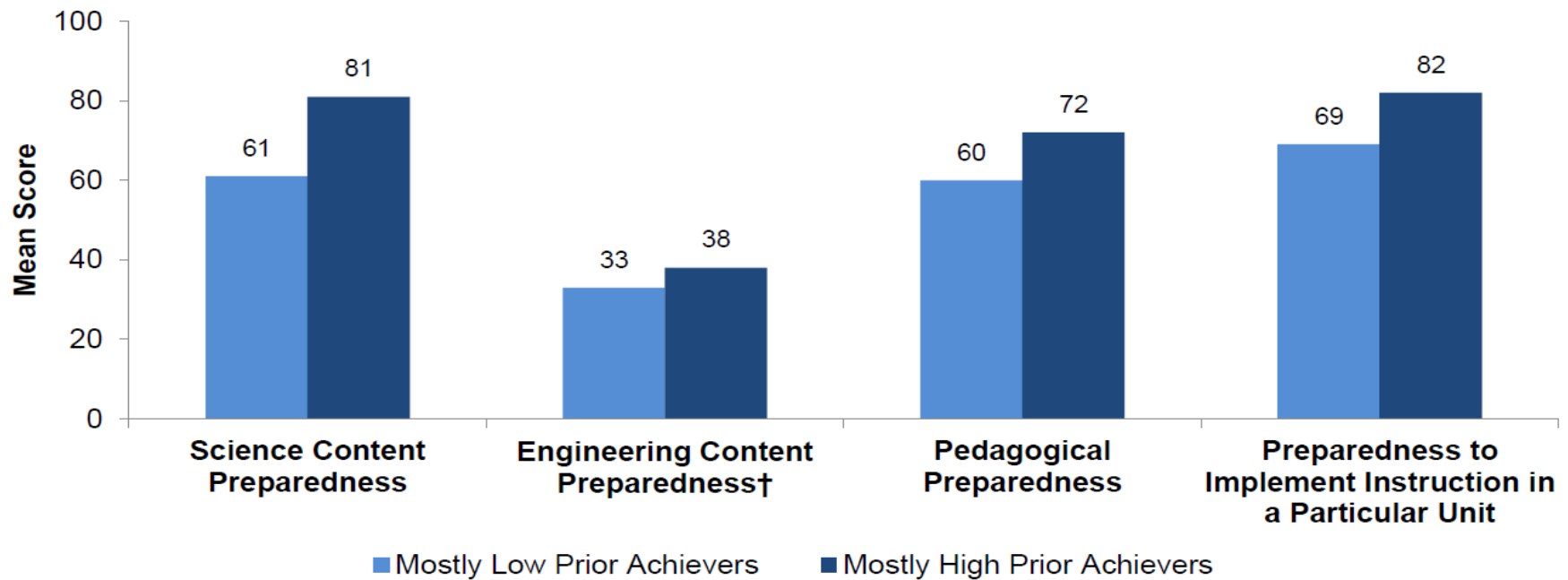
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STUDENT PERFORMANCE & TEACHER PERCEPTION OF PREPAREDNESS

Class Mean Scores for Science Teacher Perceptions of Preparedness Composites, by Prior Achievement Level of Class



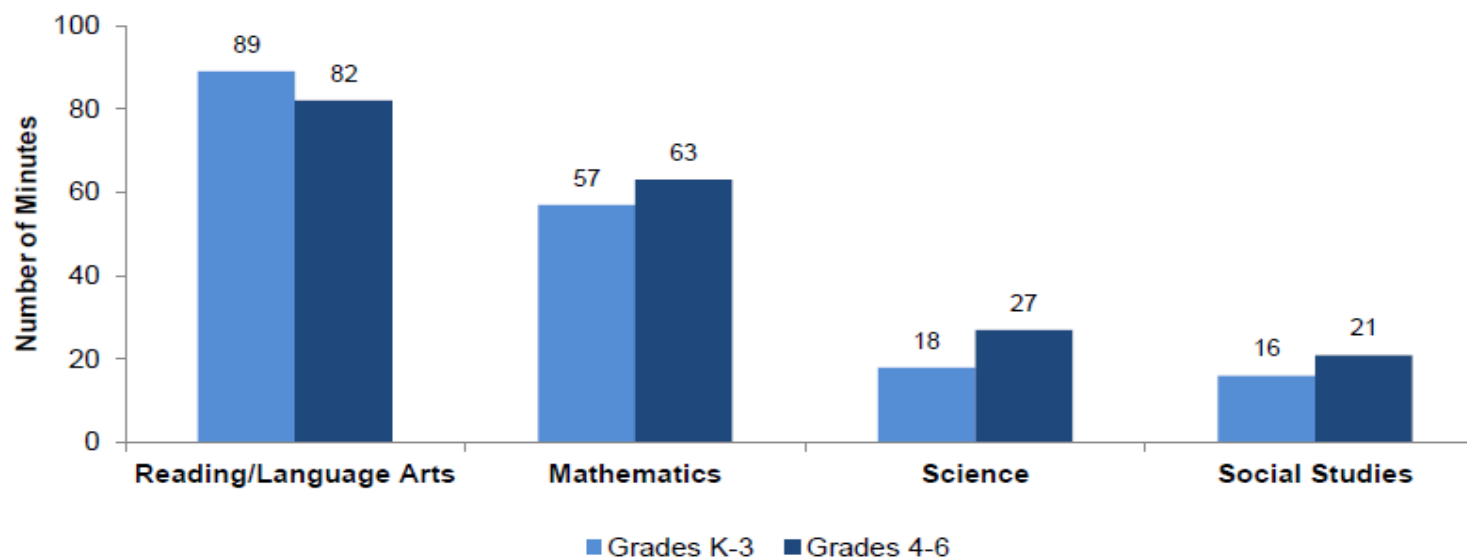
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SCIENCE IN ELEMENTARY INSTRUCTION

Average Number of Minutes per Day Spent Teaching Each Subject in Self-Contained Classes,[†] by Grade Range

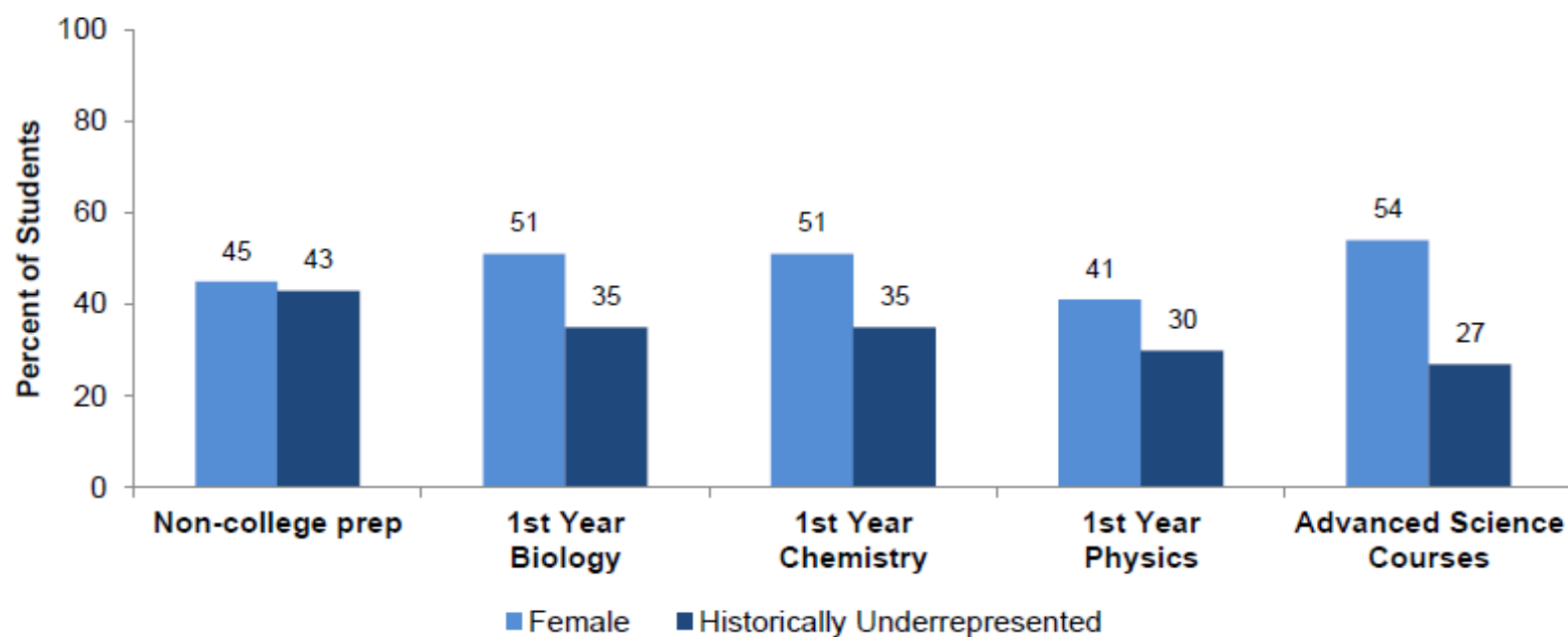


[†] Only teachers who indicated they teach reading/language arts, mathematics, science, and social studies to one class of students were included in these analyses.



DECREASING ENROLLMENT IN STEM FOR HISTORICALLY UNDERREPRESENTED GROUPS

Percentages of Females and Historically Underrepresented Students in Various High School Science Courses



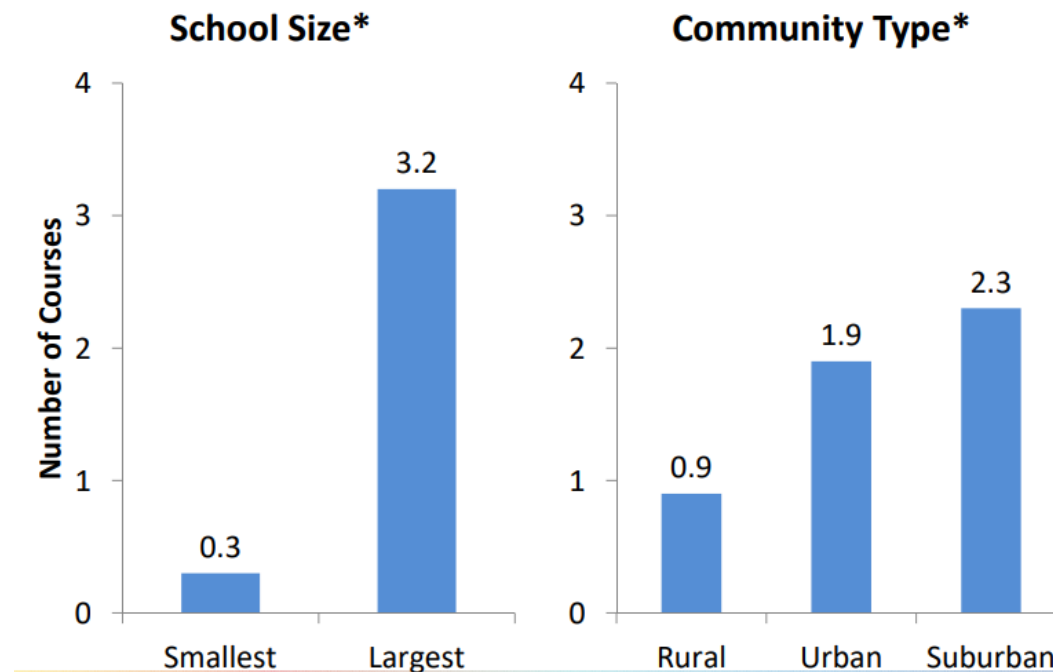
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DISPARITIES IN RURAL & URBAN EDUCATION

AP Course Access (out of 7)



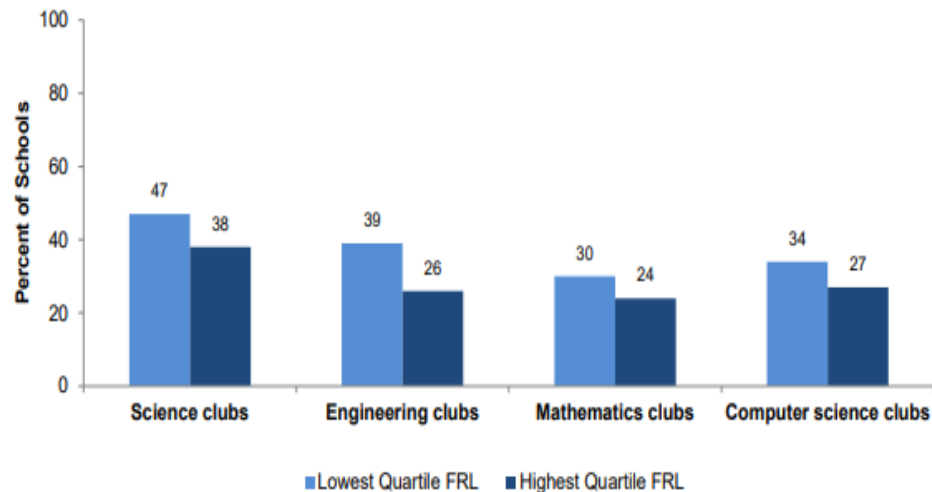
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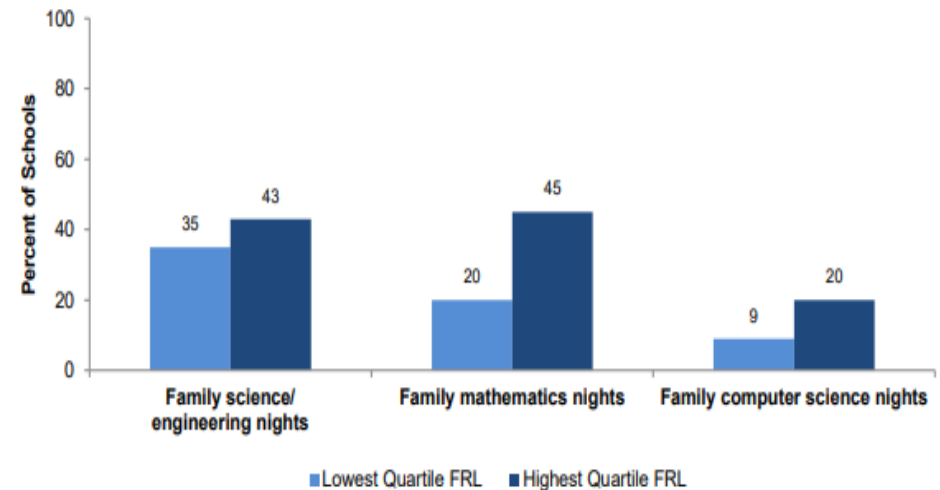
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ACCESS TO CLUBS & SCIENCE NIGHTS BASED

Schools Offering Content-Focused Clubs, by
Percentage of Students in School Eligible for Free/Reduced-Price Lunch



Schools Offering Content-Focused Family Nights, by
Percentage of Students in School Eligible for Free/Reduced-Price Lunch



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