National Aeronautics and
Space Administration

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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:

USDA

Smithsonian Institution

<u>STEM EDUCATION ADVISORY PANEL:</u>

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.

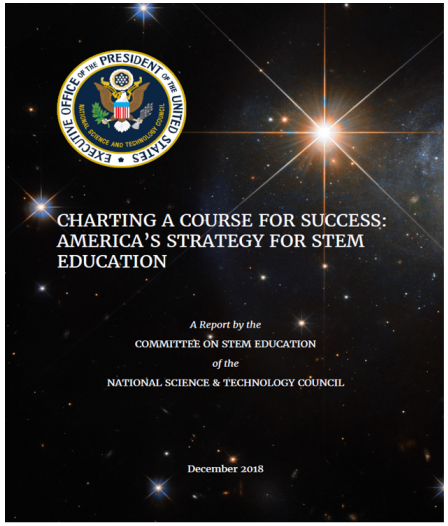
STEM Engagement 5-yr Strategic Plan

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

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

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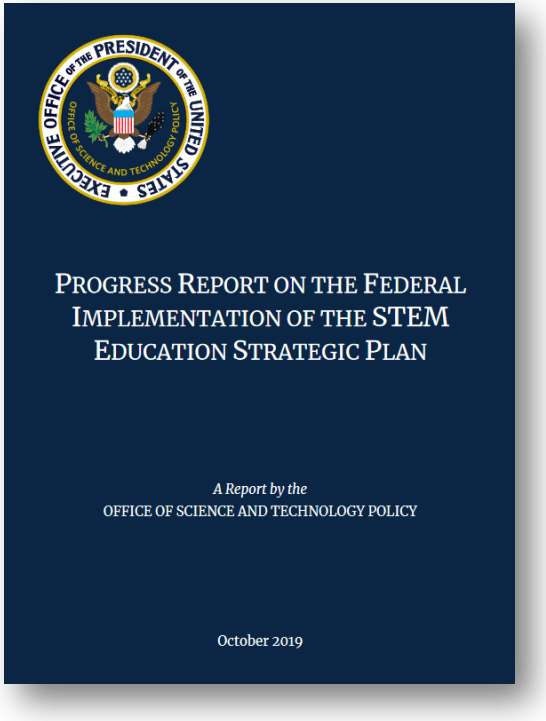
CoSTEM Annual Progress Report

- 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.

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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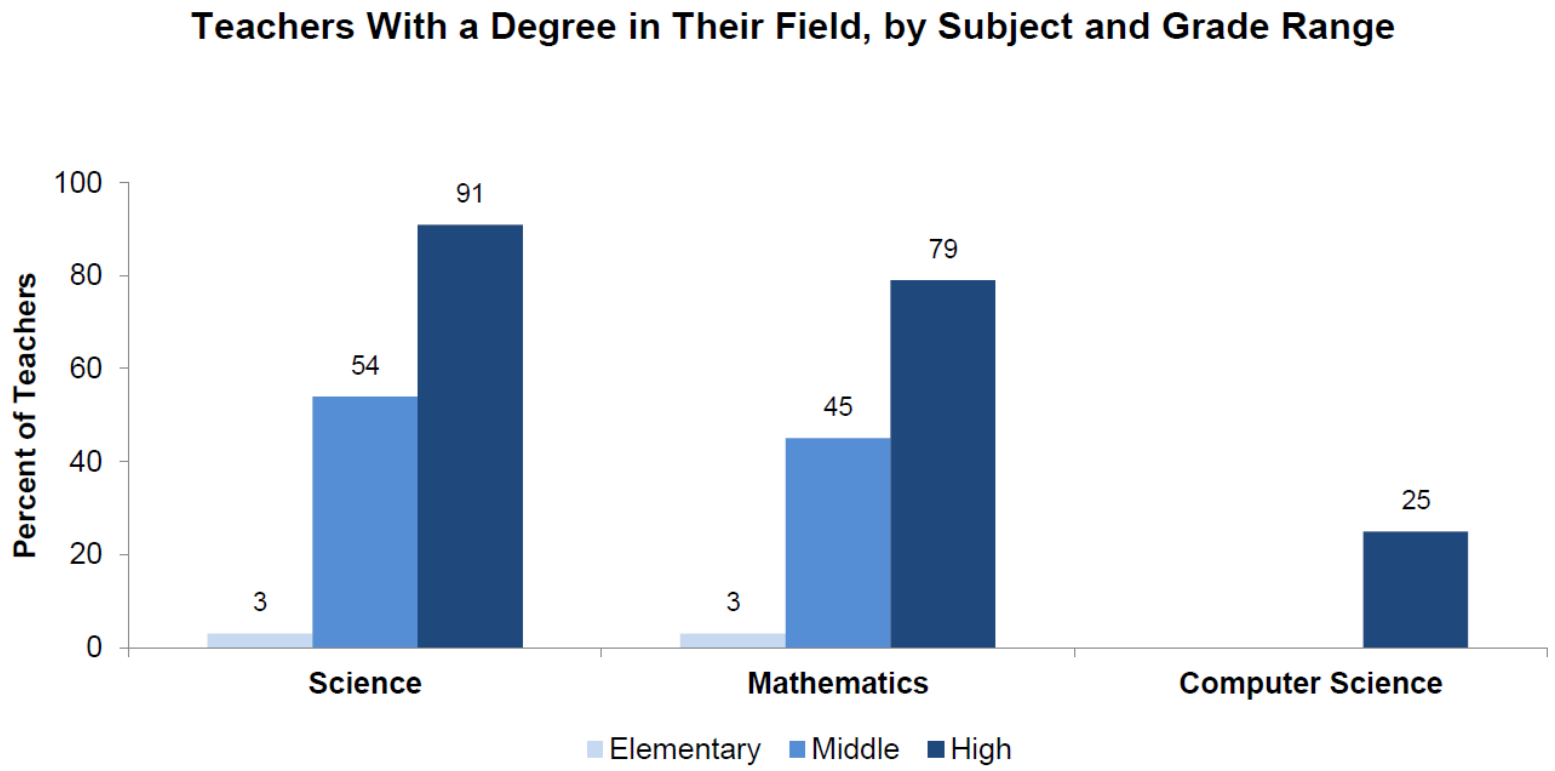
TEACHER PREPAREDNESS – DEGREES IN STEM



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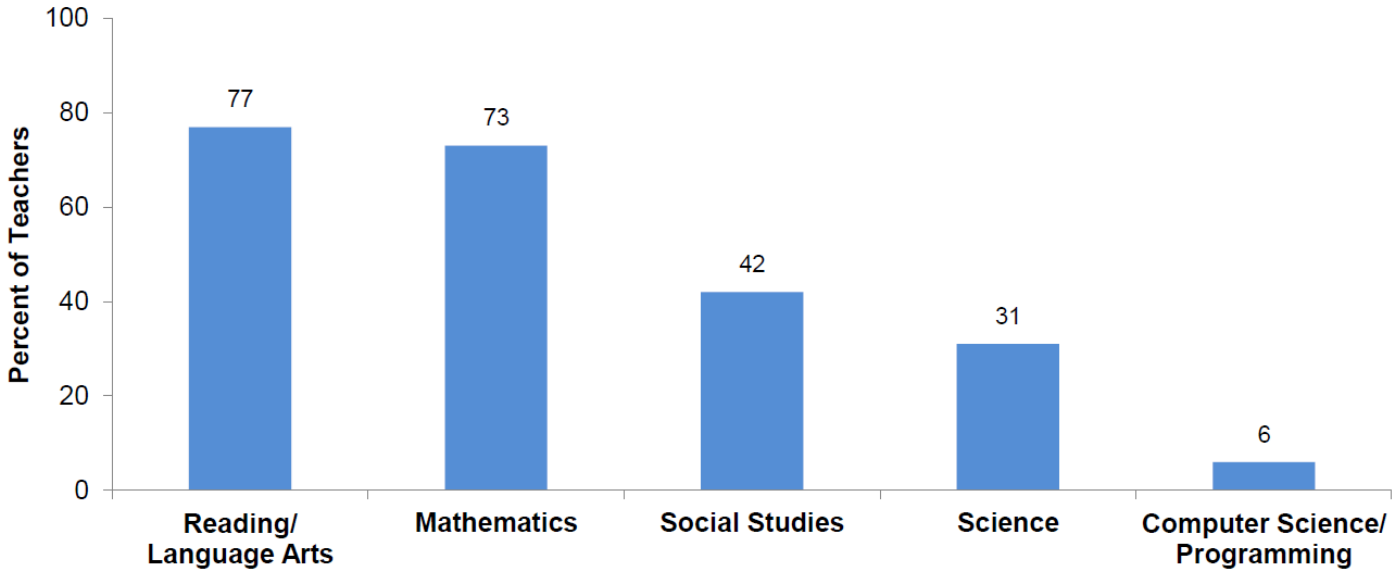
ELEMENTARY TEACHER PREPARATION

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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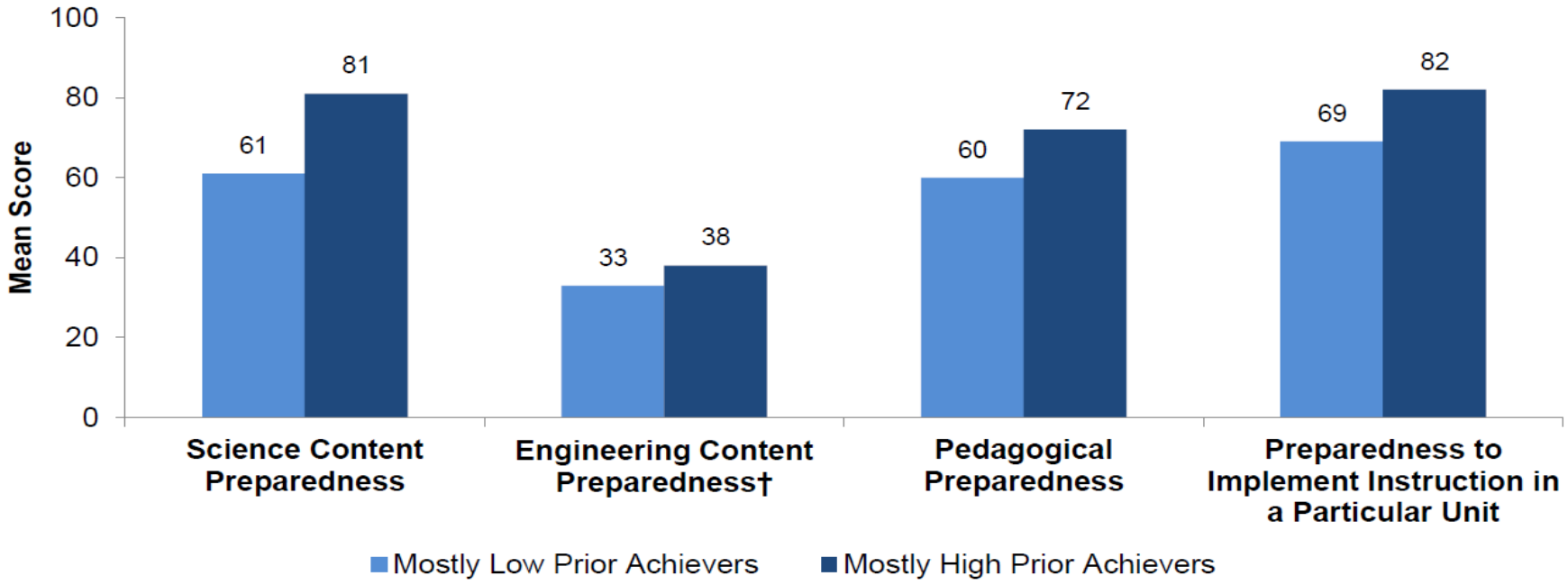
STUDENT PERFORMANCE & TEACHER PERCEPTION OF PREPAREDNESS

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



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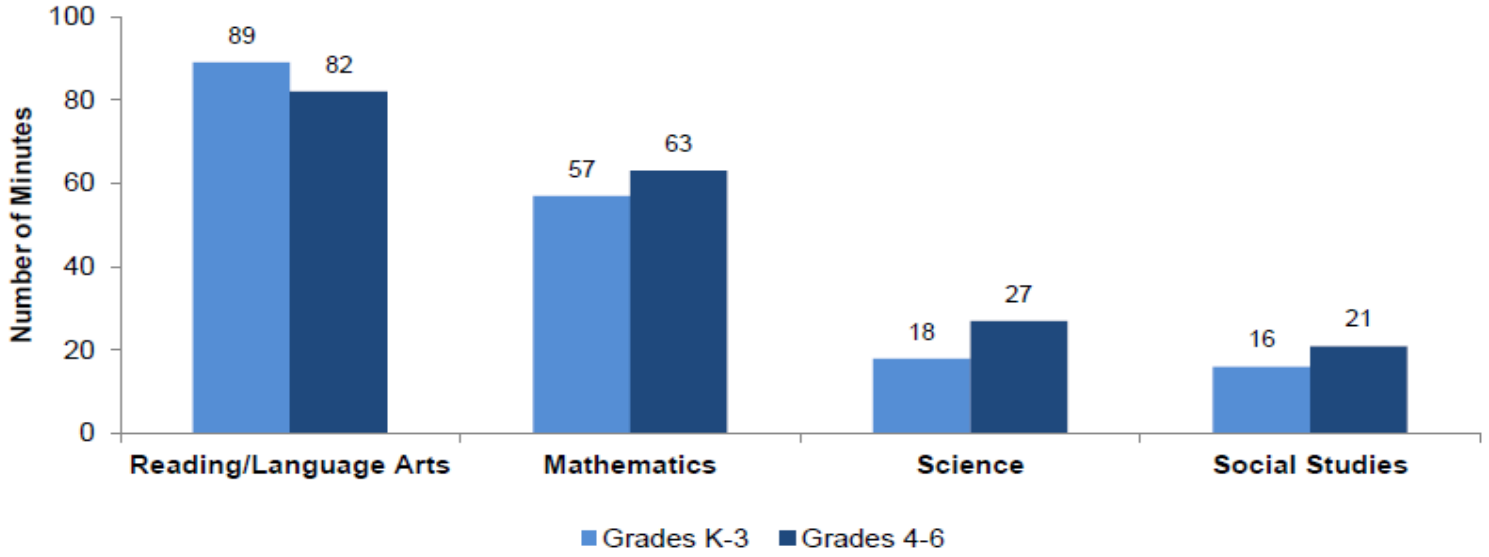
SCIENCE IN ELEMENTARY INSTRUCTION

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.

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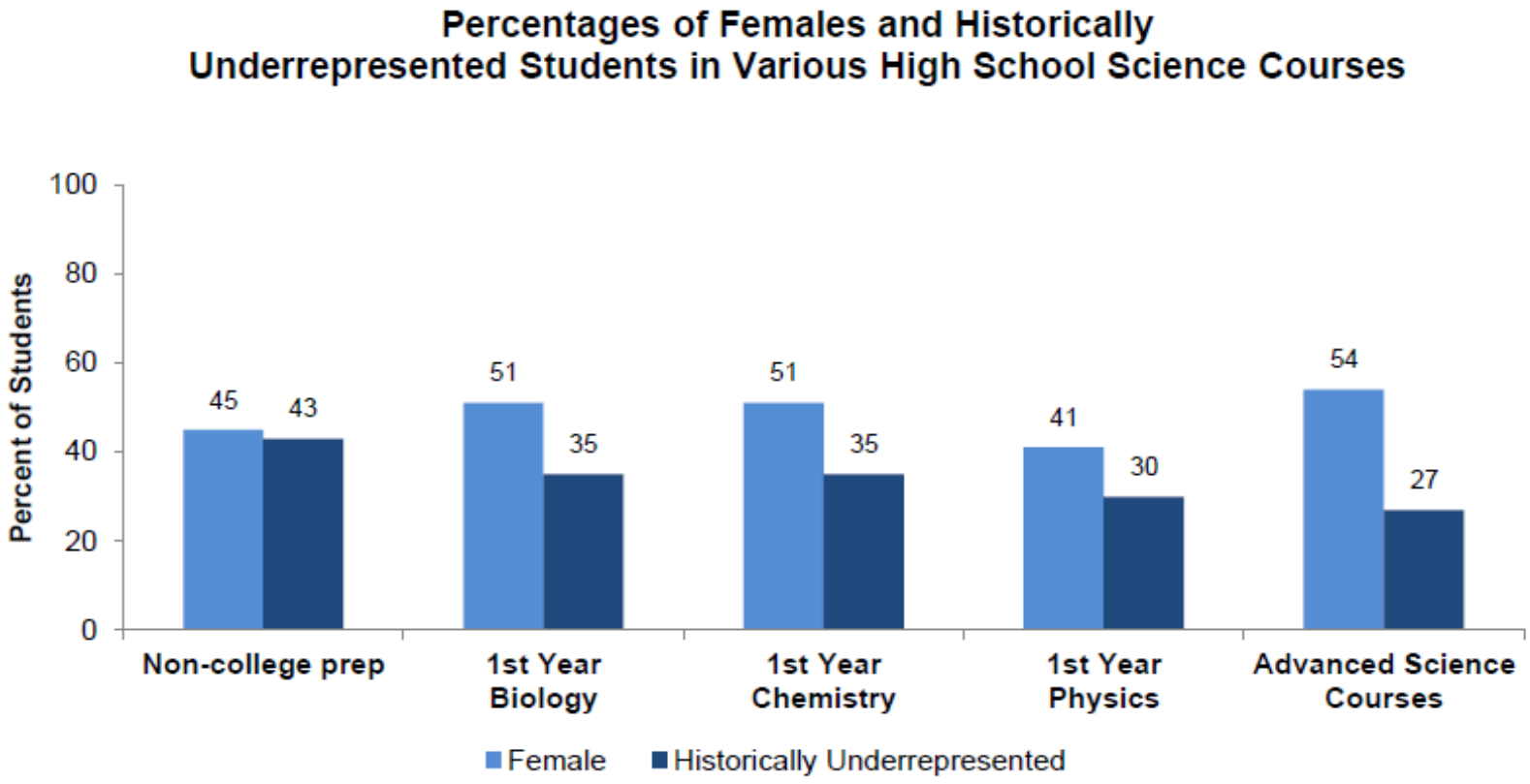
Decreasing Enrollment in STEM for Historically Underrepresented Groups



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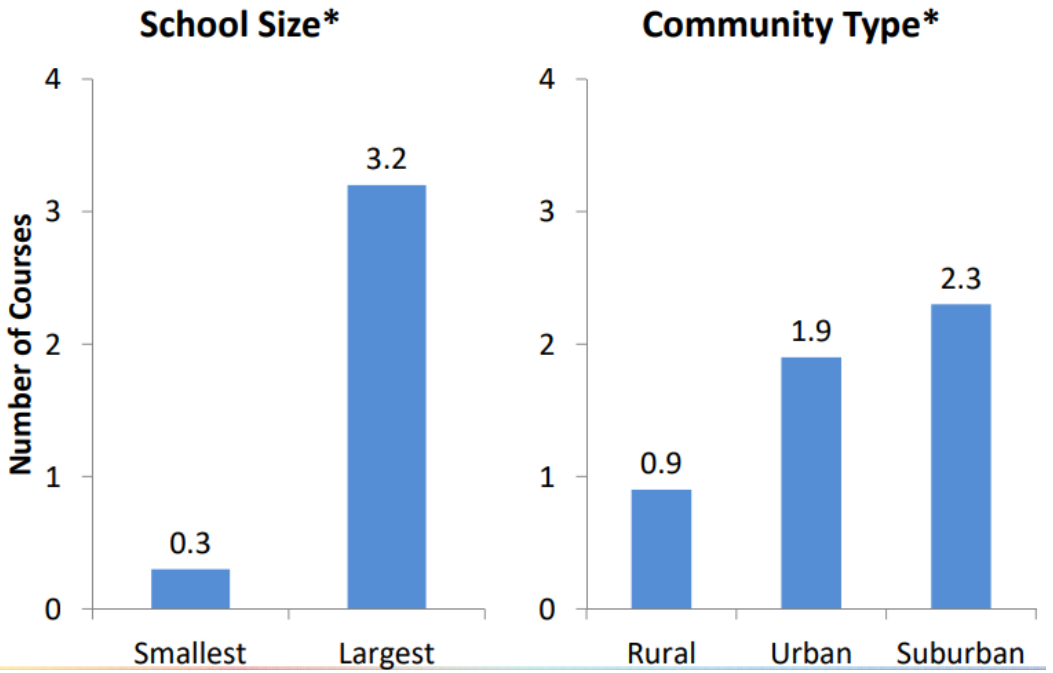
Disparities in Rural & Urban Education

AP Course Access (out of 7)



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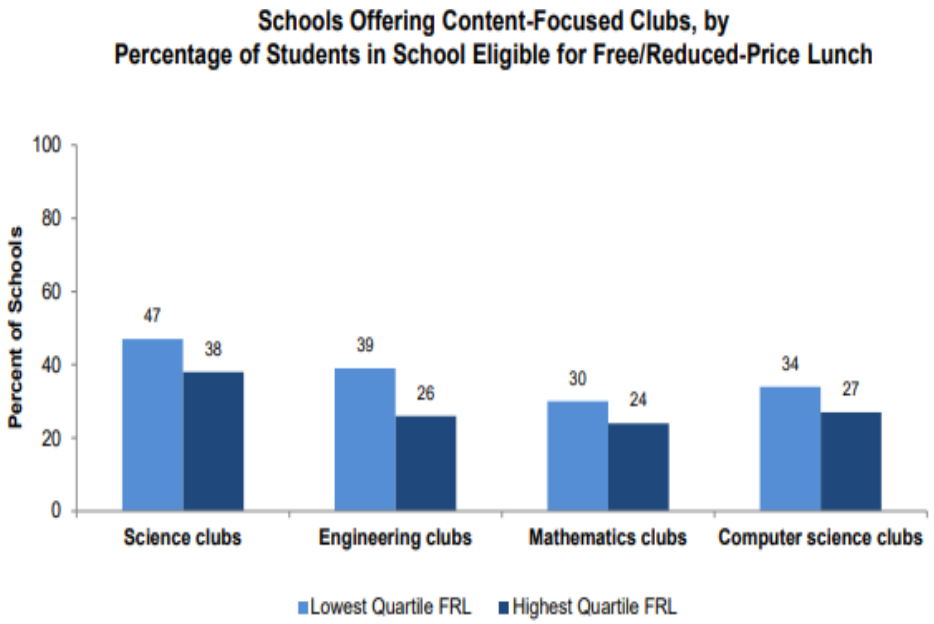
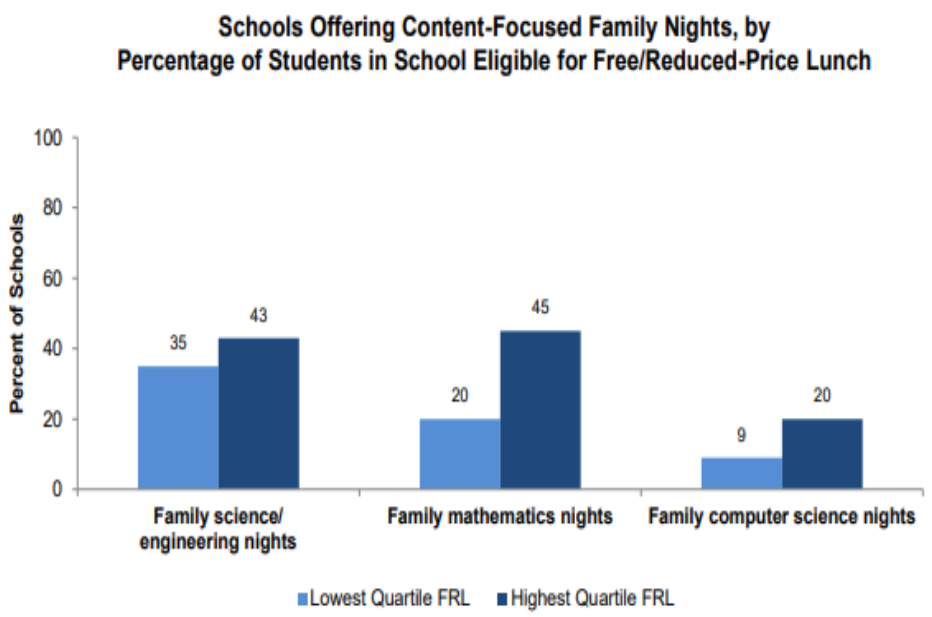
Access to Clubs & Science Nights Based





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