



N A P E

Setting the Stage: Micromessaging to Reach and Teach Every Student™

Illinois State Department of Education

August 8, 2014

Claudia Morrell



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Agenda

Topic	Approximate Time
Welcome and Introduction	20 minutes
Program Overview	45 minutes
Illinois Data	45 minutes
Building the Case for Diversity in STEM	10 minutes



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Goal

To learn about NAPE's unique approach to educator professional development and why our shared work is critical for U.S. growth and competitiveness.





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Objectives

- Define the key points and key take a ways to transform your practice
- Describe measures for student academic achievement (**PERFORMANCE**), degree and certification programs (**PARTICIPATION**), and bridging between educational levels (**PIPELINE**)
- Build a case for recruiting and retaining underrepresented students into high-tech, high-wage fields



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Activity: Welcoming Awareness

Introduce yourself to the group.

- Name
- Title
- Organization/unit





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Program Overview



Strategic Professional Development Goal

Significantly increase CTE completers, with emphasis on nontraditional students, through professional development for educators to improve classroom instruction





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Who Is NAPE?

National Alliance for Partnerships in Equity

**Professional
Development**

**Research
and
Evaluation**

**Technical
Support**

**Public Policy
and
Advocacy**



NAPE's Professional Development Suite of STEM Equity Programs

STEM Equity Pipeline™

STEM Equity for Educational Leaders

**Program
Improvement
Process for
Equity in
STEM™**

STEM Equity Teacher Training

**Micromessaging
to Reach and
Teach Every
Student™**

STEM Equity Counselor Training

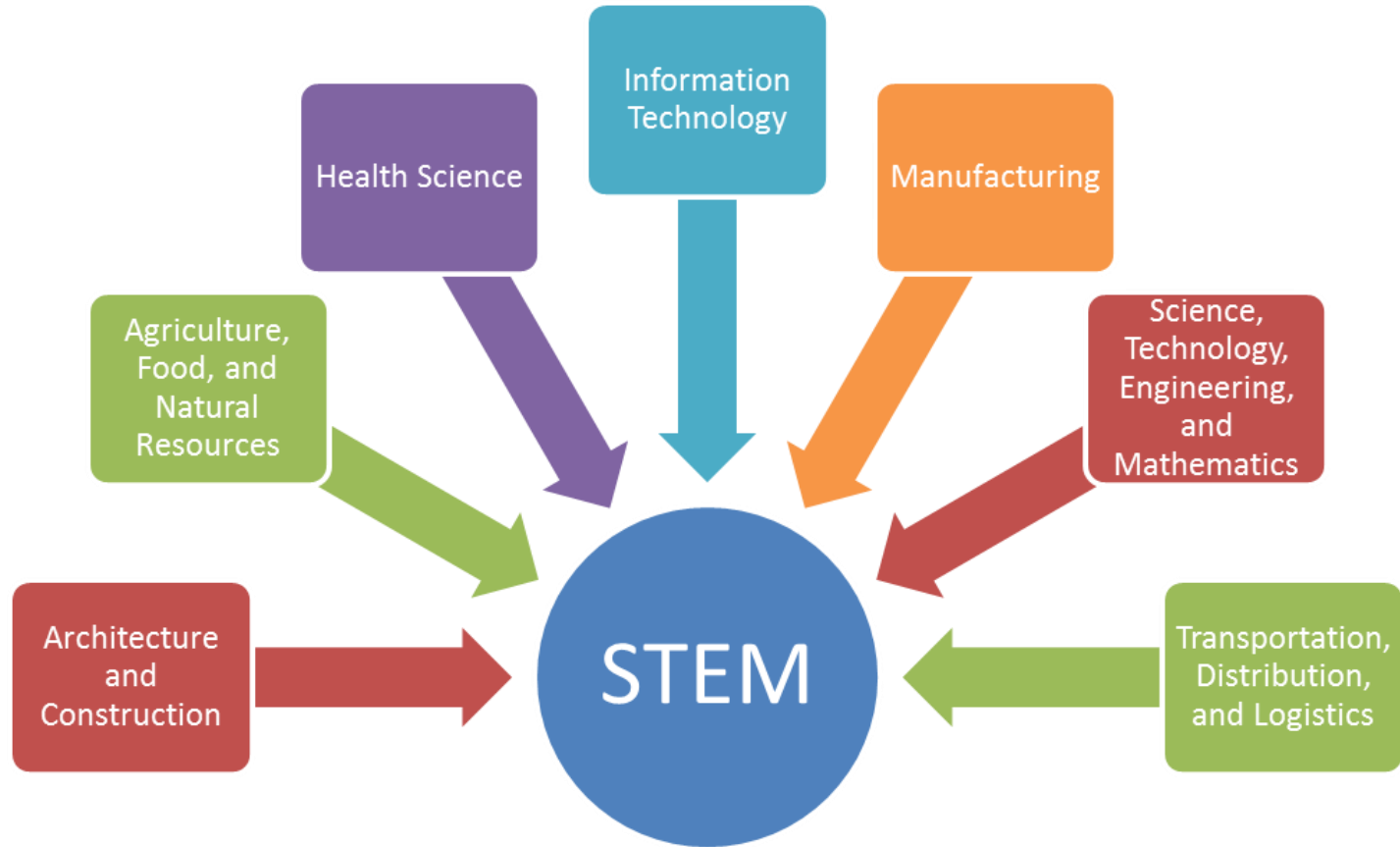
**Focus on
Counselors
Initiative™**

Tools and Resources

**Webinars, on-
line courses,
reports,
evaluation tools,
current
research,
effective
practice
resources, and
more!**



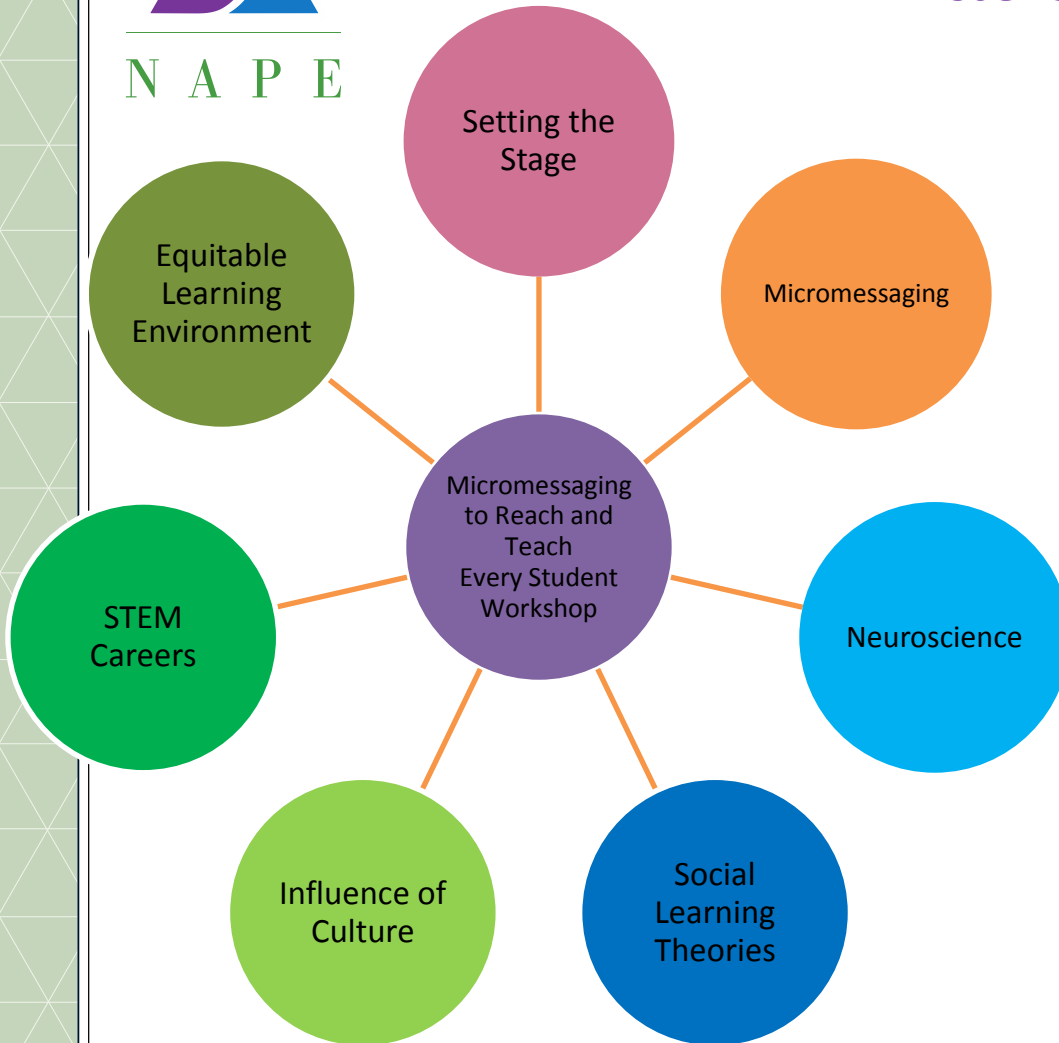
STEM's Seven Career Clusters





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What's in Store

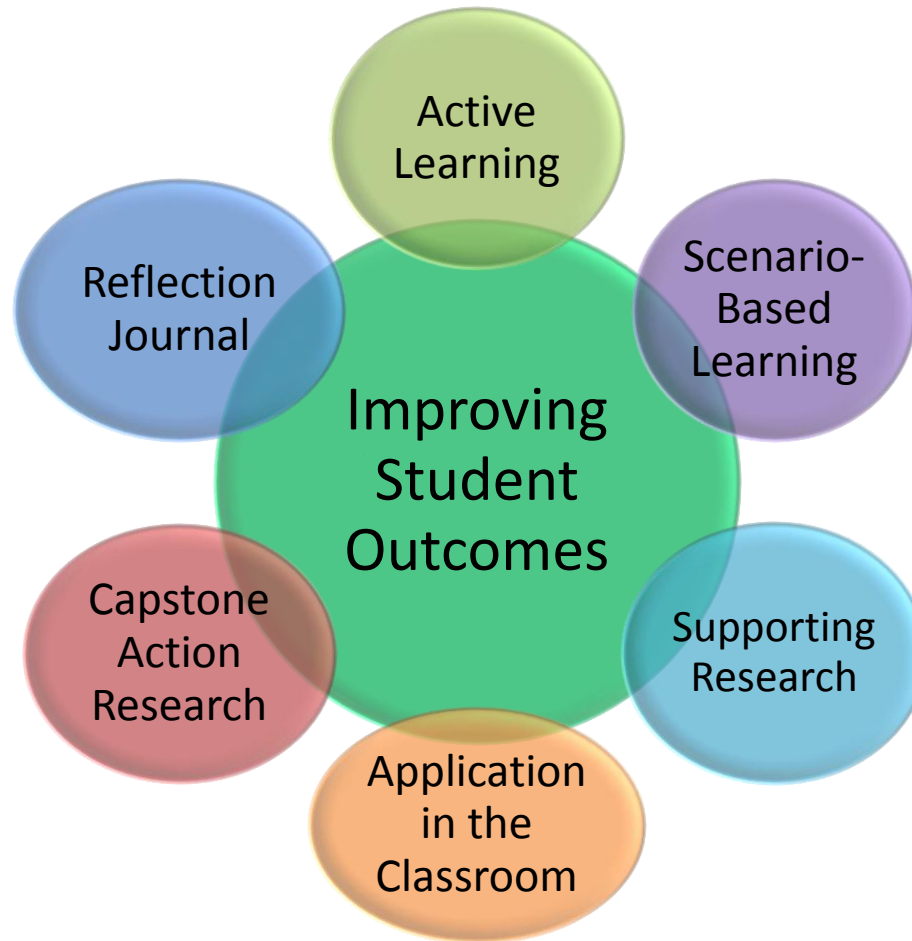


Setting the Stage: In this unit participants will learn to apply a data-driven process for program-based continuous improvement.

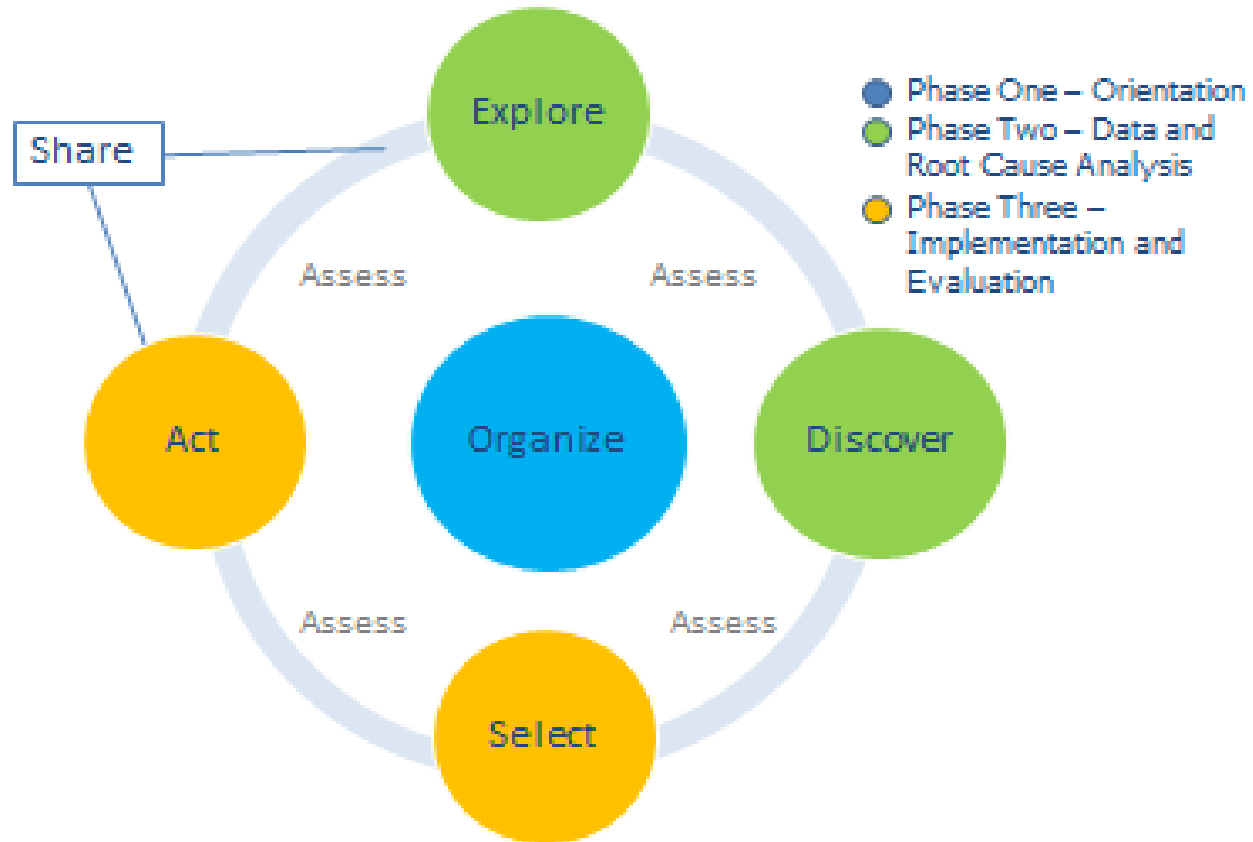


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Making It Happen



The Educator as Classroom Scientist: PIPE-STEM



Green: Facilitated Learning
Yellow: Independent Implementation



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As a Scientist, Choose Your Variables

Independent

Dependent

Ourselves

Our classroom
and institutional
climate

Our courses
and programs

Student
responses



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The Power of the Educator!

Role Model

Extended Contact

Change Agent

INFLUENTIAL

Mentor

Critical





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Explore the Data



Performance



Participation



Pipeline





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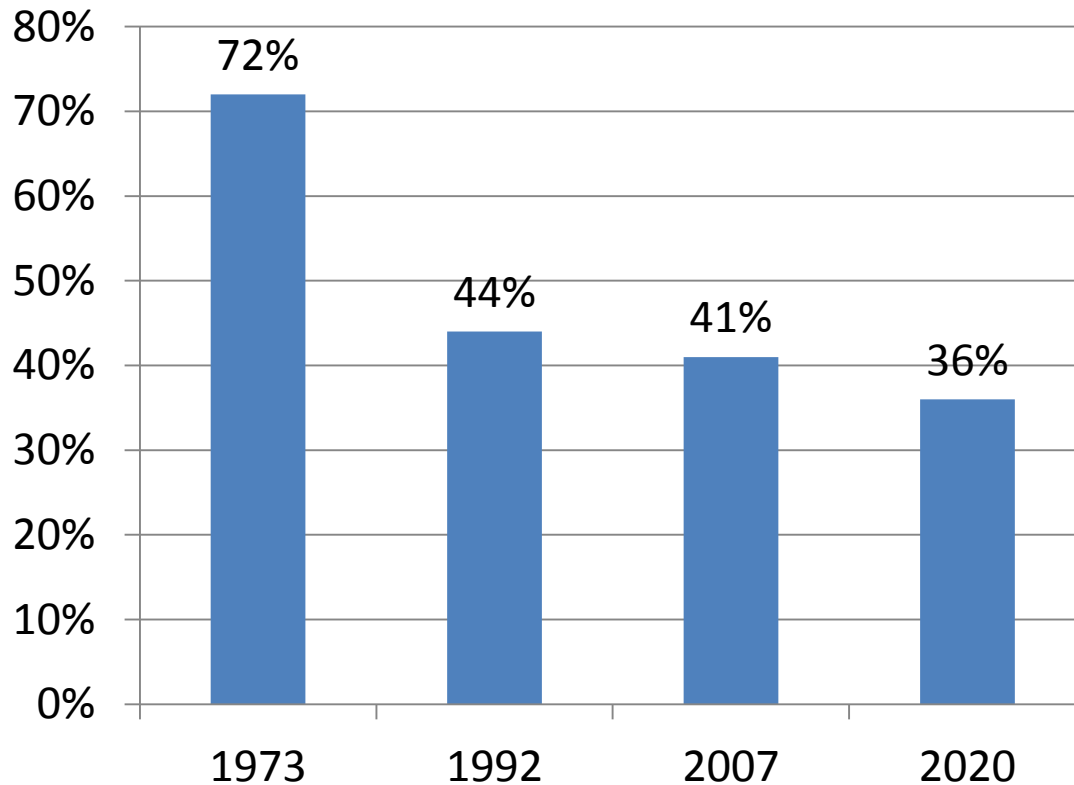
Education

**Demand for postsecondary
education will increase from
59% - 63% of all jobs by 2018**



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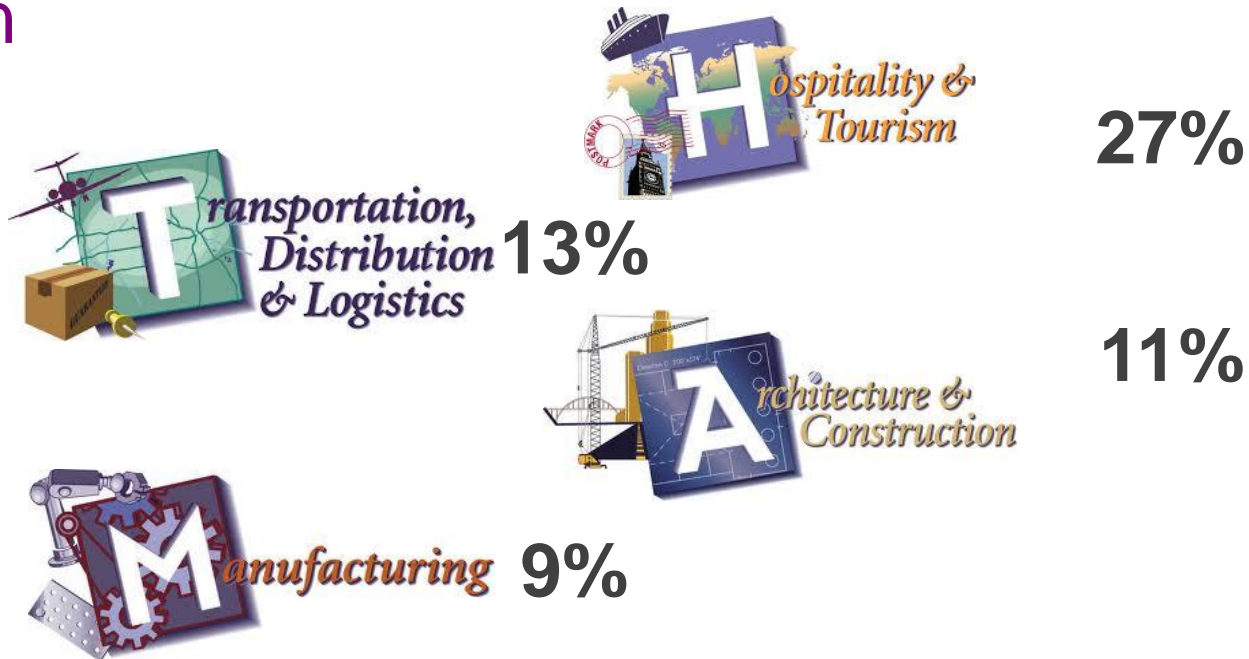
Jobs for workers with only a high school diploma or less than high school still exist but are quickly declining





Jobs for workers with a high school diploma or less are concentrated in four career clusters

- 60% of all new and replacement jobs in the U.S. economy between 2008 and 2018 will be in





Best opportunities for workers with a high school diploma are in male-dominated fields

- Over 80% of the workforce in
 - Manufacturing
 - Architecture and Construction
 - Transportation, Distribution, and Logistics

Are men



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Nontraditional Careers

Where less than 25% of the individuals employed in the field are of one gender



Examples of Nontraditional Career Fields

Women

- Transportation, Distribution, Logistics
- Manufacturing
- Science, Technology, Engineering and Math
- Information Technology

Men

- Cosmetology
- Early Childhood Ed.
- Health Care
- Elementary Education
- Human Services



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For students in Illinois with a high
school diploma-

Where are the most job openings?

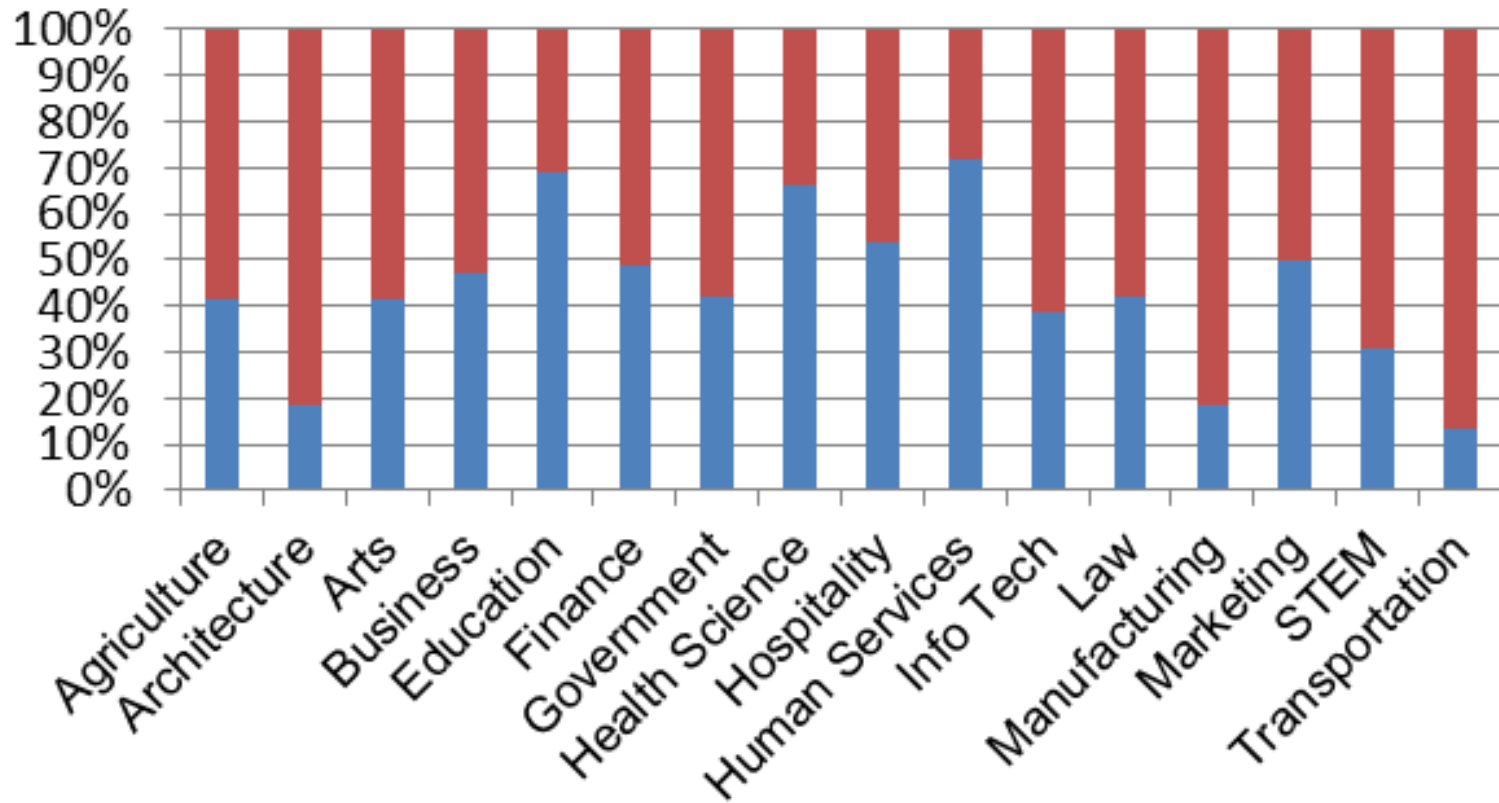
See handout page 3



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2012 Secondary Concentrators

Female Male





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Secondary Career Cluster Concentrators Dashboard



2013 Top 8 Participation CIPs in Illinois

CIP	Program	Total Students	% male/female
19.0709	Child Care Provider	23,731	18% male
52.0401	Admin. Asst.	11,462	54% male
47.0604	Auto Mechanic	10,041	8% female
15.1301	Drafting & Design	9469	14% female
01.0201	Ag. Mechanization	8155	26% female
01.0601	Applied Horticulture	8139	43% female
12.0500	Cooking/Related	7844	56% female
03.0101	Natural Resources	6774	37% female

See handout page 9



2013 Top 8 Completion CIPs in Illinois

CIP	Program	Total Students	% male/female
47.064	Auto Mechanic	2204	8% female
51.3902	Nursing Assistant	1929	14% male
12.0500	Cooking/Related	1495	60% female
10.0303	Desktop Publishing	1232	53% male
52.0401	Admin. Asst.	974	46% male
19.0709	Child Care Provider	863	12% male
15.1301	Drafting & Design	779	19% female
43.0107	Criminal Justice	671	32% female

See handout page 10

CTE Area Total Spreadsheet



NON-TRADITIONAL PARTICIPANTS

FY13

CTE AREA	GENDER		AMERICAN INDIAN	ASIAN	BLACK
	FEMALE	MALE			
Agricultural	8896	14968	36	100	716
Business	7927	9887	59	479	2130
FCS	44367	24482	171	1583	8801
Health	6720	1353	15	513	1366
Industrial	8247	40335	145	1095	4045
TOTAL	76157	91025	426	3770	17058
FY12					
Agricultural	9299	15474	56	95	939
Business	9739	12239	65	640	2694
FCS	55449	30775	256	2210	12140
Health	7855	1613	23	641	1868
Industrial	10862	50176	199	1540	6360
TOTAL	93204	110277	599	5126	24001

FY13

YEAR	CTE AREA	SPECIAL POPULATION				
		STUDENT W/ DISABILITY	LIMITED ENGLISH	ECONOMIC DISADVANTAGE	SINGLE PARENT	DISPLACED HOMEMAKERS
FY13	Agricultural	3423	109	8029	44	0
	Business	1812	217	6371	21	0
	FCS	9131	1148	27875	50	0
	Health	527	87	3821	4	0
	Industrial	7146	797	18468	10	0
	TOTAL	22039	2358	64564	129	0



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Workers with postsecondary middle skills (some college/no degree or an Associate's degree) comprise **29%** of all job openings by 2018



Jobs for workers with postsecondary middle skills are concentrated in six career clusters

- 64% of all new and replacement jobs in the U.S. economy between 2008 and 2018 will be in



8%



9%



9%



10%



13%



16%



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For students in Illinois with a some college or an associates degree-

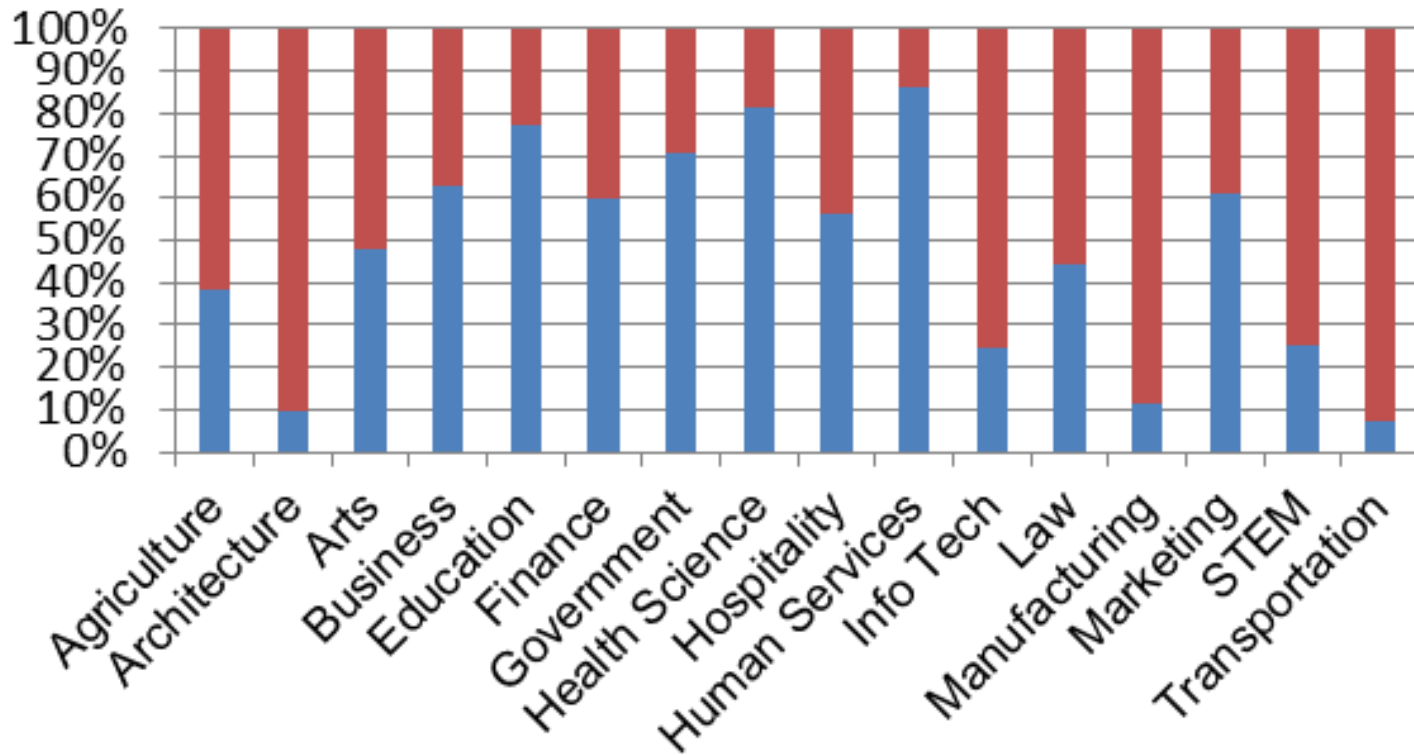
Where are the most job openings?



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2012 Postsecondary Concentrators

Female Male





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Postsecondary Career Cluster Concentrators Dashboard



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Women need postsecondary education to earn wages that men with a high school diploma earn



Jobs for workers with a Bachelor's degree are concentrated in nine career clusters

- 72% of jobs available for workers with a Bachelor's degree or better are found in nine career clusters
- At this level essentially all career clusters are essentially accessible
- The remaining 28% of jobs for workers with a Bachelor's degree or better pay the highest wages
- A Bachelor's degree is not a guarantor to high-paying jobs



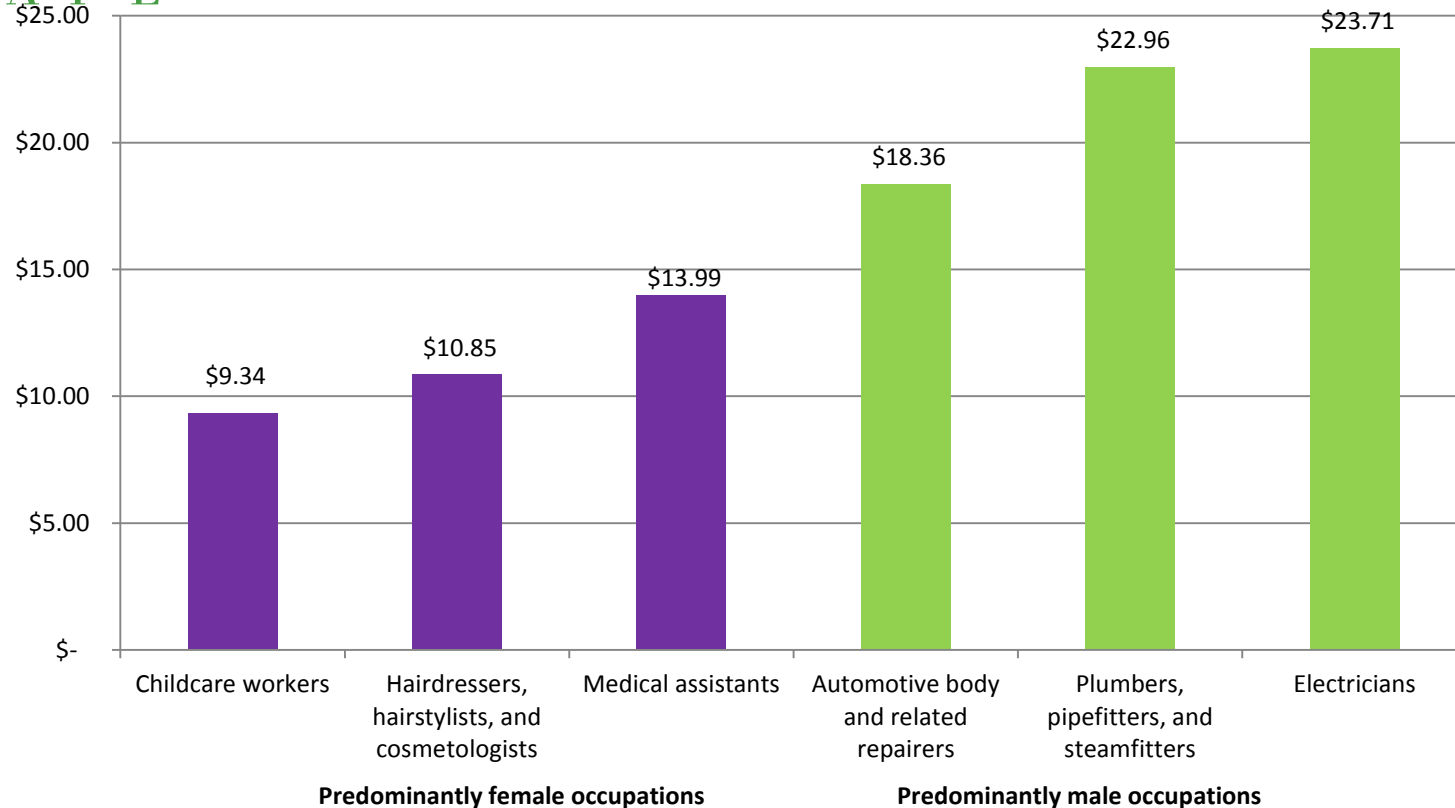
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Career Choice Matters



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Women found in lower paying career preparation programs than men



Median Hourly Earnings for Selected Predominantly Female and Male Occupations

Source: Bureau of Labor Statistics, Occupational Employment Statistics, May 2011



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The fastest growing clusters have the highest concentration of postsecondary workers

Health Science is projected to rank first in the number of jobs added and second in growth rate through 2018



Many of the larger career clusters grow slowly and do not pay a living wage

- STEM cluster pays the highest wages overall, an average of \$74,000
- Hospitality and Tourism averaged \$29,000 in 2008
- STEM and Information Technology are the best paying career clusters for workers with middle skills



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31% of workers with an Associate's degree earn more than the average worker with a Bachelor's degree



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Gender wage gap varies by cluster

- Difference in wages between men and women across clusters ranges from

**\$2000 in Architecture and
Construction**



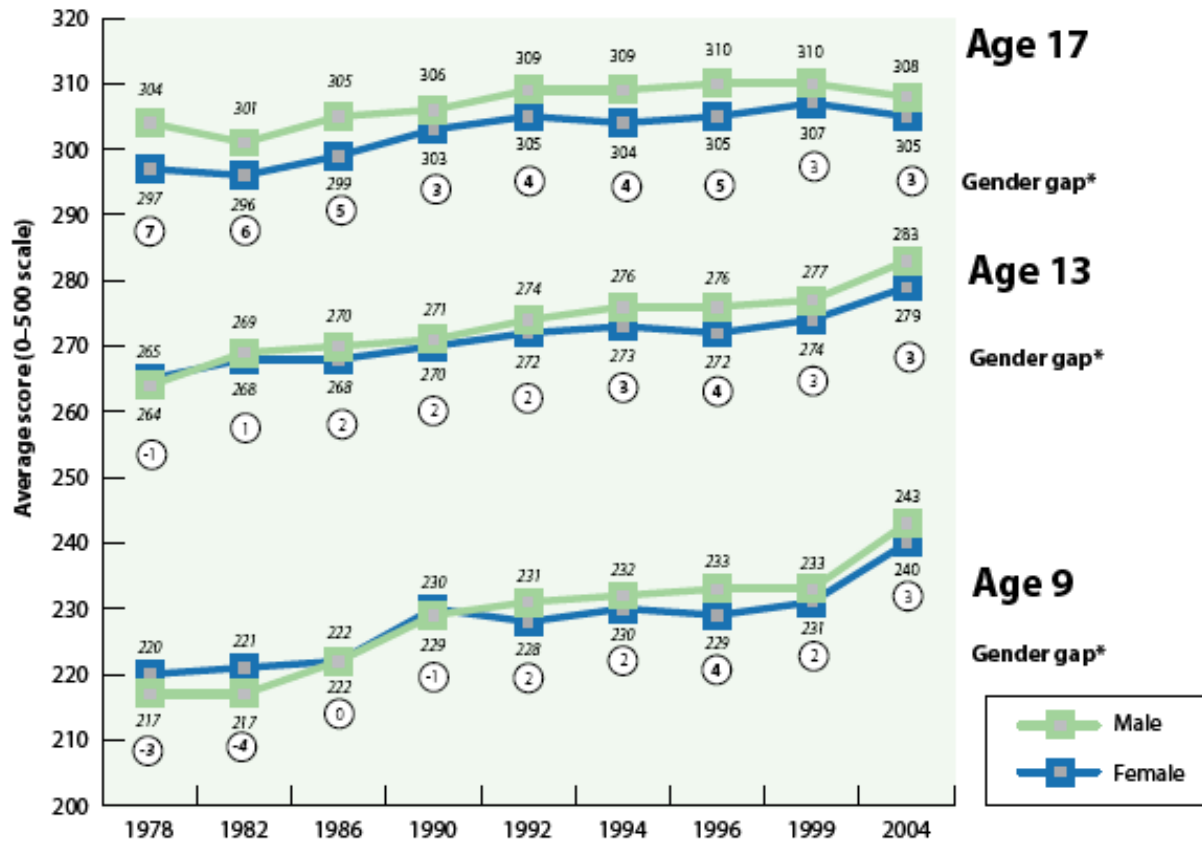
\$69,000 in Health Science
**The smallest gender wage
gap is in STEM**



STEM Performance

Core Academic-Longitudinal Data

FIGURE 2. NAEP-LTT MATHEMATICS ASSESSMENT AVERAGE SCORES, BY GENDER, 1978-2004

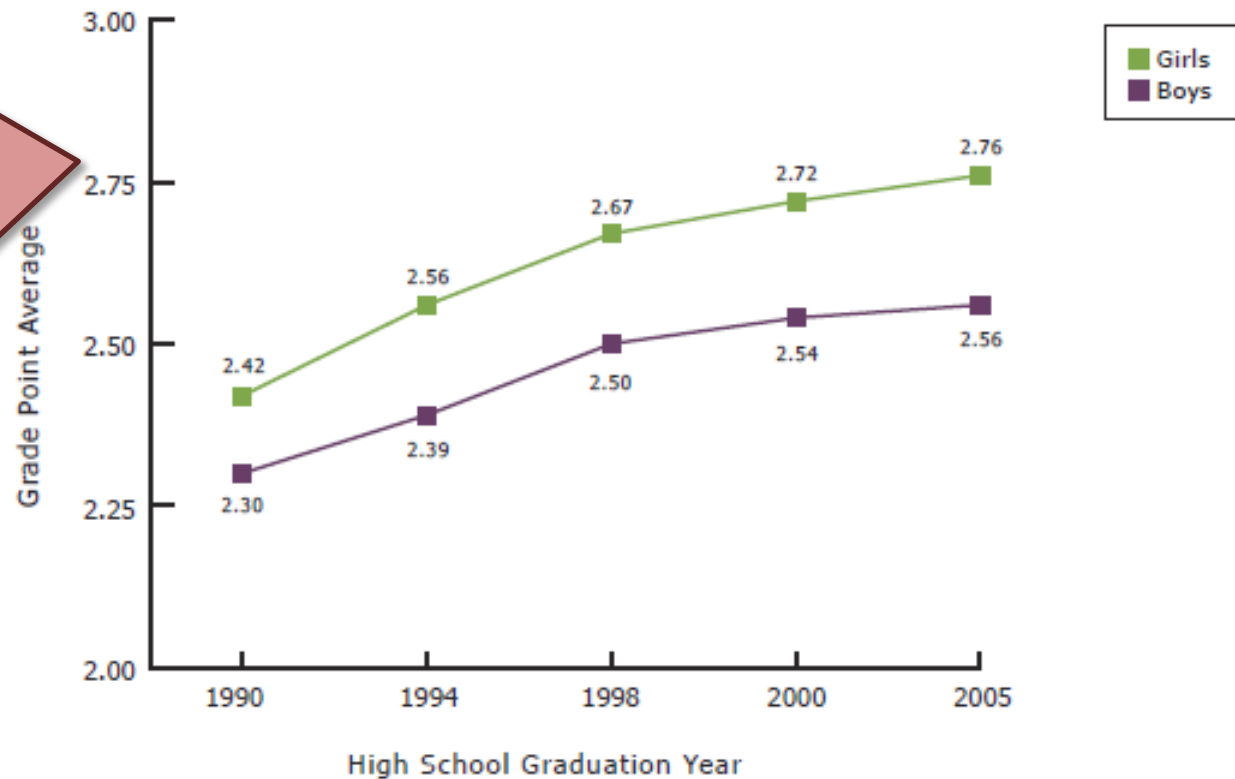




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Grade Point Average in High School Mathematics and Science (Combined), by Gender, 1990-2005

Female high school graduates now also earn higher GPAs, on average, in math and science, than their male peers do.



Source: U.S. Department of Education, National Center for Education Statistics, 2007, *The Nation's Report Card: America's high school graduates: Results from the 2005 NAEP High School Transcript Study*, by C. Shettle et al. (NCES 2007-467) (Washington, DC: Government Printing Office).

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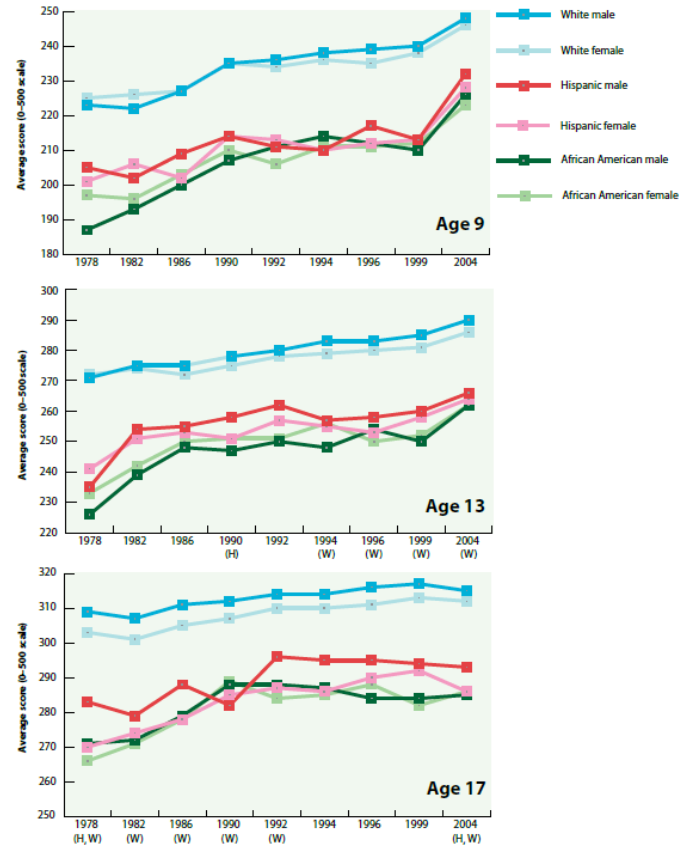
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STEM Performance Gaps—Race

White males and females out perform Hispanic and African Americans on the National Assessment of Educational Progress – Mathematics Assessment

Race

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Note: A, H, and W indicate years in which there was a significant gender difference in scores among African American (A), Hispanic (H), or white (W) students.

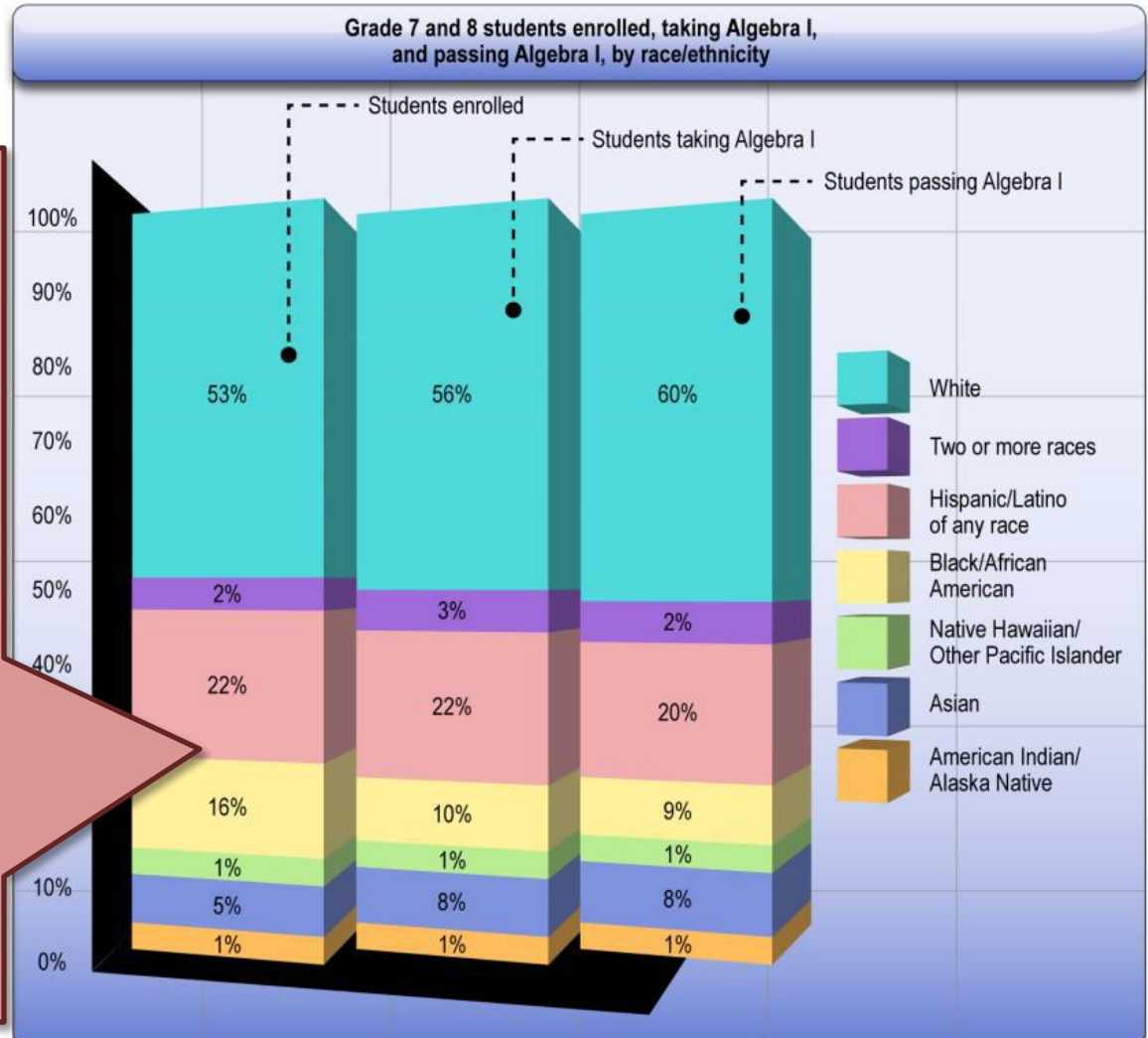
Source: U.S. Department of Education, National Center for Education Statistics, NAEP Data Explorer, Washington, DC, Author.



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The Algebra I Gateway

While Latino and black students represent 38% of students enrolled in grades 7 or 8, they represent 32% of students taking Algebra I in those grades and 29% of students passing Algebra I.

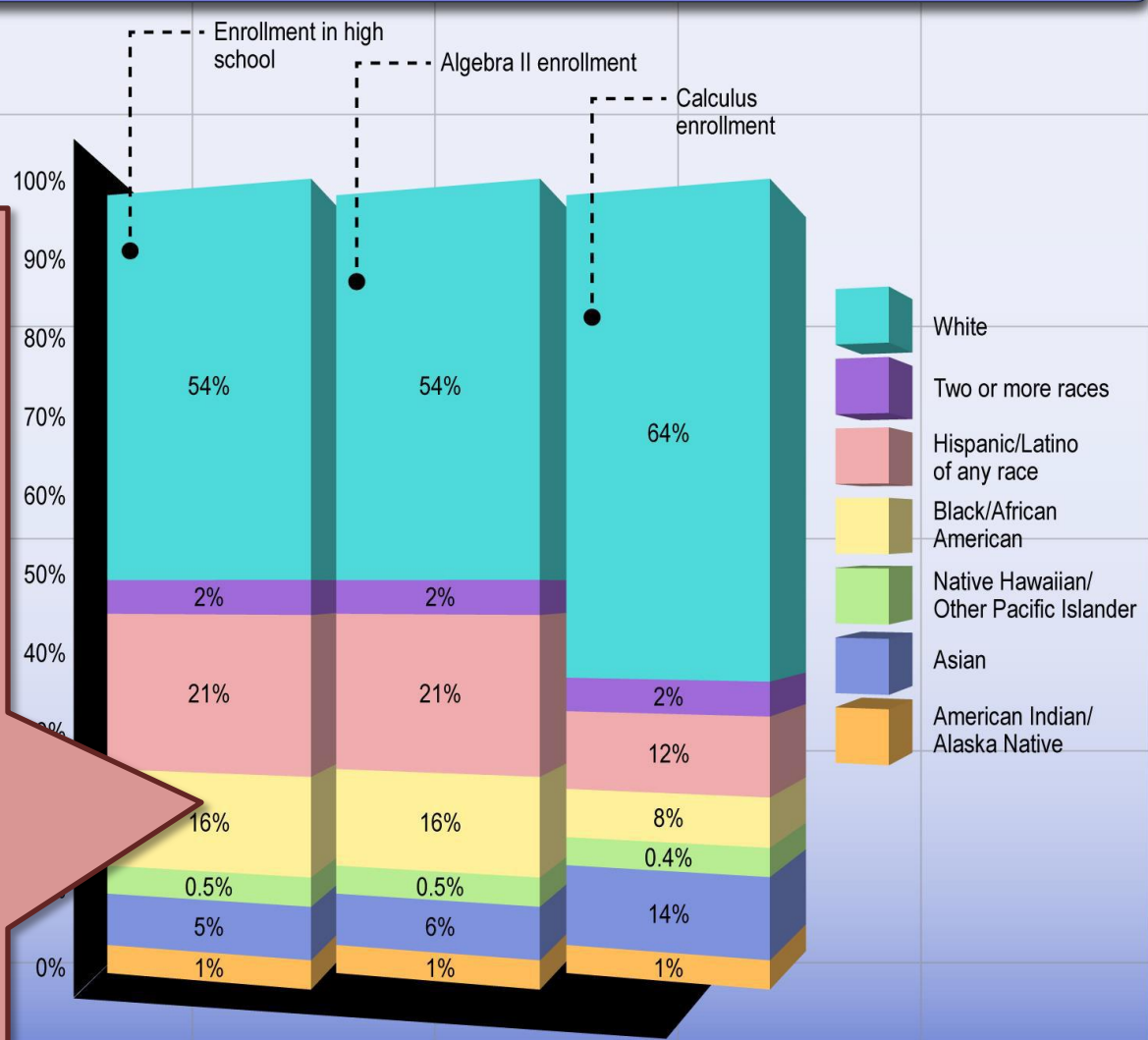




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While black and Latino students represent 16% and 21%, respectively, of high school enrollment, they are only 8% and 12%, respectively, of the students enrolled in calculus

Algebra II and calculus enrollment, by race and ethnicity

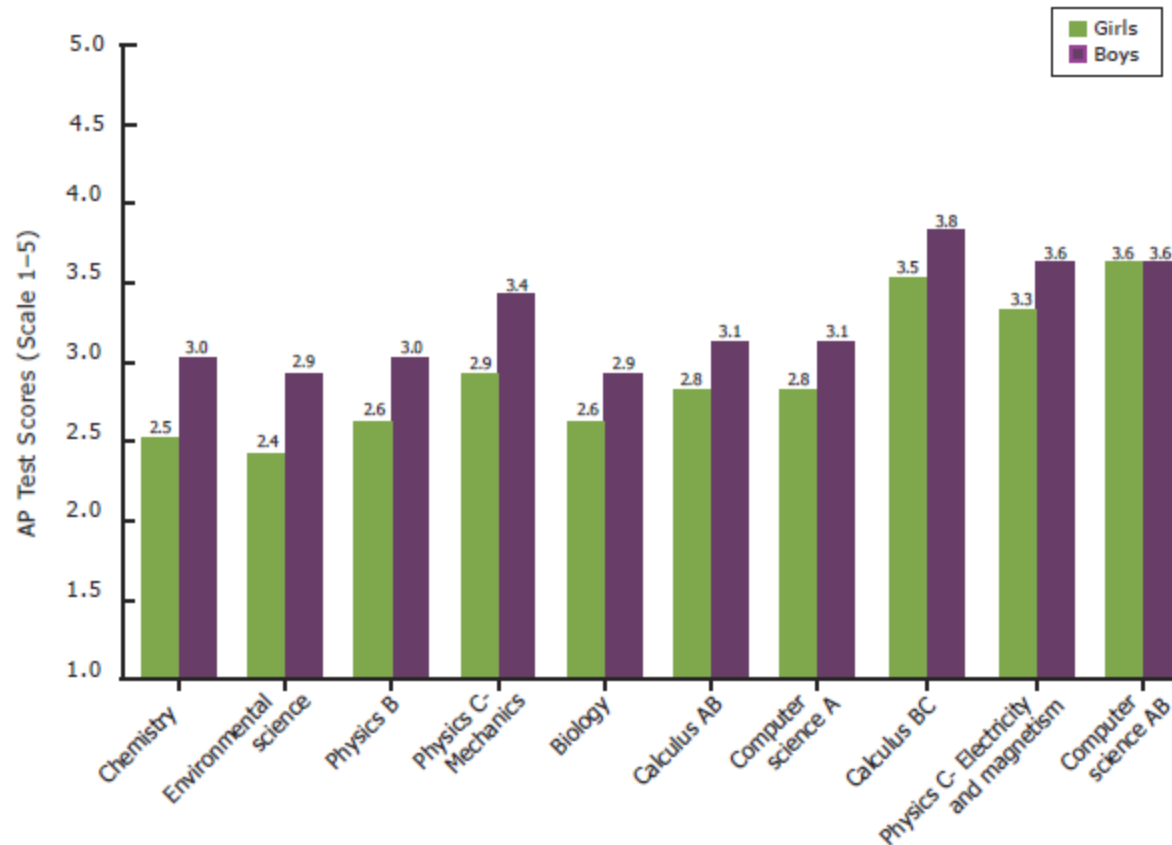




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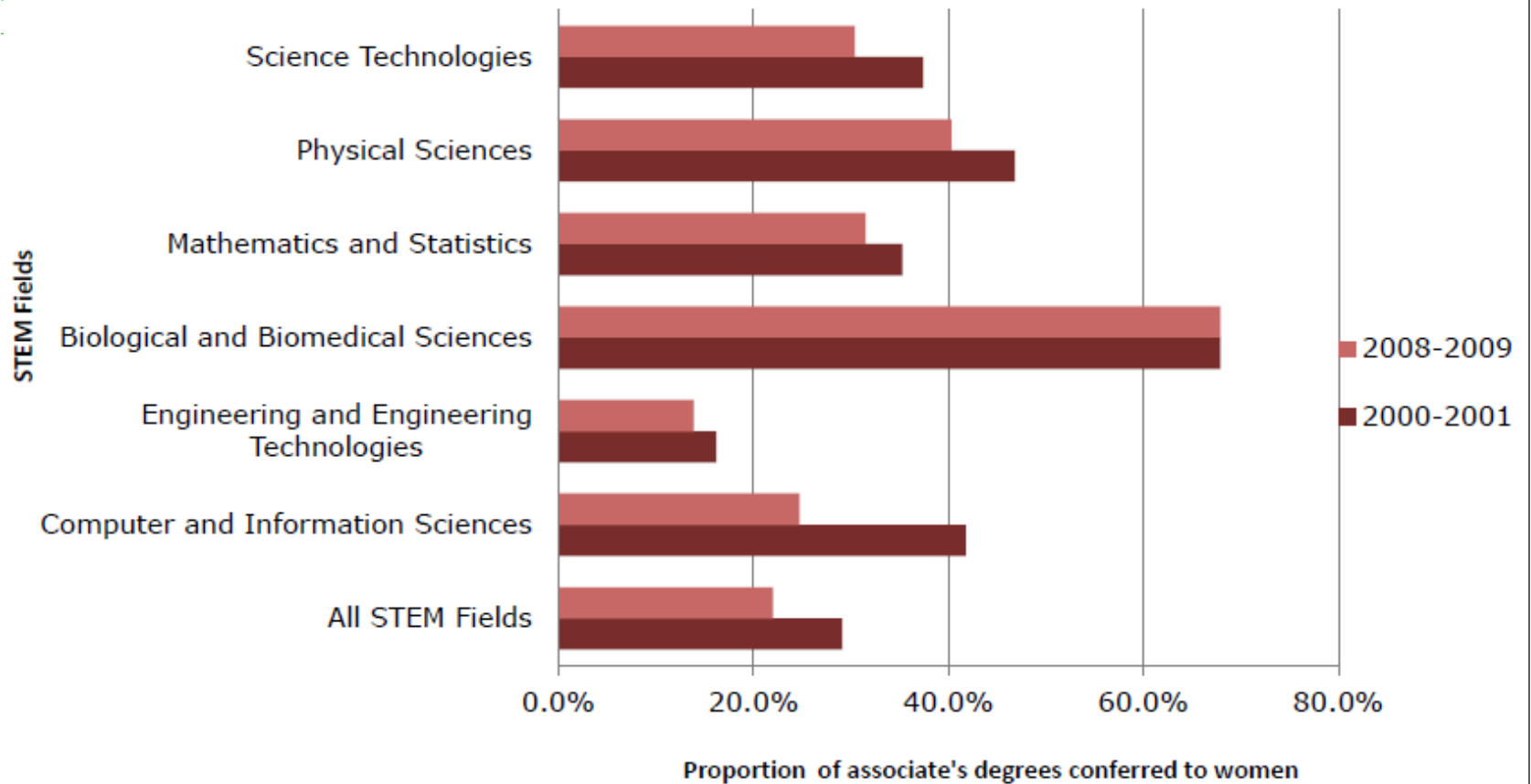
Average Scores on Advanced Placement Tests in Mathematics and Science Subjects, by Gender, 2009

Higher grades
do not translate
into higher
scores on AP
tests



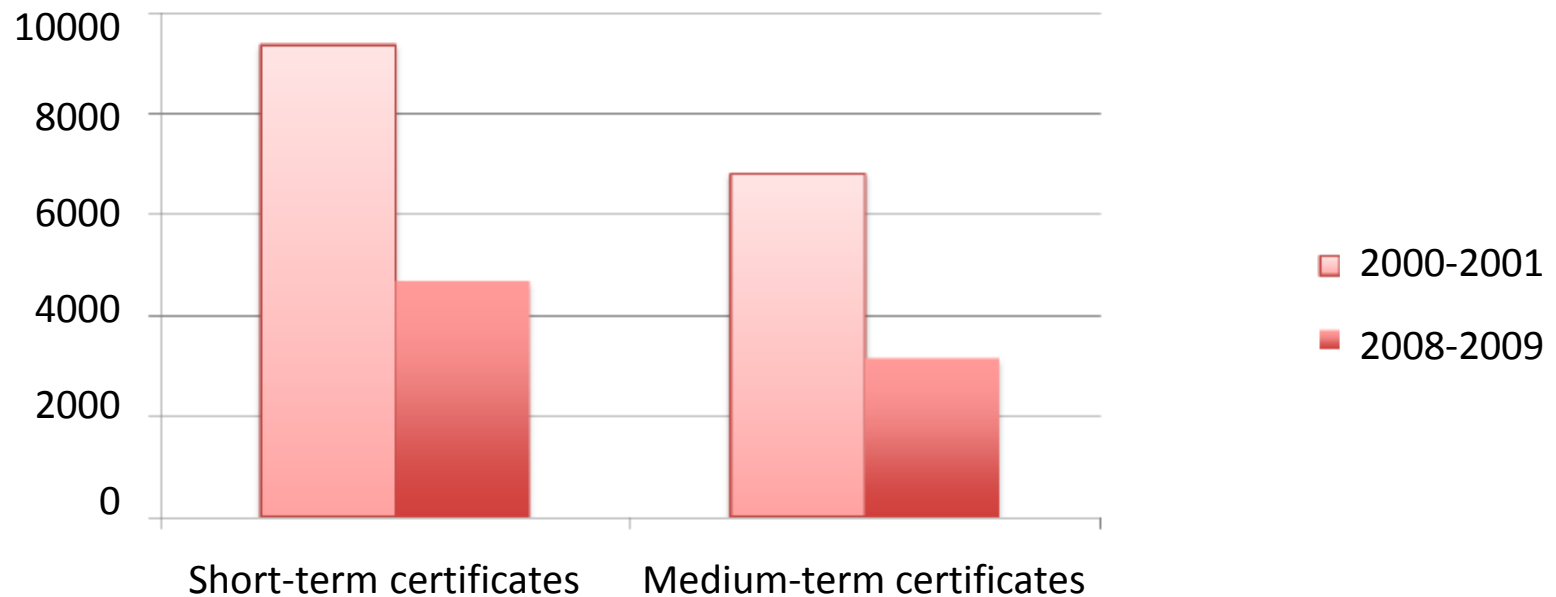
Source: Retrieved November 11, 2009, from the College Board website at www.collegeboard.com.

Figure 2. Percentage of Associate's Degrees Awarded to Women by STEM Field, 2000-2001 and 2008-09



Source: U.S. Department of Education. National Center for Education Statistics. Postsecondary Awards

Figure 3. Women's Receipt of Occupational Certificates in STEM Fields, 2000-2001 and 2008-2009



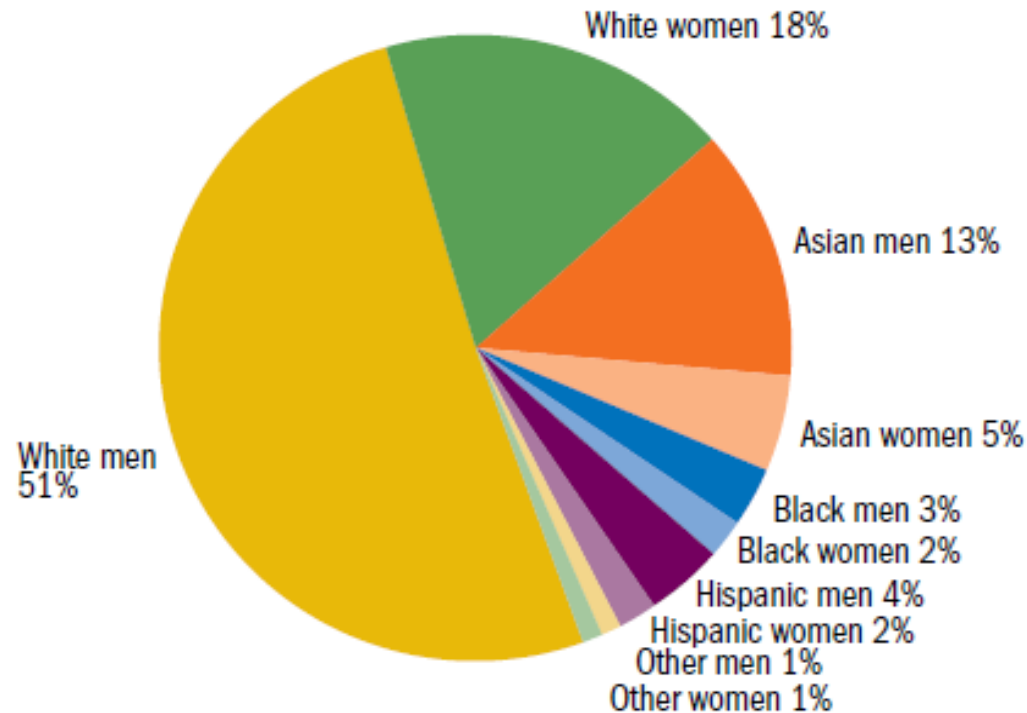
Source: U.S. Department of Education, National Center for Education Statistics. NCES2011-226





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Scientists and engineers working in science and engineering occupations: 2010



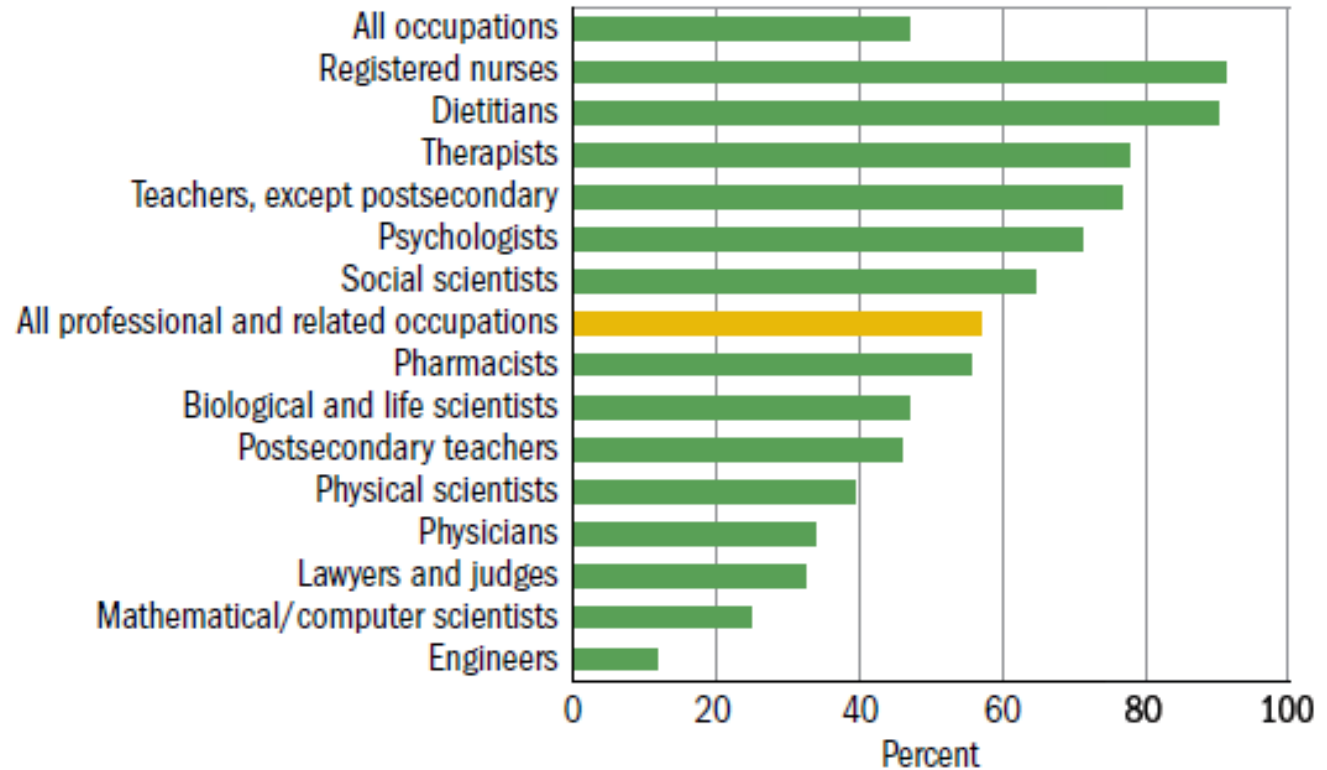
NOTE: Hispanic may be any race. Other includes American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander, and multiple race.

SOURCE: *Women, Minorities, and Persons with Disabilities in Science and Engineering*: www.nsf.gov/statistics/wmpd/.



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Employed women 16 years and older as a percentage of selected occupations: 2011



SOURCE: *Women, Minorities, and Persons with Disabilities in Science and Engineering*:
www.nsf.gov/statistics/wmpd/.



Activity

Brainstorm at your table for 5 minutes:

1. What data would you like to see to help you determine equity gaps at your school?
2. Where can you get the data you want to see?



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Status of Females and Other Underrepresented Groups in STEM



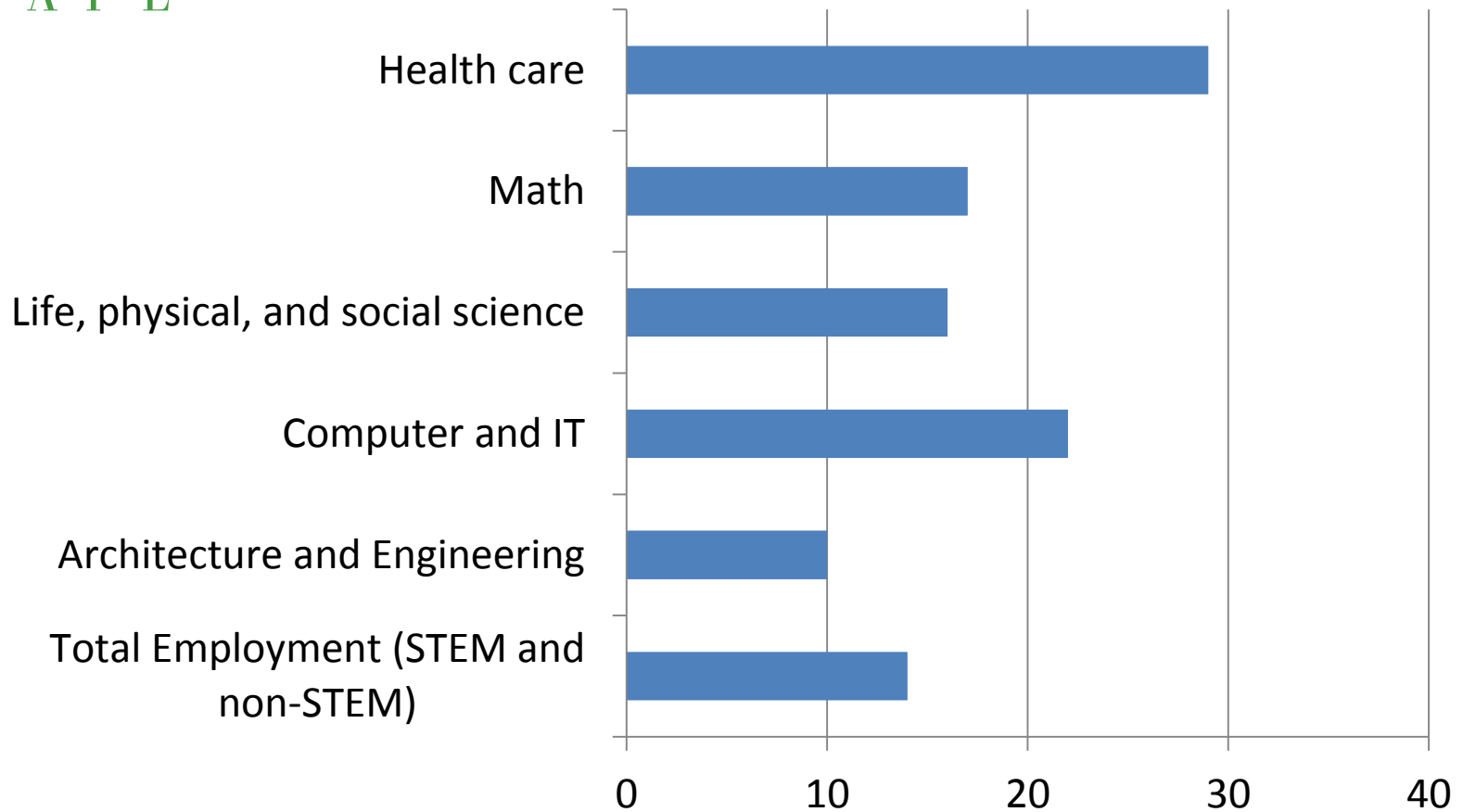
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Activity: Startling Statements

1. Interview three other people (not including yourself) and ask them to guess what they think the number is that belongs in the blank in your statement.
2. Talk to each person individually (not as a group) so they will not influence each others' answers.
3. Once you have your three answers, report out the average of your three responses (add the three and divide by three) and the range (the high and low response).



Projected Growth in Employment in Selected STEM Occupations, 2010-2020



Source: Bureau of Labor Statistics. Chart 5. *Occupational Outlook Handbook, 2011-12 Edition*.



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What You'll Do



Performance



Participation



Pipeline

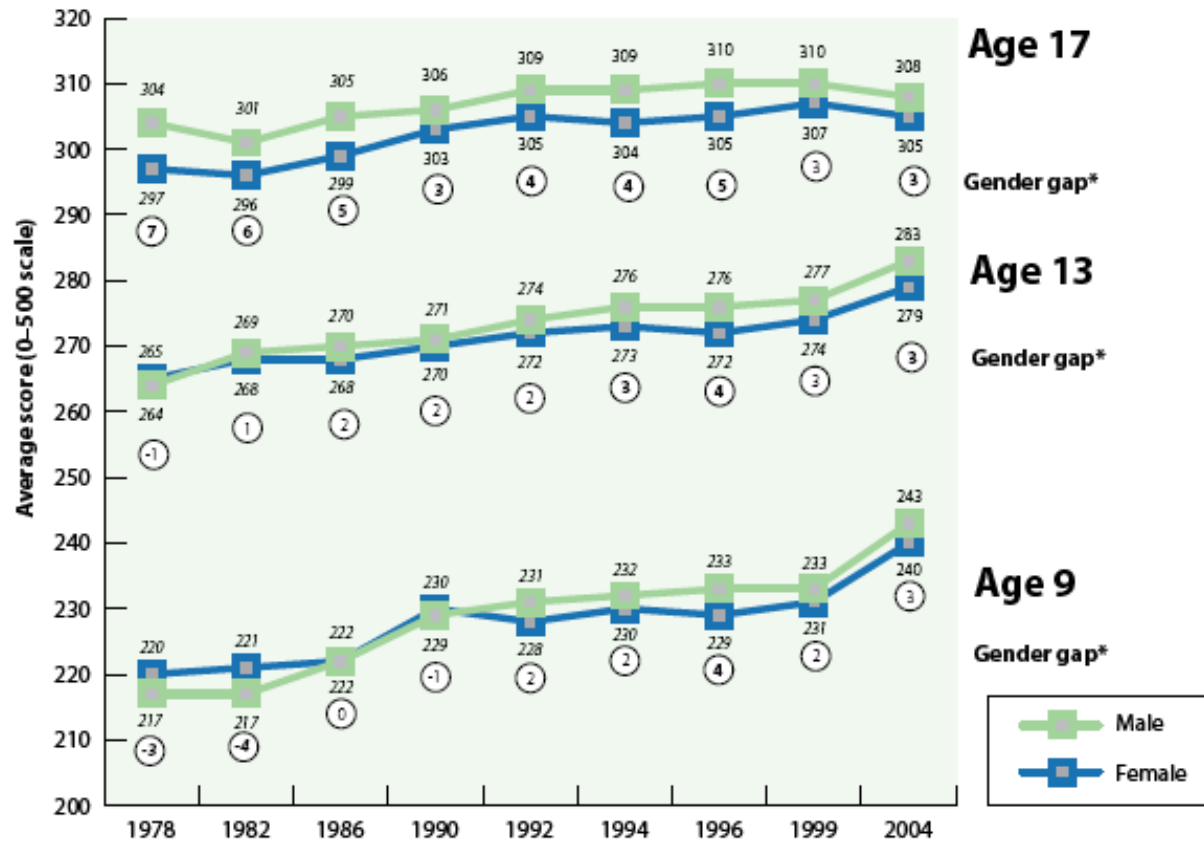




STEM Performance

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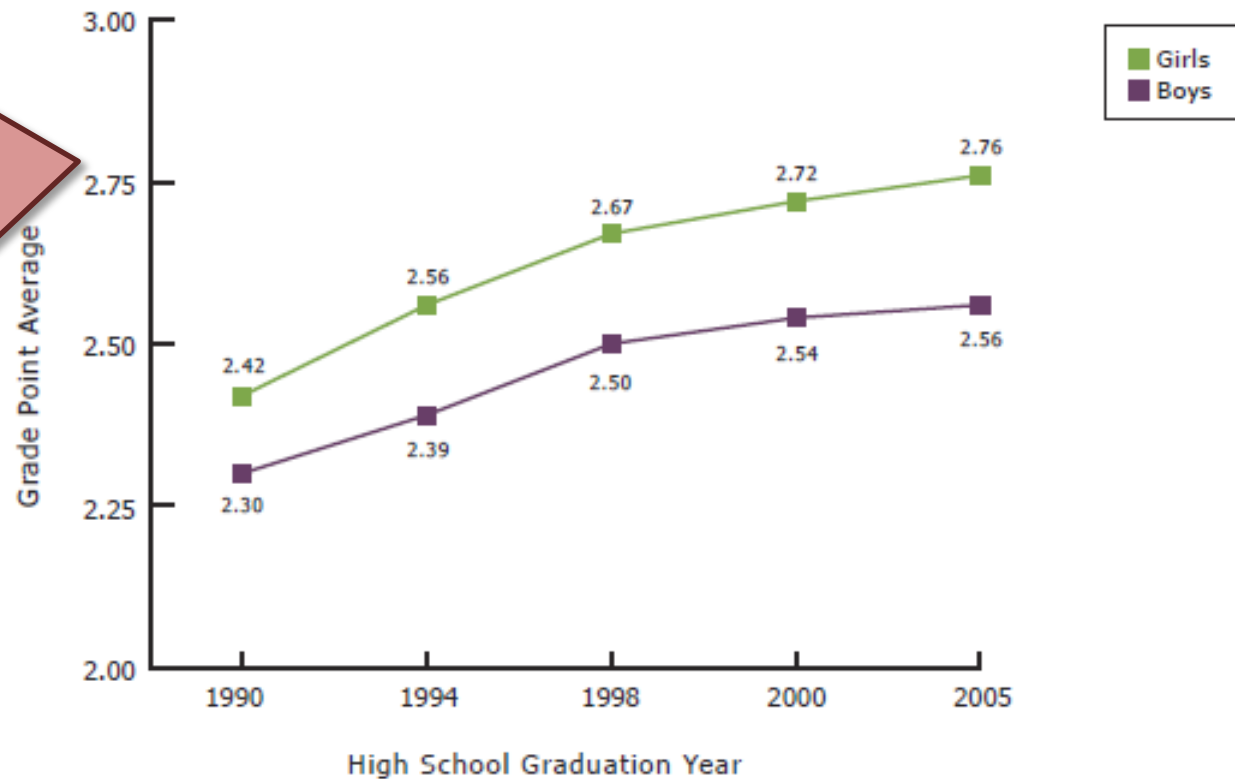




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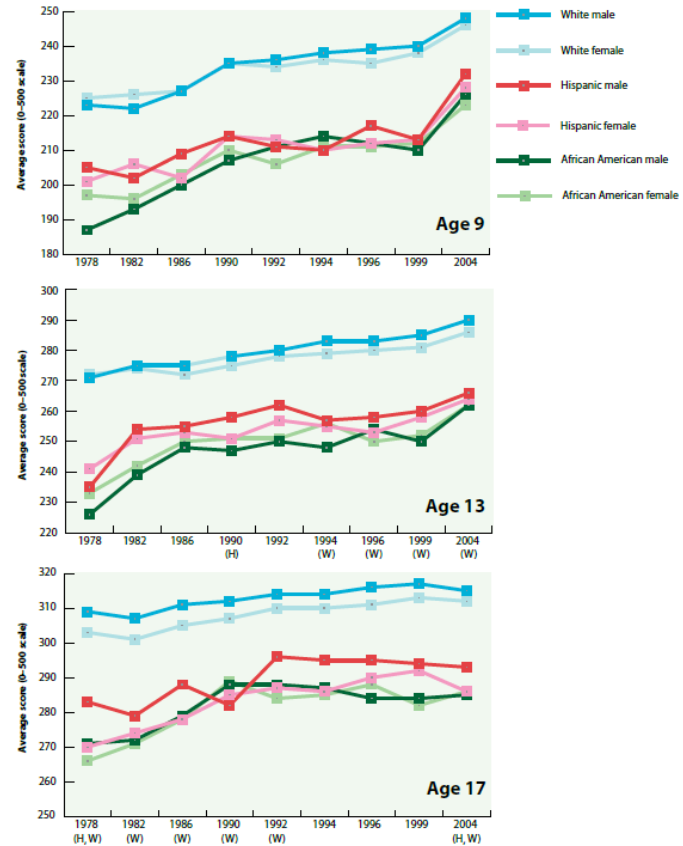
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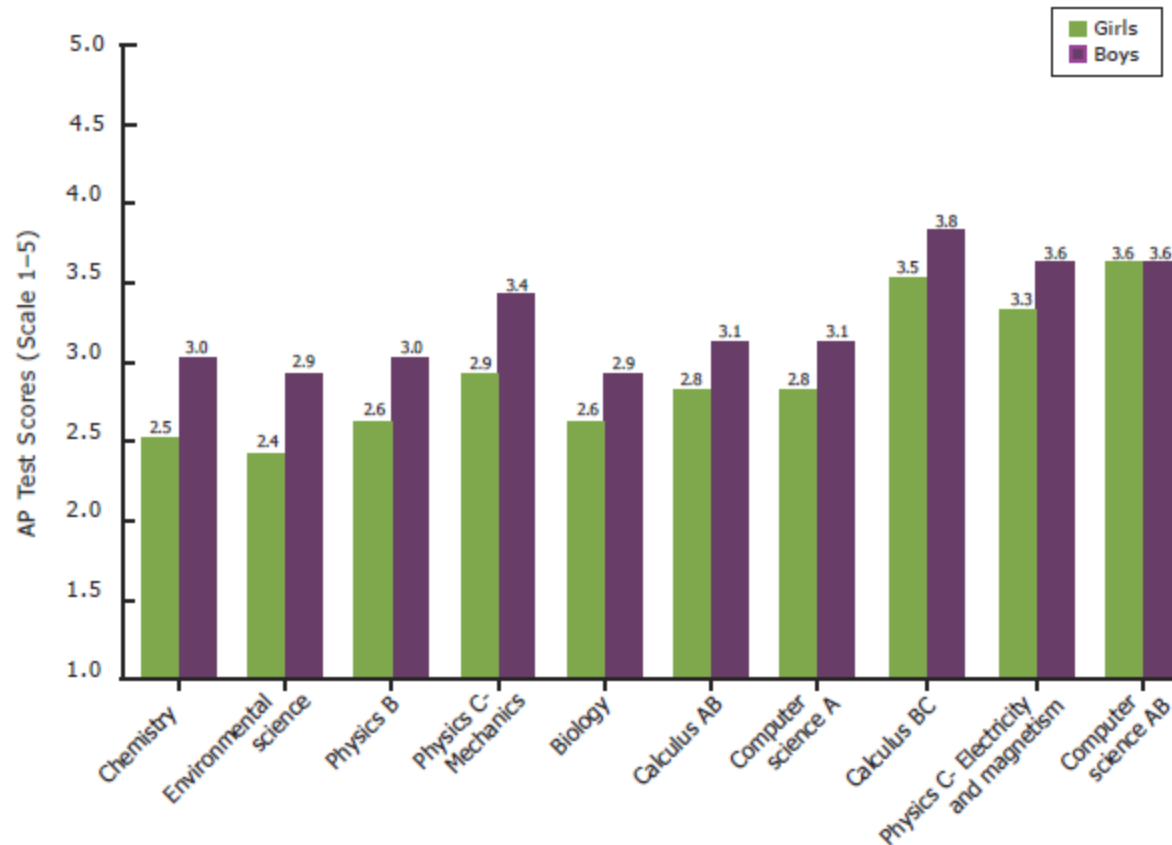
Source: U.S. Department of Education, National Center for Education Statistics, NAEP Data Explorer, Washington, DC, Author.



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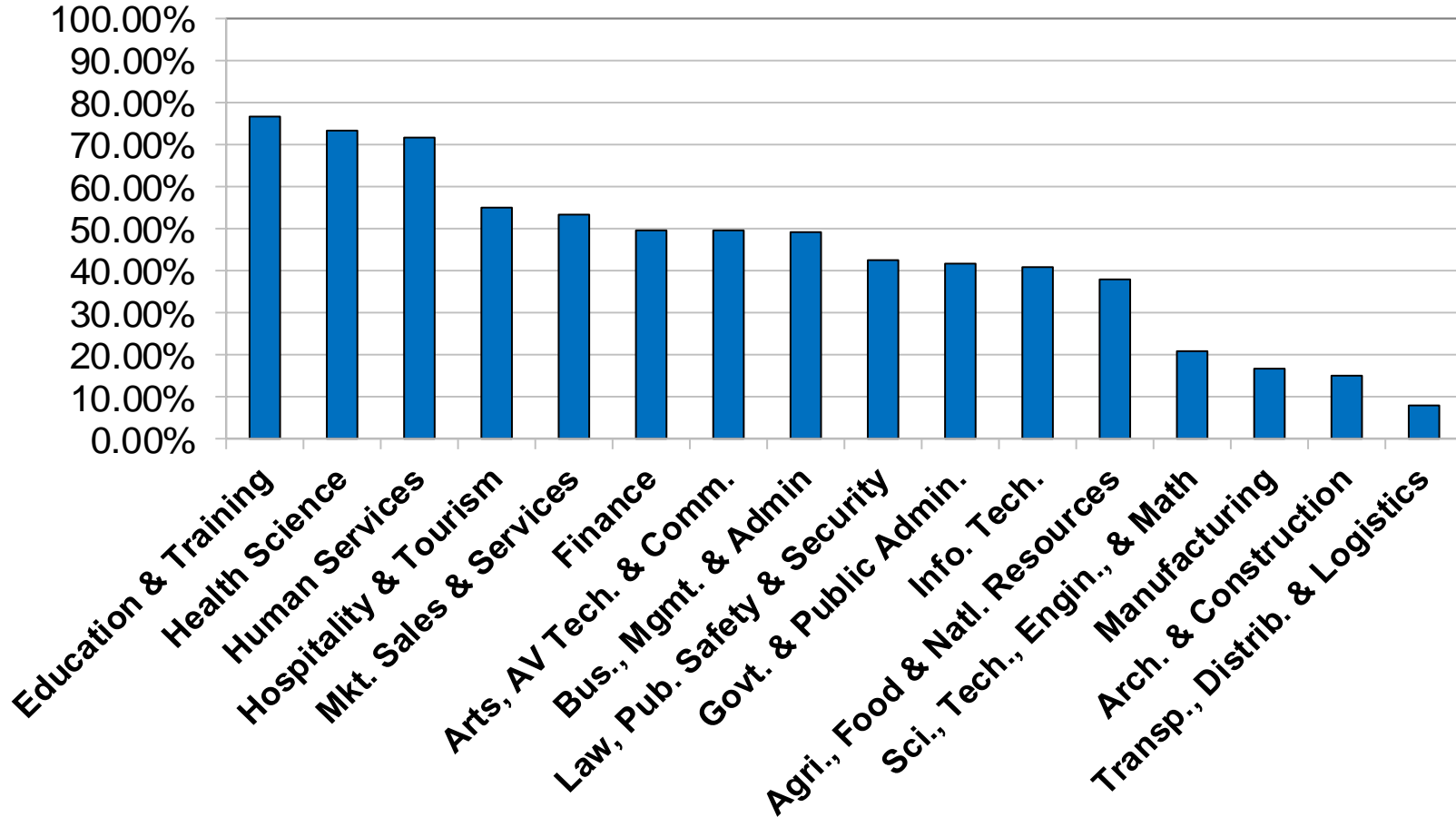


Source: Retrieved November 11, 2009, from the College Board website at www.collegeboard.com.



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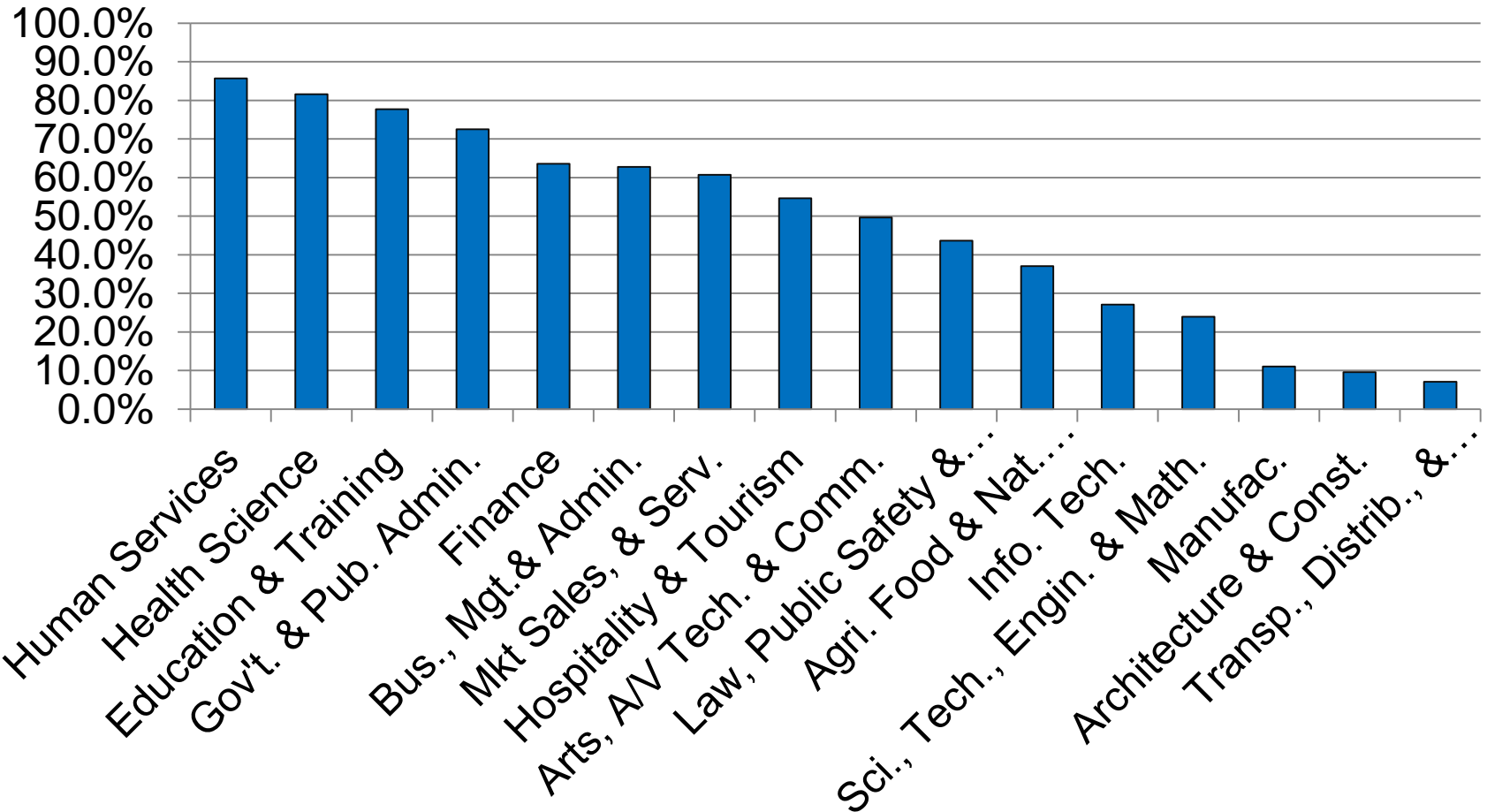
Female *Participation* in Secondary Career and Technical Education 2009-10





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Female *Participation* in Postsecondary CTE Education 2009-10

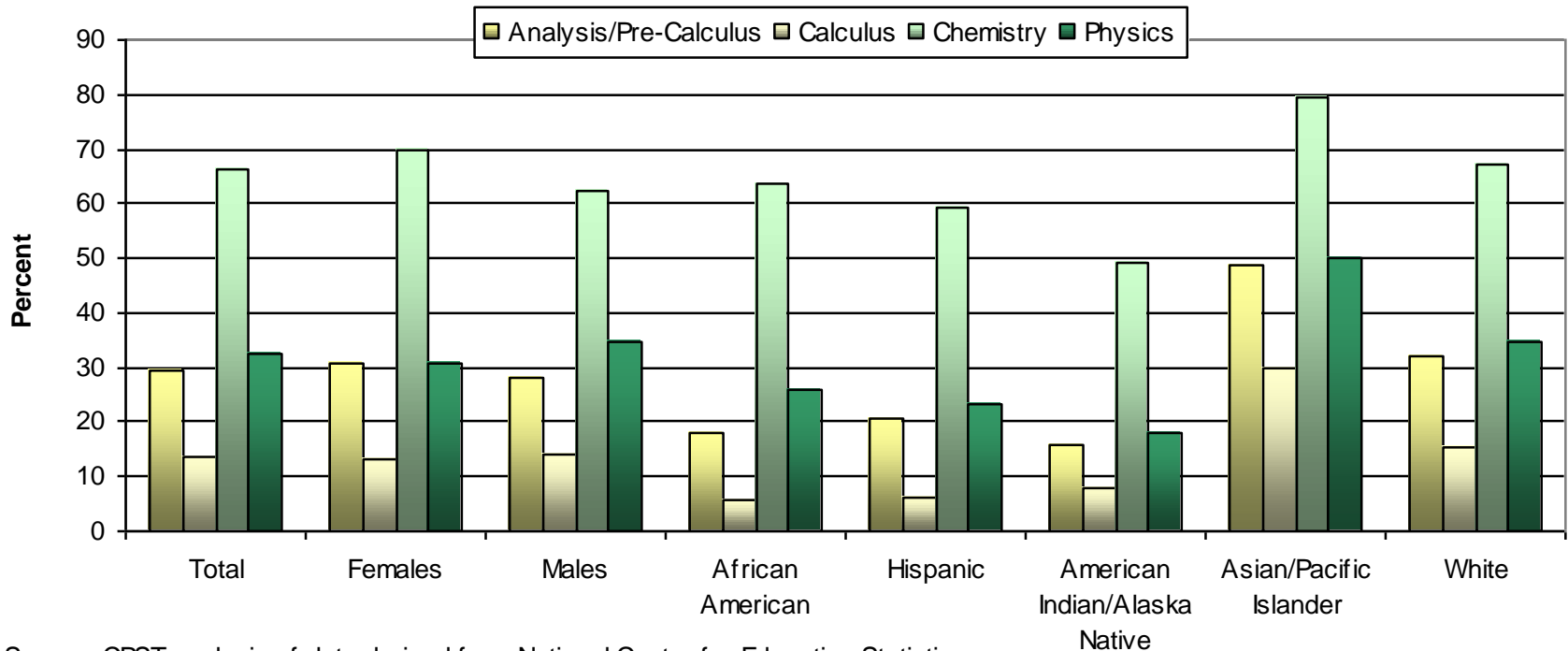




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Racialized Participation Gaps in High Schools Across STEM Courses

Figure 1-7. High School Graduates' Science and Mathematics Course Taking, Selected Courses, 2005 by Gender and Race/Ethnicity



Source: CPST analysis of data derived from National Center for Education Statistics
Digest of Education Statistics, 2007.

CPST

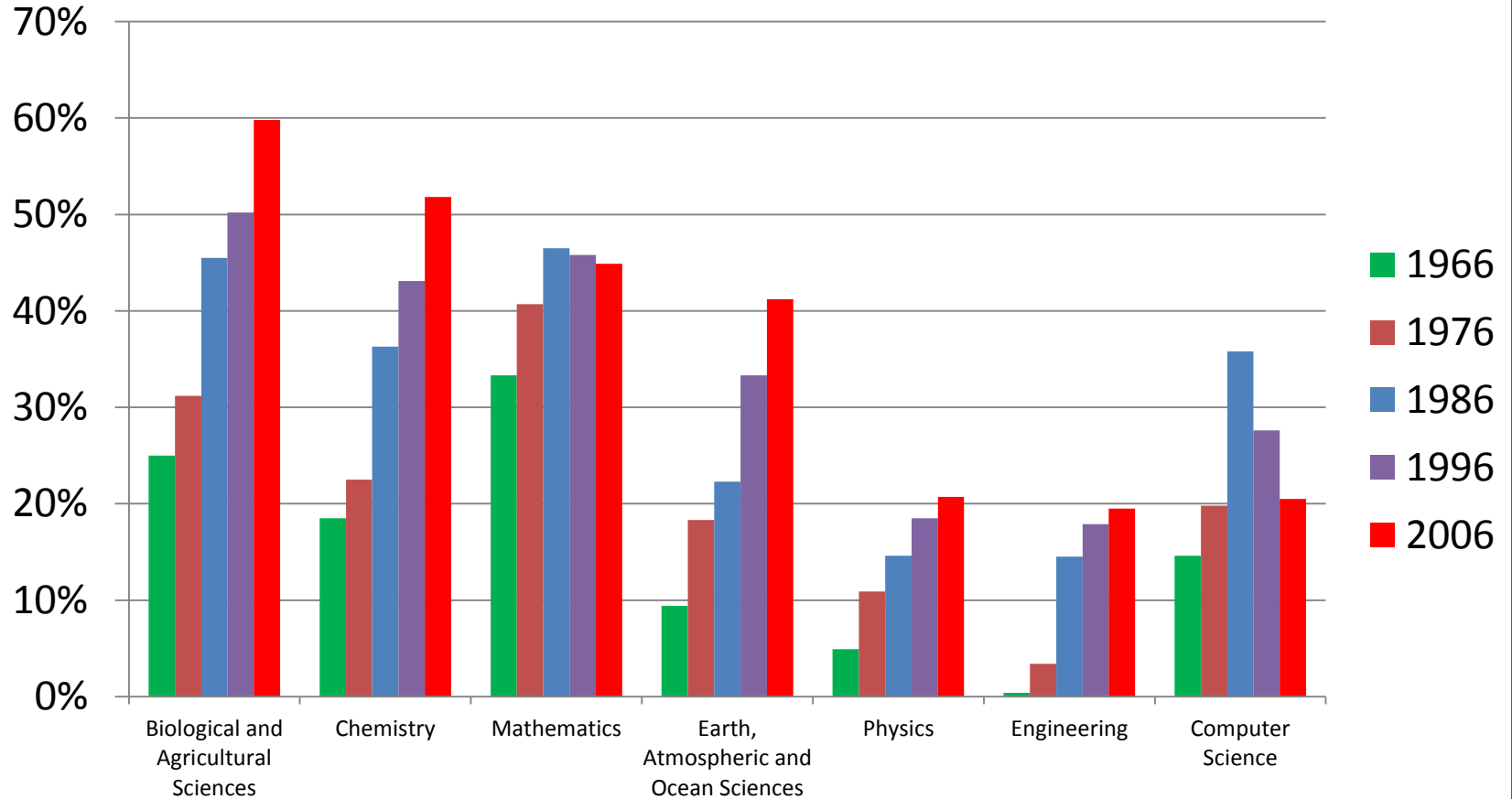
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Women's *Persistence* as STEM Bachelor's Degree Holders

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Bachelor's Degrees Earned by Women in Selected Fields, 1966–2006



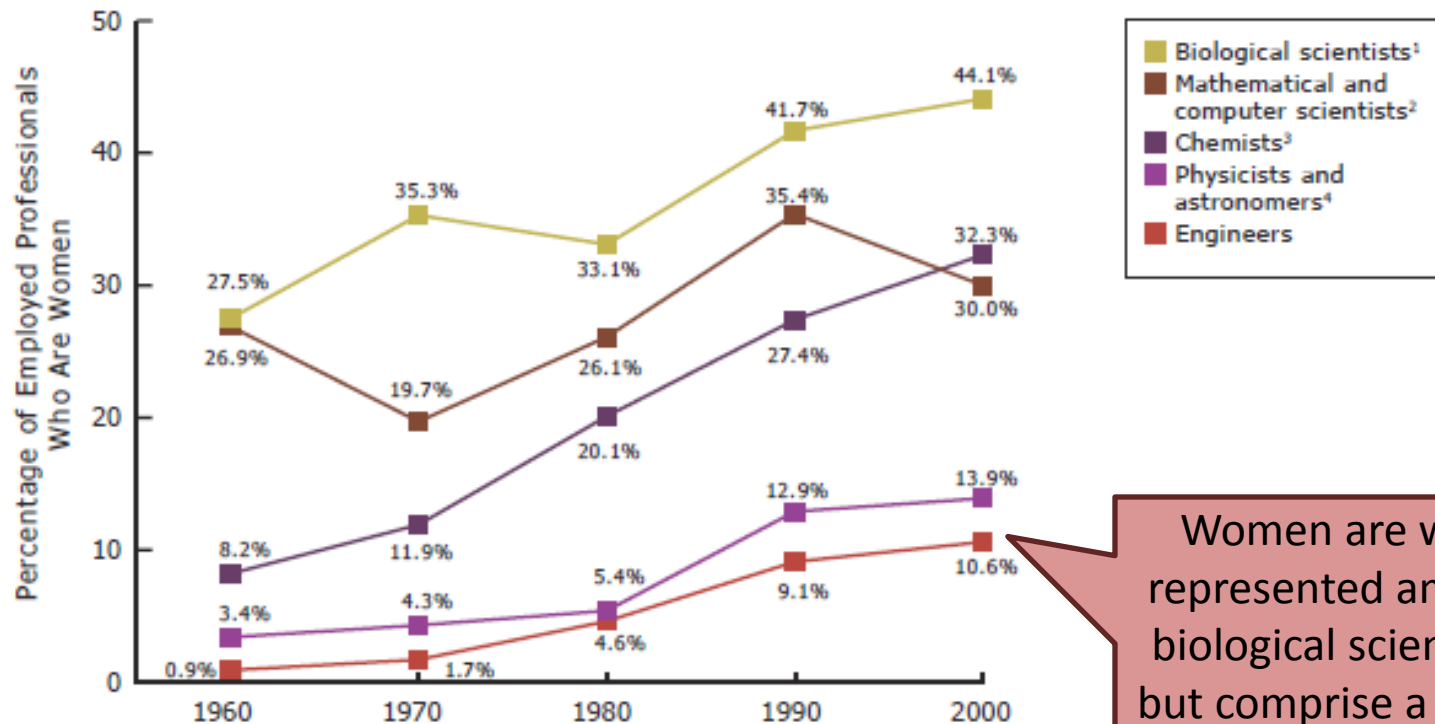
Source: National Science Foundation, Division of Science Resources Statistics, 2008, *Science and engineering degrees: 1966–2006* (Detailed Statistical Tables) (NSF 08-321) (Arlington, VA), Table 11, Author's analysis of Tables 34, 35, 38, & 39.

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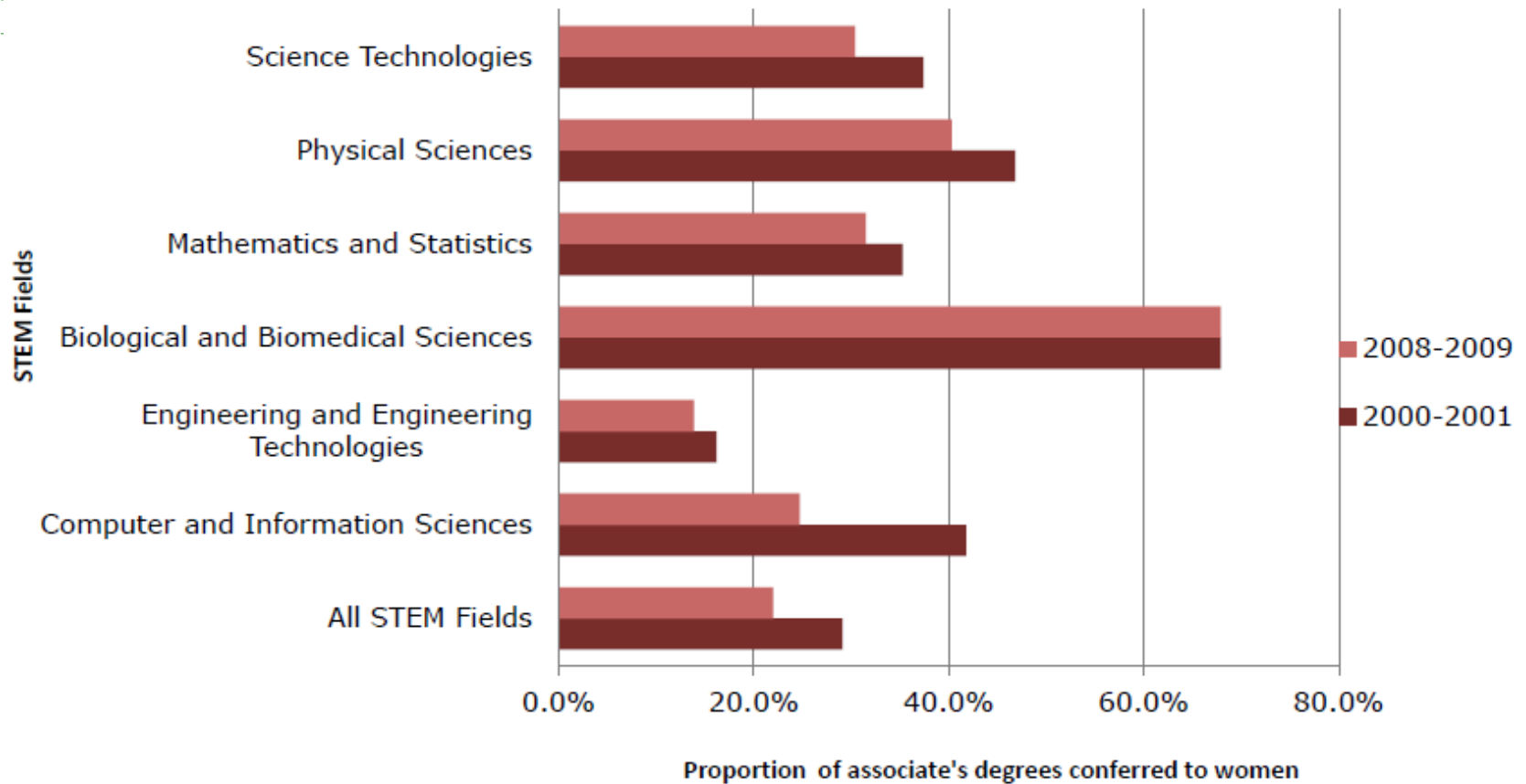
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Women in Selected STEM Occupations, 1960-2000



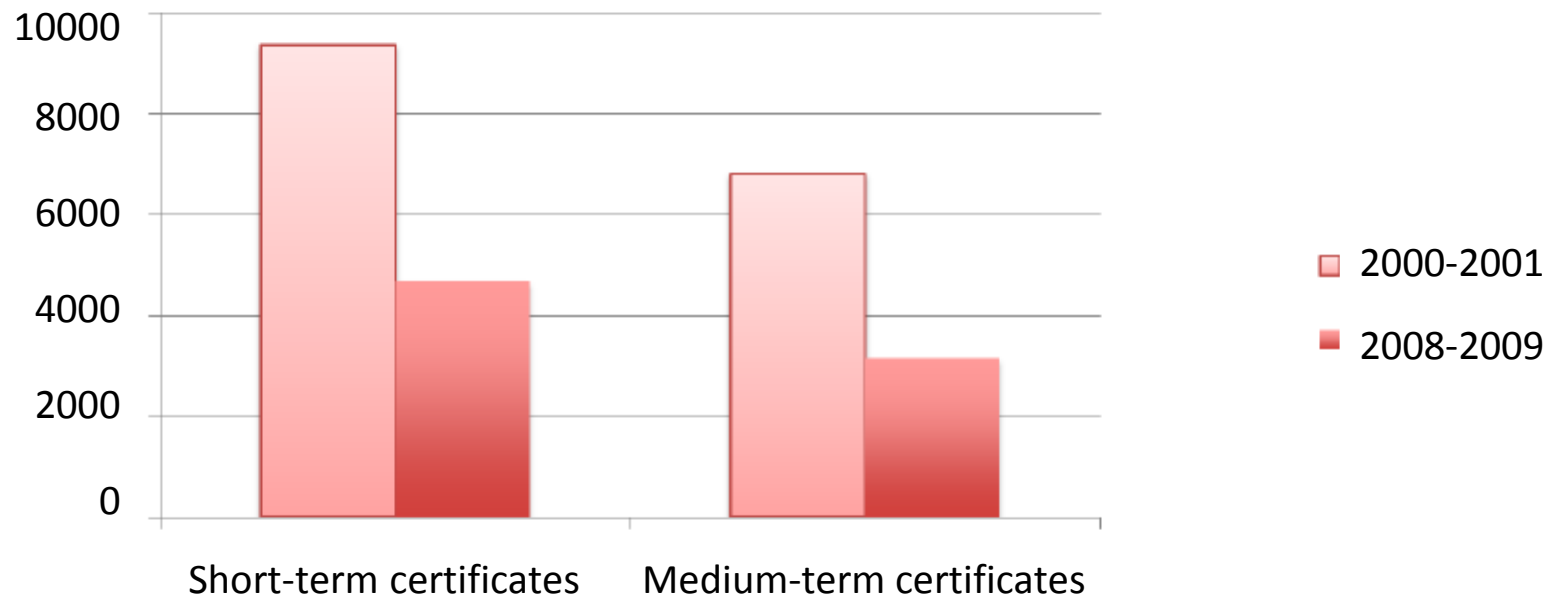
Women are well represented among biological scientists but comprise a small minority of engineers.

Figure 2. Percentage of Associate's Degrees Awarded to Women by STEM Field, 2000-2001 and 2008-09



Source: U.S. Department of Education. National Center for Education Statistics. Postsecondary Awards

Figure 3. Women's Receipt of Occupational Certificates in STEM Fields, 2000-2001 and 2008-2009



Source: U.S. Department of Education, National Center for Education Statistics. NCES2011-226





Activity

Journal/reflect/consider for 5 minutes:

1. What are the conditions you believe are creating the data just reviewed?
2. What do you **know** about student STEM participation in your classroom, building/program, or district level?
3. What kind of information would be helpful to you?
4. Share with a partner.



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Building the Case for Diversity in STEM



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NAPE Believes....

1. Every educator cares for her or his students and wants every one to be successful.
2. Remarks that offend someone based on their race, gender, class, ethnicity, ability, etc., originate from *unintended ignorance*.
3. Every student deserves access to an inclusive, equitable educational opportunity.





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Why do we care about increasing the diversity in the STEM workforce?





Activity: Why Do You Care About Equity in STEM?

Business
Case

Workforce
Perspective

Moral
Argument

Individual
Career Choice
Family
Sufficiency



Diversity: The Workforce Perspective

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- Increasing demand for a strong STEM workforce
- The current STEM workforce is aging and retiring
- Increasing diversity of the workforce including those that are significantly underrepresented in STEM





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Diversity: The Business Case

- A lack of diversity leads to a cost in designs not thought of, in solutions not produced.
Source: Dr. Bill Wulf, Past President, National Academy of Engineering
- Not engaging women and minorities in the engineering enterprise ignores more than 50% of America's intellectual talent.
Source: Bostonworks.com
- The evidence has been mounting with gender diversity emerging as the most influential determinant of Return on [financial] equity.
Source: Significance, June 2011, v. 8, issue 2, pp 80-81



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Diversity: The Moral Argument

Occupational segregation accounts for the majority of the gender and race wage gap.





Diversity: Individual Career Choice and Family Sufficiency

- STEM careers make a world of difference and help shape the future.
- STEM careers have the lowest gender pay gap.
- STEM jobs represent 70% of the highest 150 paying jobs in the United States.





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Wrap-up



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Goal

To learn about NAPE's unique approach to educator professional development and why our shared work is critical for U.S. growth and competitiveness.





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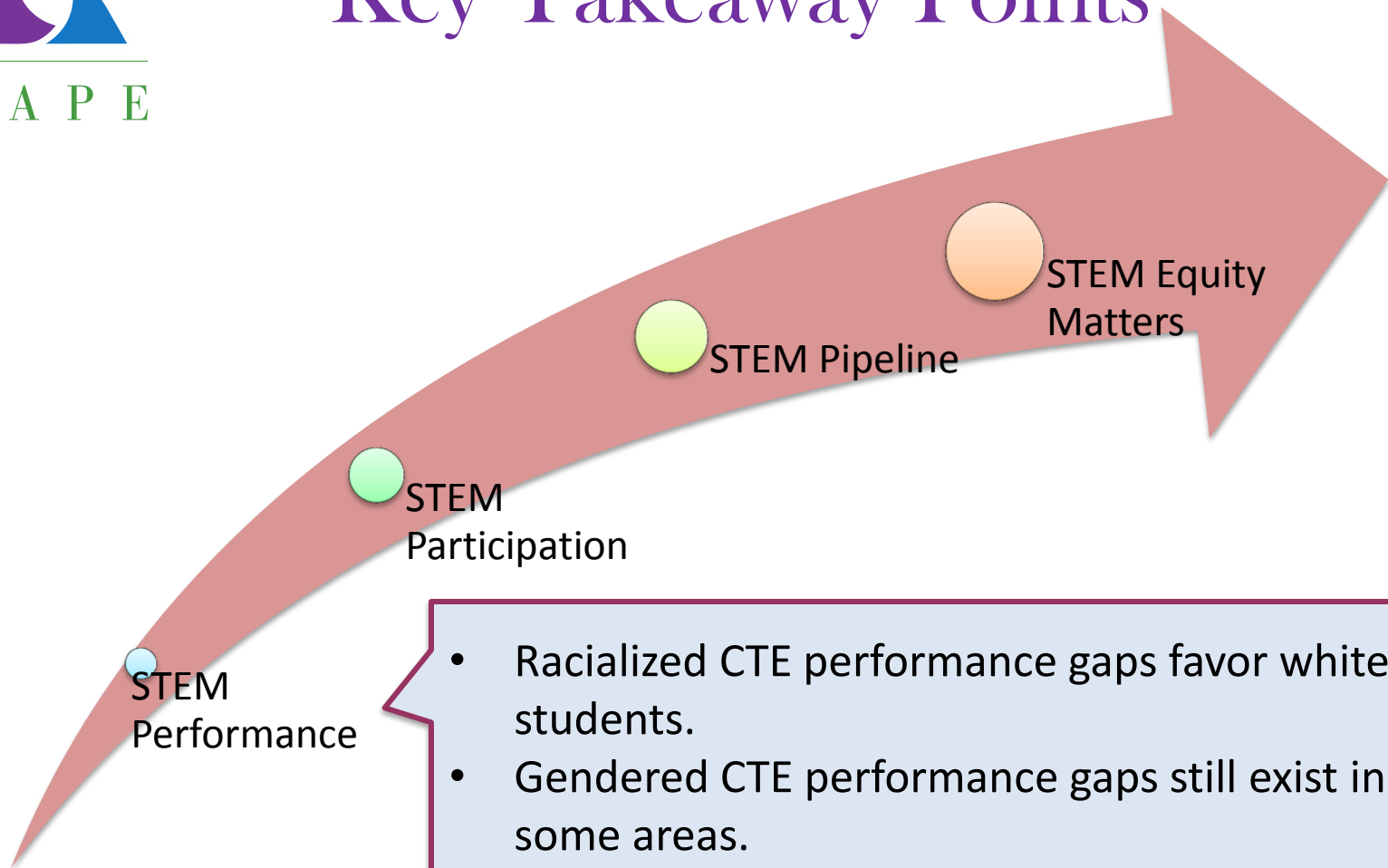
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- Describe measures for student academic achievement (**PERFORMANCE**), degree and certification programs (**PARTICIPATION**) , and bridging between educational levels (**PIPELINE**)
- Build a case for recruiting and retaining underrepresented students into high-tech, high-wage fields



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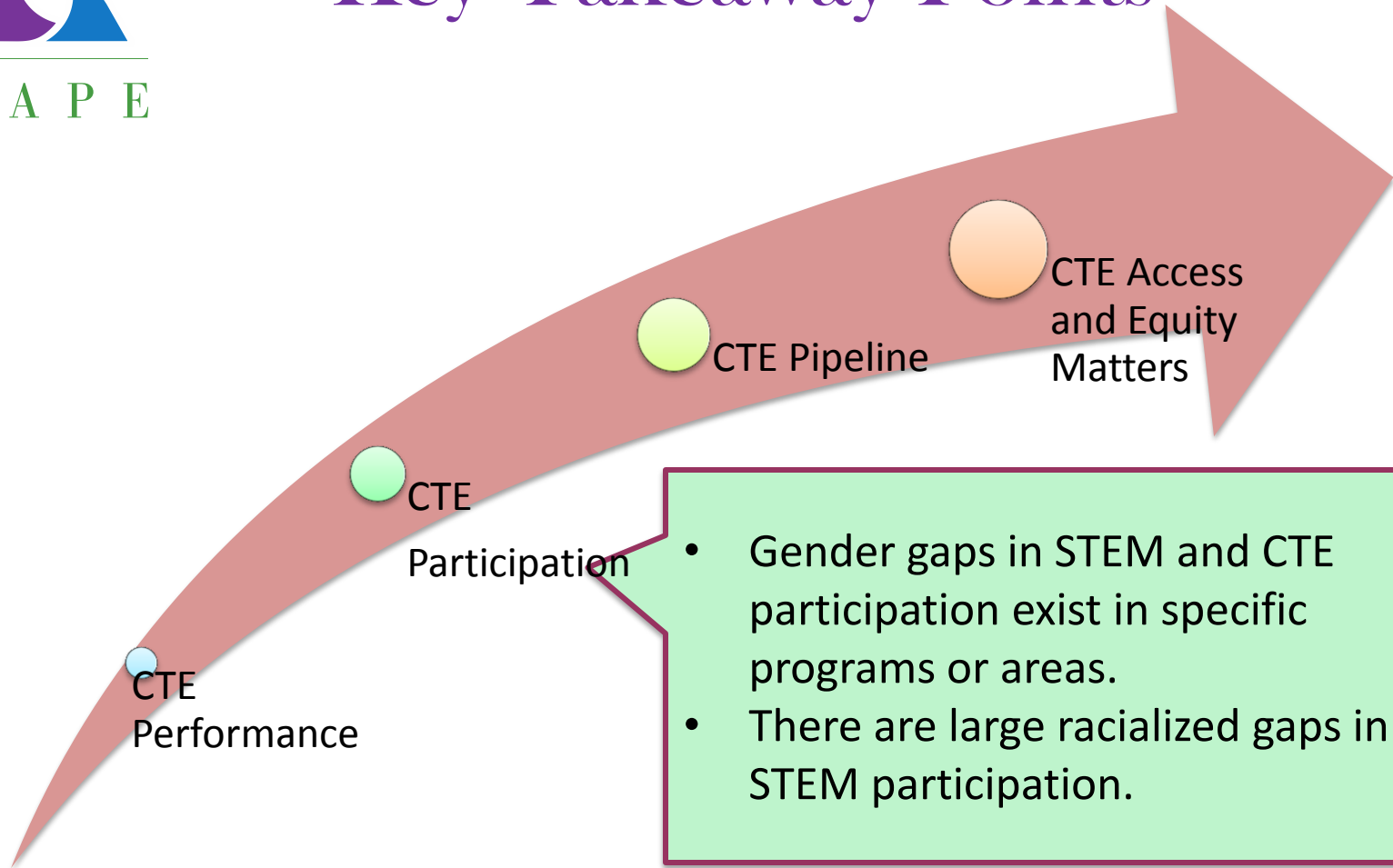
Key Takeaway Points





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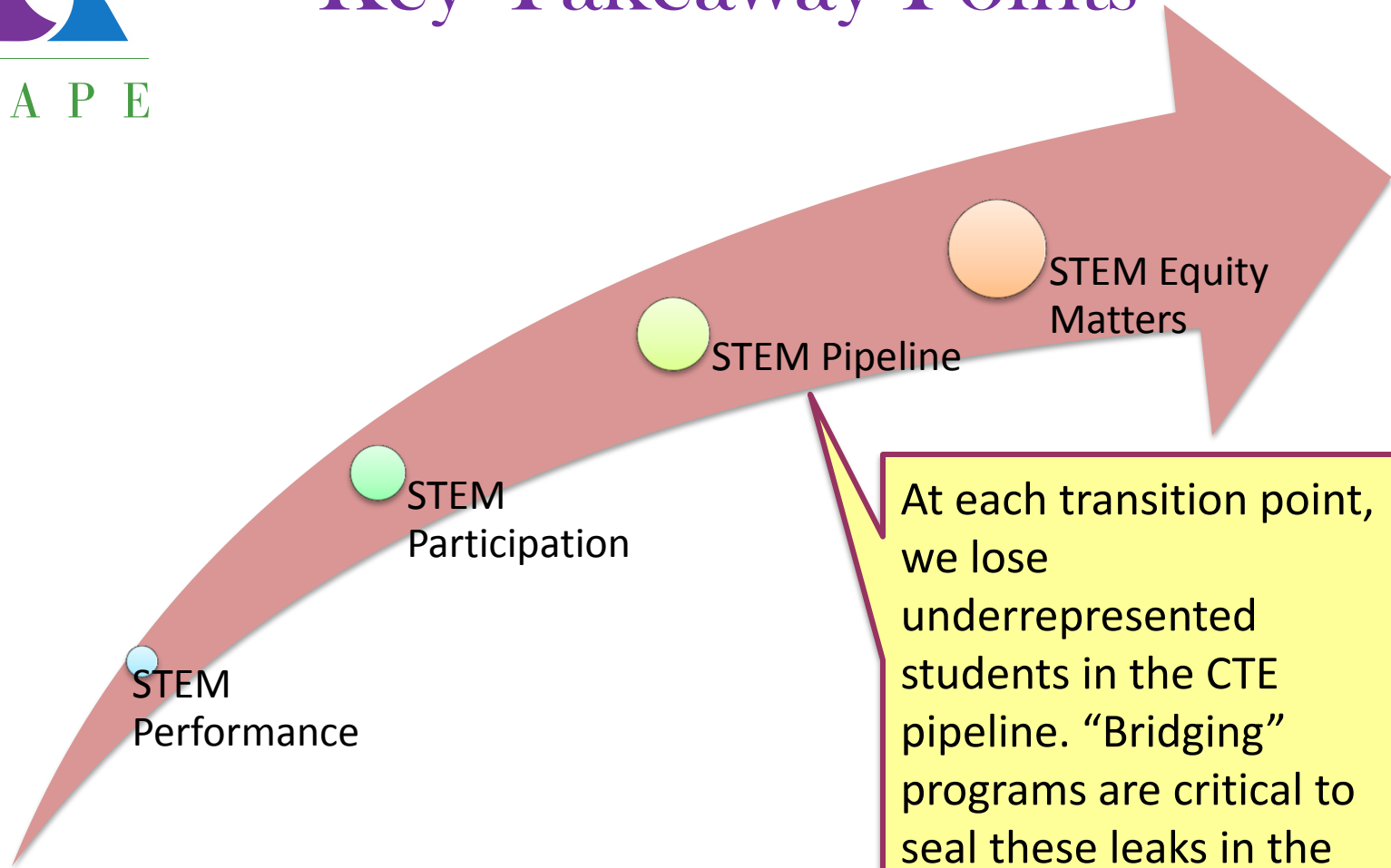
Key Takeaway Points





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Key Takeaway Points

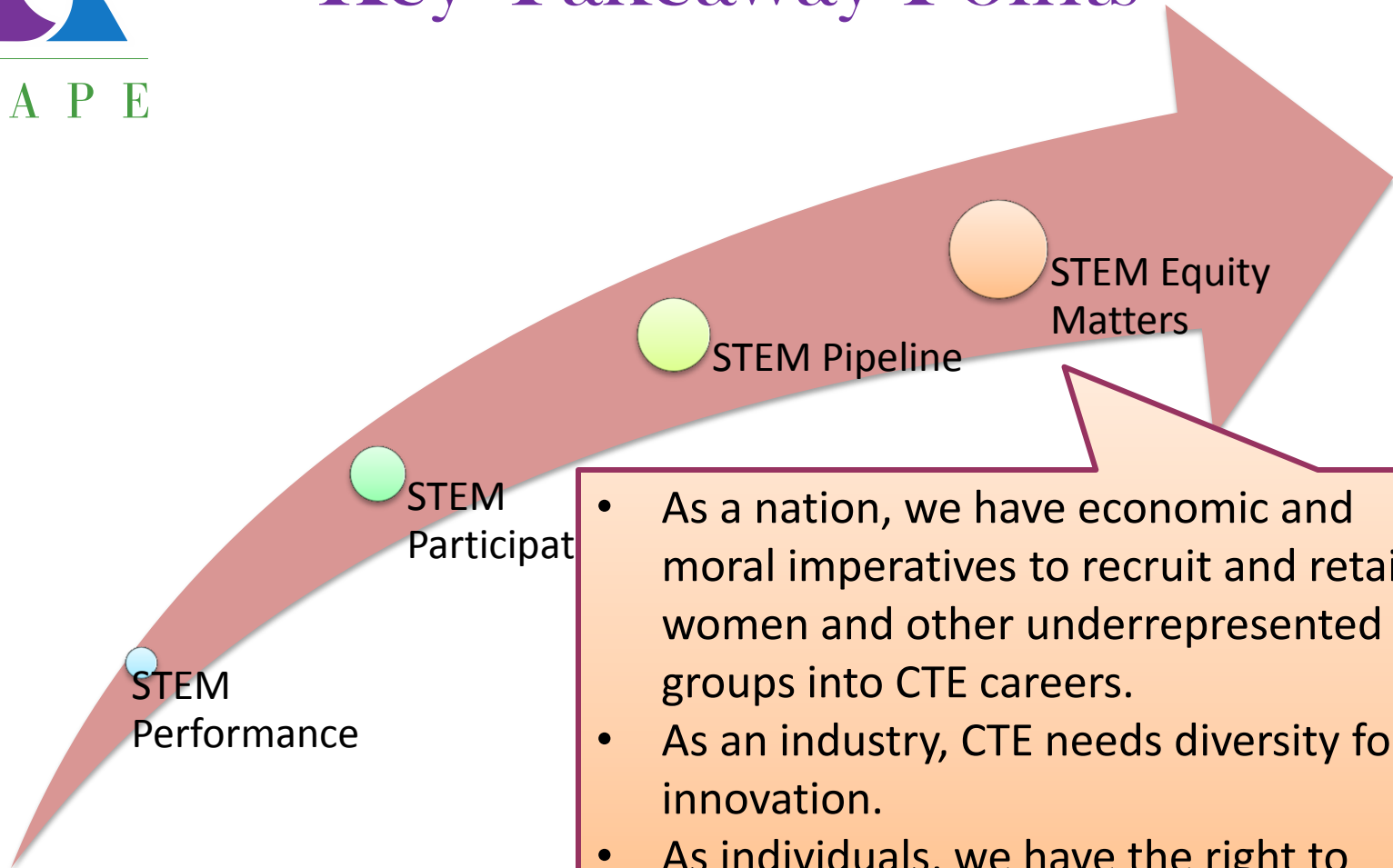


At each transition point, we lose underrepresented students in the CTE pipeline. “Bridging” programs are critical to seal these leaks in the pipeline.



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Key Takeaway Points



- As a nation, we have economic and moral imperatives to recruit and retain women and other underrepresented groups into CTE careers.
- As an industry, CTE needs diversity for innovation.
- As individuals, we have the right to choose satisfying, sustaining careers.



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Moving Forward

- As the scientist in your classroom, review your data and begin to formulate a hypothesis for any weaknesses or gaps that exist in student outcomes.
- As a researcher in your classroom, think about how your methods might be changed to improve your students' performance.
- As the coach in your classroom, consider the key messages you can make to your “team members” to affect their best game.
- As the educator in your classroom, recognize and reflect on the power you have to impact the lives of students.



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Nobody
cares how
much you
know until
they know
how much
you care.

Theodore
Roosevelt



Women@NASA's Aspire2Inspire (A2I) Program
<http://women.nasa.gov/a2i/>