Elementary and Secondary STEM Education

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November 2–4, 2021

2021 FCSM Research & Policy Conference

National Center for Science and Engineering Statistics

Social, Behavioral and Economic Sciences

National Science Foundation

Presentation Outline

- How does the United States compare internationally in mathematics and science achievement?
- What do scores on a national mathematics assessment tell us about the performance of U.S. students?
- How do STEM teacher qualifications vary by school characteristics?
- What trends are we seeing in STEM high school coursetaking and are STEM high school experiences associated with choice of postsecondary STEM majo

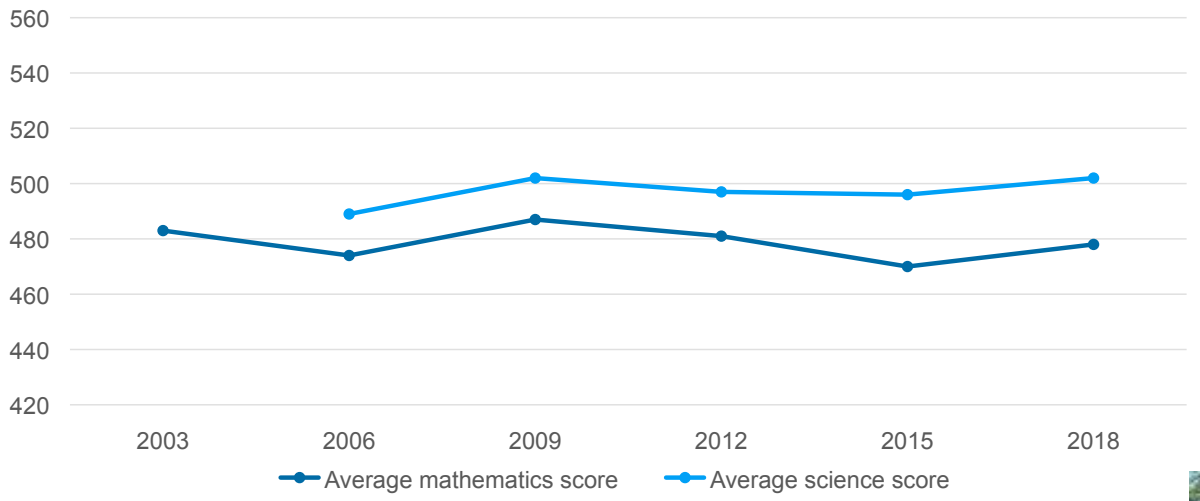
How does the United States compare internationally in mathematics and science achievement?

U.S. ranks higher internationally in science literacy than in mathematics literacy

- In mathematics, U.S. 15-year-olds in 2018 ranked 25th among 37 OECD countries on the PISA assessment
- In science, U.S. 15-year-olds in 2018 ranked 7th among 37 OECD countries on the PISA assessment
- Japan, South Korea, Estonia, and the Netherlands were the highest-scoring OECD countries in mathematics in 2018, and Estonia and Japan were the highest scoring in science.

International science scores improve

Average scores of U.S. 15-year-old students on the PISA mathematics and science literacy scales: 2003–18

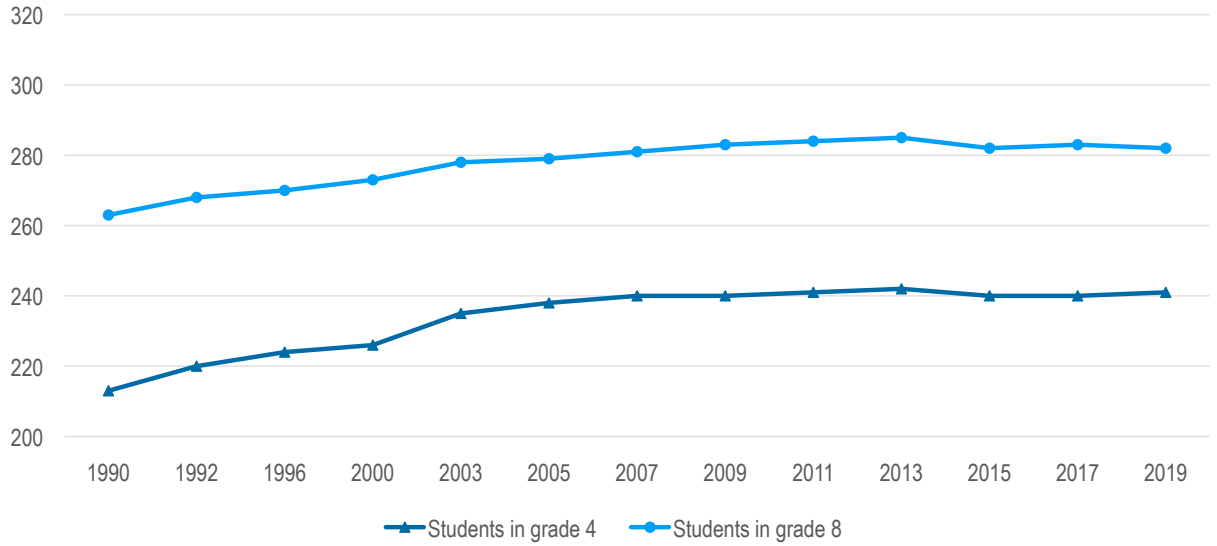


Source: Organisation for Economic Co-operation and Development (OECD), PISA, 2003, 2006, 2009, 2012, 2015, and 2018. https://nces.ed.gov/surveys/pisa/pisa2018/index.asp#/math/intlcompare.

What do scores on a national mathematics assessment tell us about the performance of U.S. students?

Math achievement scores essentially unchanged since 2007

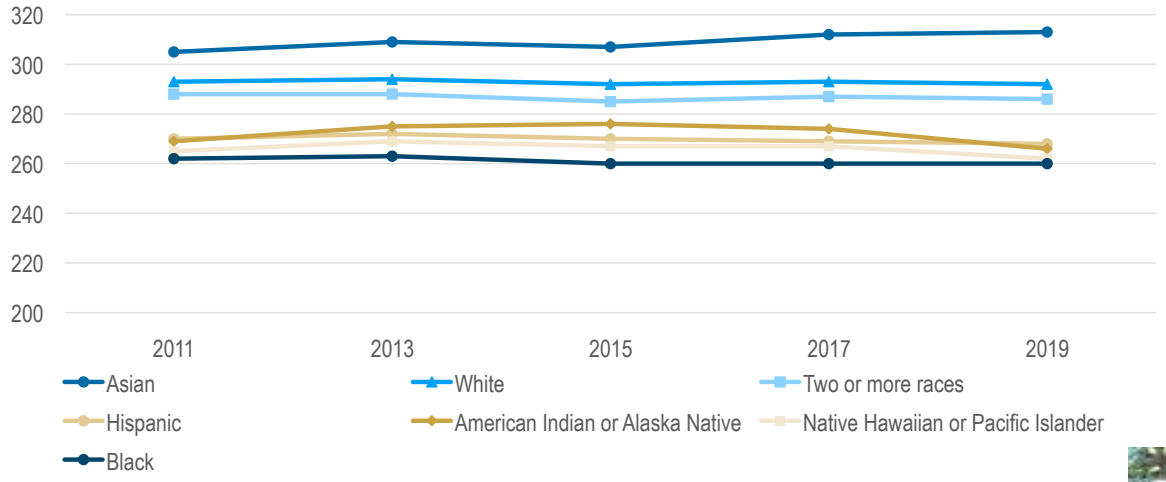
Average scores of students in grades 4 and 8 on the NAEP mathematics assessment: 1990–2019



Source: National Center for Science and Engineering Statistics, special tabulations (2020) of the 2009, 2011, 2013, 2015, 2017, and 2019 NAEP mathematics assessments, National Center for Education Statistics.

Score disparities by race or ethnicity persist

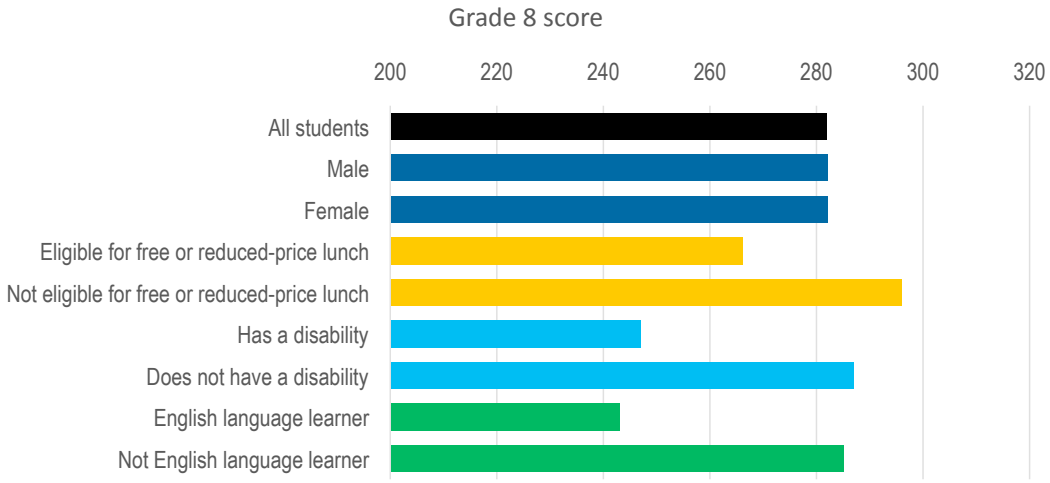
Average scores of students in grade 8 on the NAEP mathematics assessment, by race or ethnicity: 2011–2019



Source: National Center for Science and Engineering Statistics, special tabulations (2020) of the 2011, 2013, 2015, 2017, and 2019 NAEP mathematics assessments, National Center for Education Statistics.

Score disparities also seen among other groups

Average scores of students in grade 8 on the NAEP mathematics assessment, by sex, socioeconomic status, disability status, and English language learner status: 2019

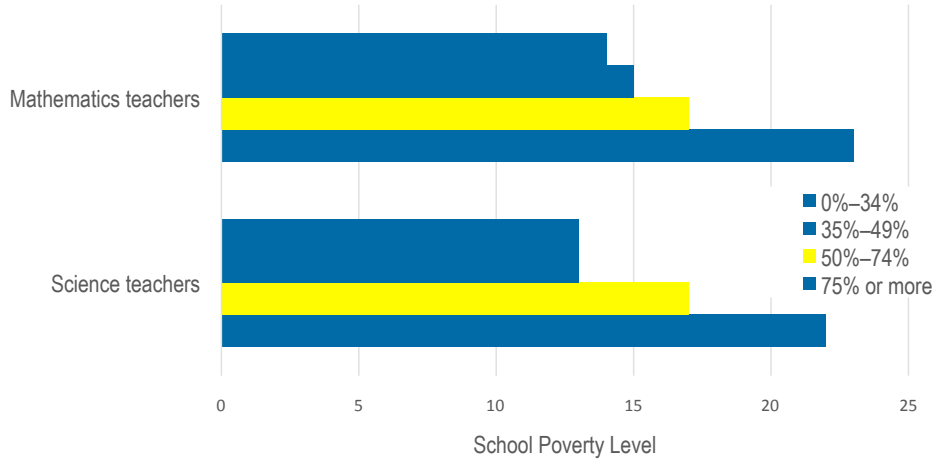


Source: National Center for Science and Engineering Statistics, special tabulations (2020) of the 2019 NAEP mathematics assessments, National Center for Education Statistics.

How do STEM teacher qualifications vary by school characteristics?

Access to experienced teachers varies by school poverty level

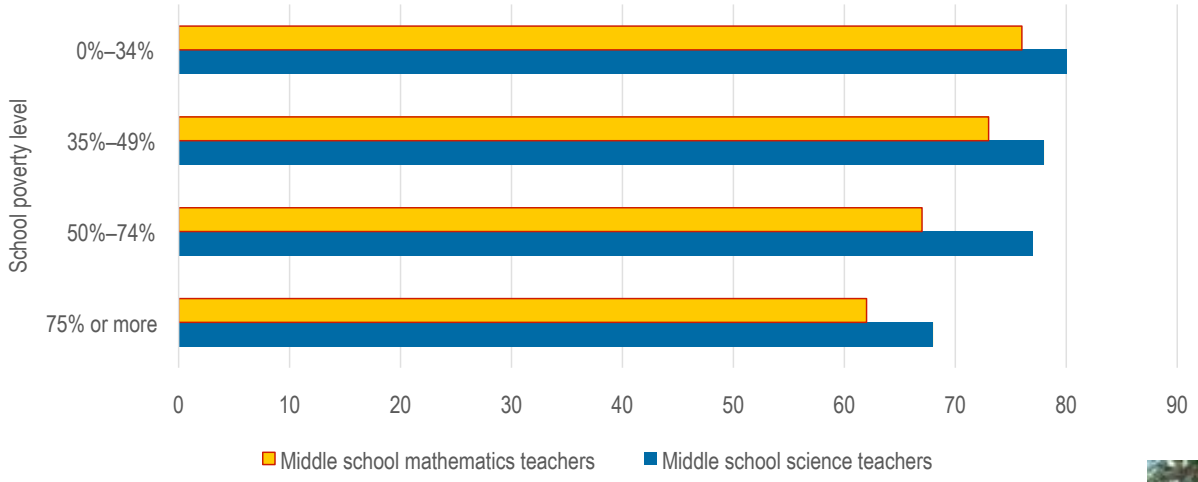
Public middle and high school mathematics and science teachers with 3 years or fewer of teaching experience, by school poverty level: 2017–18



Source: National Center for Science and Engineering Statistics, special tabulations (2020) of the 2017–2018 National Teacher and Principal Survey, National Center for Education Statistics.

Teachers with in-field degrees more prevalent at low-poverty schools

Public middle school mathematics and science teachers with in-field subject-matter preparation, by teaching field and school poverty level: 2017–18

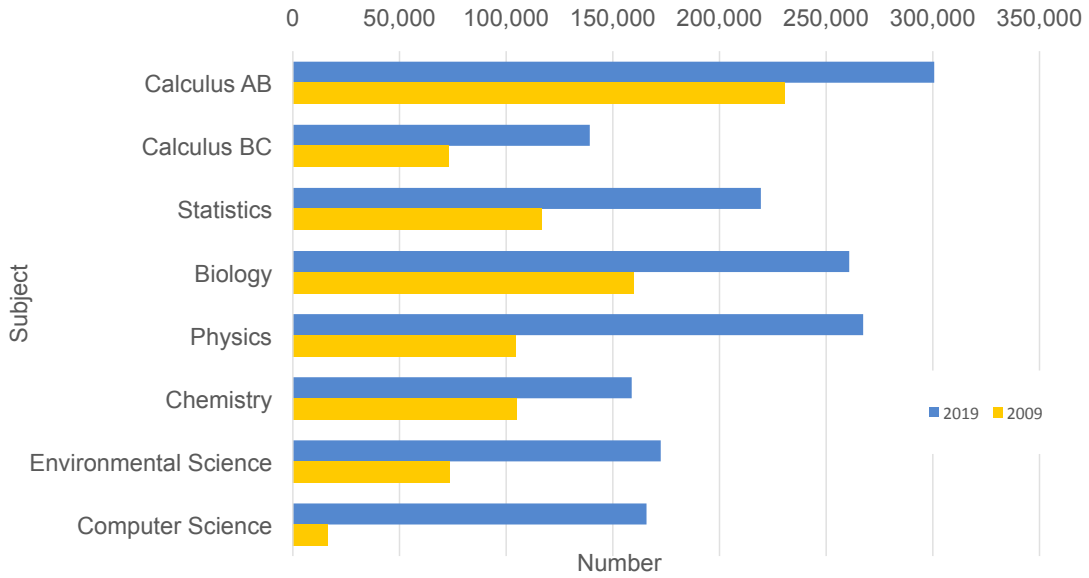


Source: National Center for Science and Engineering Statistics, special tabulations (2020) of the 2017–2018 National Teacher and Principal Survey, National Center for Education Statistics.

What trends are we seeing in STEM high school coursetaking and are STEM high school experiences associated with choice of postsecondary STEM major?

More students are taking STEM AP exams

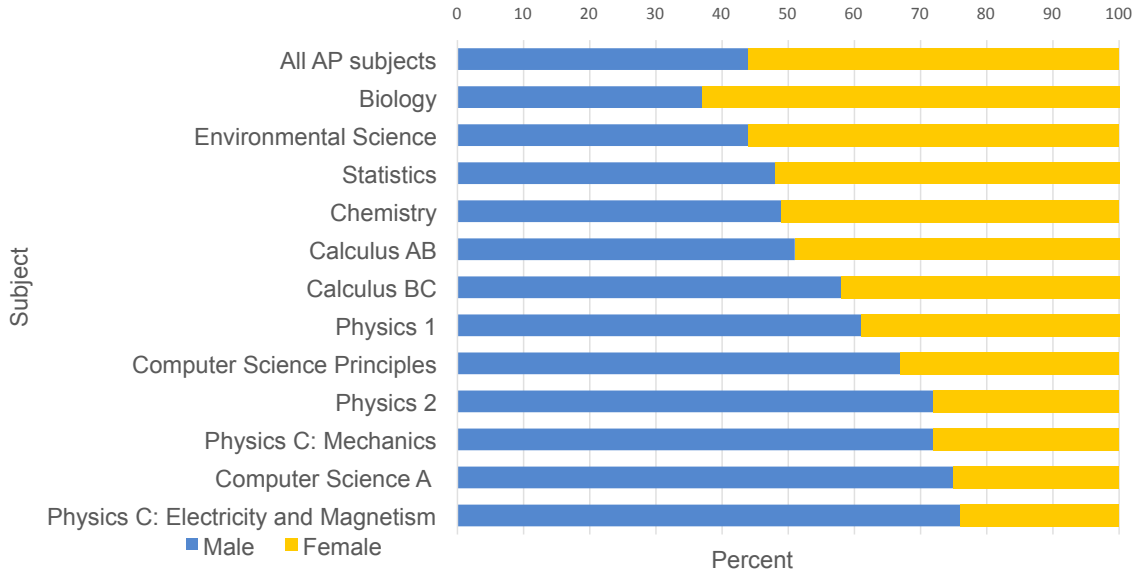
Number of students taking AP STEM exams, by selected subjects: 2009 and 2019



Source: College Board, AP Program Participation and Performance Data 2019. https://research.collegeboard.org/programs/ap/data/participation/ap-2019.

Differences by sex seen in AP STEM exam-taking

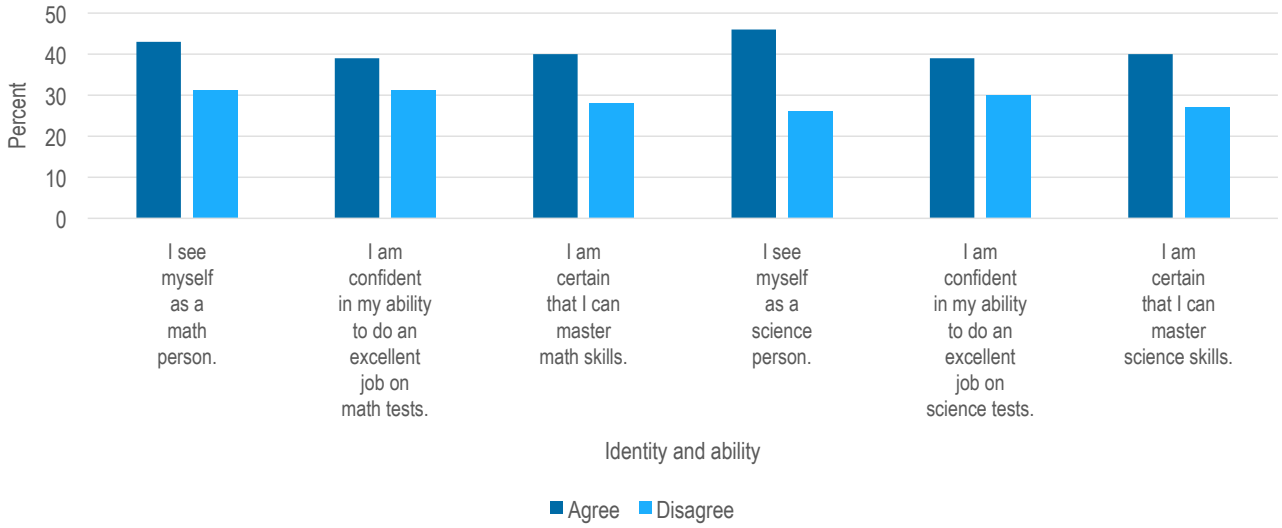
AP exam takers in selected subjects, by sex: 2019



Source: College Board, AP Program Participation and Performance Data 2019. https://research.collegeboard.org/programs/ap/data/participation/ap-2019.

Math and science identity in high school associated with choice of postsecondary STEM major

Among fall 2009 students in grade 9 who enrolled in postsecondary education after high school, percentage who reported that their current or most recent major was in a STEM field, by perception of mathematics and science identity and ability



Source: National Center for Science and Engineering Statistics, special tabulations (2020) of the High School Longitudinal Study of 2009 (HSLS:09), First Follow-Up and Second Follow-Up.

Check out more information and analysis in *Science and Engineering Indicators* Elementary and Secondary STEM Education

Contact

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