



Math Misplacement: A Leak in the STEM Pipeline



Silicon Valley Community Foundation
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What is Math Misplacement?

Many people think of math misplacement as accelerated promotion of inadequately prepared or unprepared students, to the detriment of the student. However, we have identified a critical, missing piece to math misplacement practice. It occurs when a 9th grade student is held back from advancing to the next math course, despite having successfully achieved a “B” or better in the previous 8th grade math course or having met or exceeded California standardized assessments.



Is Math Misplacement occurring in California schools?

According to the Noyce Foundation’s Pathways Study¹ which investigated math placement in nine school districts located in the San Francisco Bay Area, nearly 65 percent of students who took Algebra I in 8th grade were forced to repeat Algebra in 9th grade, instead of being placed in Geometry as a freshman in high school, even though 42% met proficiency standards in 8th grade on the Mathematics Assessment Resource Service (MARS) test in Algebra, and more than 60% of the students scored “Proficient” or “Advanced” on the California Standardized Test in Algebra. It was determined by the researcher that failure to master the subject matter was not the cause of why these students were being held back.

Who is being affected by Math Misplacement?

The Pathways Study found that children of color were more likely to experience math misplacement. Disproportionate numbers of African American, Latino and Pacific Islander students were forced to retake Algebra I in 9th grade. The data found that while 52.6% of African American students took Algebra I in 8th grade, only 17.8% of African American students were enrolled in Geometry in 9th grade. Similarly, half of all Latino students took Algebra I in 8th grade, but by 9th grade only 16% were enrolled in Geometry. In other words, only about one-third of

RESEARCH OBSERVATION

“After reading this report, we are left with many questions, not the least of which is whether we educators are, inadvertently and unnecessarily, creating a California at risk of being unable to compete in an increasingly technological society – not because we are teaching badly, but rather because we are needlessly holding many capable students back from progressing through advanced mathematics in high school by flunking them in Algebra, destroying their confidence, and leaving them to languish in a mystifying morass of confusing course titles with bewildering and narrow exit gates.”

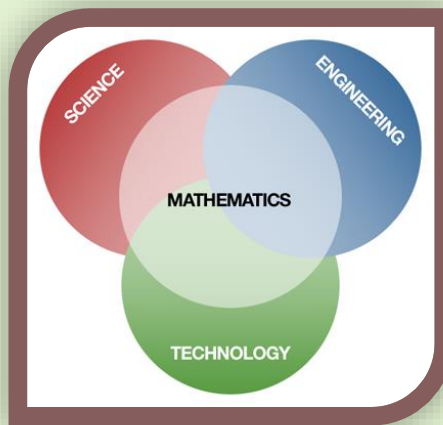
- **Steve Waterman, Pathways Report Researcher**

¹ Noyce Foundation “Pathways Report”: Dead Ends and Wrong Turns on the Path through Algebra (2010).
Link: http://www.noycefdn.org/documents/Pathways_Report.pdf

students in these groups were promoted to Geometry, a dramatically lower percentage than Asian or White students.

How are those affected by math misplacement being impacted?

Too many incoming freshmen high school students, particularly students of color, are being held back to repeat Algebra I instead of being advanced to Geometry, hurting their chance for advanced math success. Math placement is essential to prepare students for a college track and/or readiness for growing careers in science, technology, engineering, and mathematics (STEM). When students are inaccurately placed in the 9th grade, they are effectively derailed from their college trajectory. While our state and nation struggle to meet the workforce demands of the fast-growing and vibrant STEM industry, our ability to compete in the global market is being hampered by this “leak” in the STEM pipeline that is limiting the number of successful students pursuing STEM careers.



How does Math Misplacement create a leak in the STEM pipeline?

Accurate math placement is essential to prepare students for a college track and/or readiness for growing careers in STEM. Research shows math placement decisions for middle school students can have profound effects on their math success in high school and beyond. For example, the University of California and California State University systems require a minimum of three years of mathematics and give preference to students who have taken high level math courses such as calculus or statistics. Accurate placement in math is essential to filling the STEM pipeline and plays an important role in meeting the demands of the STEM sector.

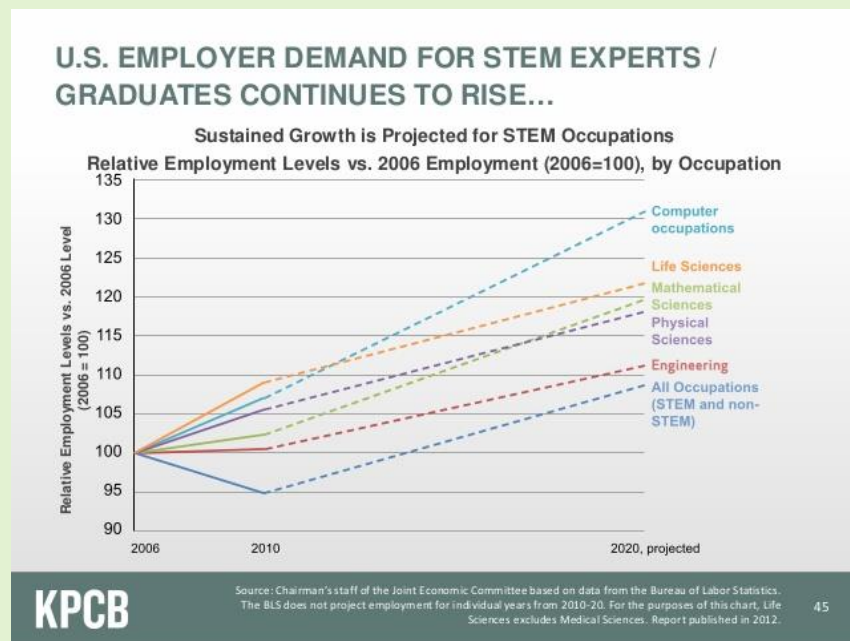
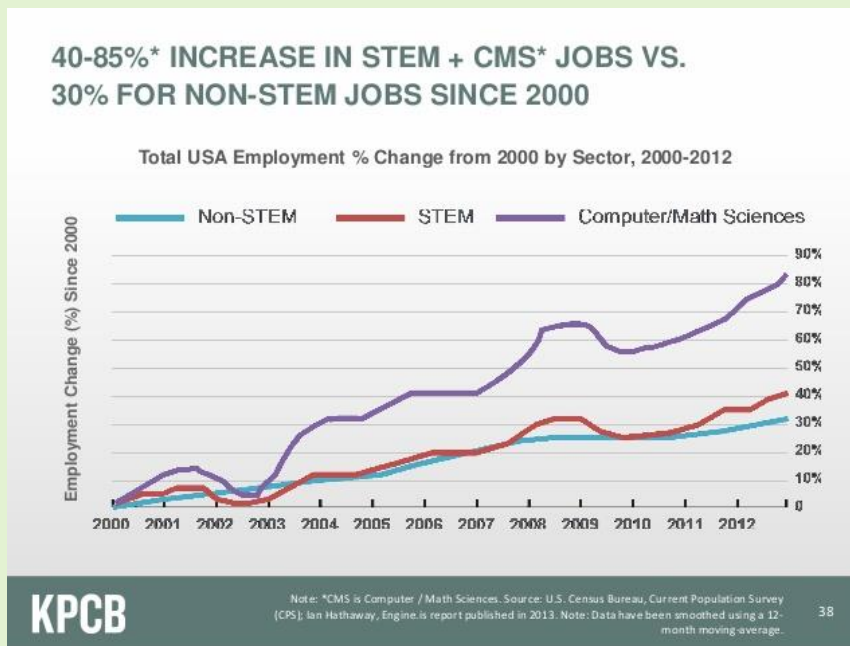
STEM Pipeline



Could a leak in the STEM pipeline have greater economic implications?

Yes. If large STEM employers cannot find the skilled workforce they demand here in the United States, then they will have no choice but to locate job centers in other countries or hire

highly skilled immigrant workers. A 2014 Brookings Institute Report found that skills common to STEM occupations are in short supply relative to demand and are valued more by employers². The charts below³ summarize the increasing U.S. employer demand for STEM graduates:



² 2014 Brookings Institute Report – Still Searching: Job Vacancies and STEM Skills. Link: <http://www.brookings.edu/~media/research/files/reports/2014/07/stem/job-vacancies-and-stem-skills.pdf>

³ Immigration in America & Growing Shortage of High-Skilled Workers. Link: <http://www.slideshare.net/kleinerperkins/immigration-in-america-and-the-growing-shortage-of-highskilled-workers>

A failure to expand the STEM pipeline by ensuring a healthy stream of successful students from the K-12 system, will continue to result in a huge gap between U.S. employer demand for STEM experts and graduates, and the number of qualified STEM workers available to fill those positions. Unfortunately, the forecast paints an even bleaker picture of what is to come in the future if more successful students are held back from excelling and pursuing careers in STEM fields. Future employment trends predict sustained growth in these fields, particularly those in computer and mathematical sciences.

What is the solution for fixing Math Misplacement?

Math misplacement can be solved by ensuring that local school districts with 8th grade and/or 9th grade students, develop, establish and implement a fair, objective, and transparent mathematics placement policy that determines placement decisions based on a student's proficiency. Silicon Valley Community Foundation is sponsoring and California State Conference of the California NAACP is co-sponsoring a bill in the Legislature to solve this problem. The California Mathematics Placement Act of 2015 (SB 359 Senator Holly Mitchell) would require school districts to establish math placement policies that:

- Systematically takes multiple, current or existing, measures into consideration, including California standardized assessments and pupil course grades.
- Includes multiple progress check points throughout the academic year for placement accuracy and individual pupil progress, including at least one check point within the first month of the start of the academic year.
- Requires examination of aggregate pupil placement data, at least annually, to ensure that there is no disproportionate impact in mathematics course placement of pupils by race, ethnicity, or socioeconomic background. Aggregate results of such examination shall be reported to the school board and prominently posted on the district's website.
- Offers clear recourse for pupils and parents who question individual placement decisions.
- Ensures that school districts' mathematics placement policy is available to pupils and parents and is posted prominently on the district's website.

What are the benefits for districts that adopt math placement policies?

Twenty-two school districts in the San Francisco Bay Area have already taken the lead on adopting their own mathematics placement policies. Adopting these policies have many benefits including:

- Eliminating the potential for bias in math placement decisions.
- Increasing the transparency of methods used to make student placement decisions.
- Ensuring fairness throughout the math placement process.
- Providing parents and students with an option to challenge math placement decisions.
- Helping to advance the goals of Local Control Funding Formula and Common Core State Standards in Mathematics as math placement data could be a compelling indicator of equity in mathematics to help close the achievement gap.
- Ensuring a greater diversity of successful students is prepared for college and/or STEM careers.



Where can I learn more about math misplacement?

Silicon Valley Community Foundation is leading the charge to elevate and solve instances of math misplacement and has drafted sample policies for school districts to use. For more information visit siliconvalleycf.org or contact Gina Dalma, Grantmaking Director at gdalma@siliconvalleycf.org

