

Our Promise

We engineer opportunity for minorities in STEM.

Our Mission

To ensure American competitiveness in a flat world by leading and supporting the national effort to expand U.S. capability through increasing the number of successful African American, American Indian, and Latino young women and men in science, technology, engineering, and mathematics (STEM) education and careers.

Our Vision

An engineering workforce that looks like America.

Our Belief

Diversity drives innovation.

Our Purpose

Through partnerships with like-minded entities, we serve as a catalyst to increase the proportion of African American, American Indian, and Latino young women and men in STEM careers. We inspire and encourage excellence in engineering education and career development toward achieving a diverse and dynamic American workforce.

Shaping an American STEM workforce where diversity drives innovation and global competitiveness

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STEM EDUCATION AND TEACHER PREPARATION

Policy Recommendations

Teacher Preparation: Research has shown that teachers with **greater pedagogical knowledge**, including knowledge and understanding of students' learning habits, **are more highly rated and effective in the classroom** (Darling-Hammond, 2000). Unfortunately, math and science teachers, on average, receive less formal teacher training than their peers (Ingersoll, Merrill, & May, 2012). **Training and preparation** for science, technology, engineering, and mathematics (STEM) teachers should continue to focus on subject-matter, but **should also emphasize pedagogy**.

Teacher Retention: Teachers who receive less pedagogical training are more likely to leave the profession (Ingersoll, Merrill, & May, 2012). There is also **higher turnover in schools that serve high proportions of students from lower socioeconomic backgrounds** (Achinstein, Ogawa, Sexton, & Freitas, 2010). Teacher training must focus

on facilitating learning with students from different backgrounds, and understanding how students from different cultures learn.

Alternative Teacher Certification Programs:

African American and Latino teachers are more likely than White teachers to leave the profession (Ingersoll, Merrill, & May, 2012). **Alternative teacher certification programs**, which are methods that allow teachers to get certified outside of a college or university degree in education, **attract a higher percentage of teachers of color in urban areas than traditional programs** (Zeichner and Schulte, 2001). Several studies have shown no significant difference in the achievement of students learning from alternatively and traditionally trained teachers (Suell & Piotrowski, 2007). More research must be done on the effect of such programs on student achievement and teacher retention, and on best practices from high-quality alternative programs.

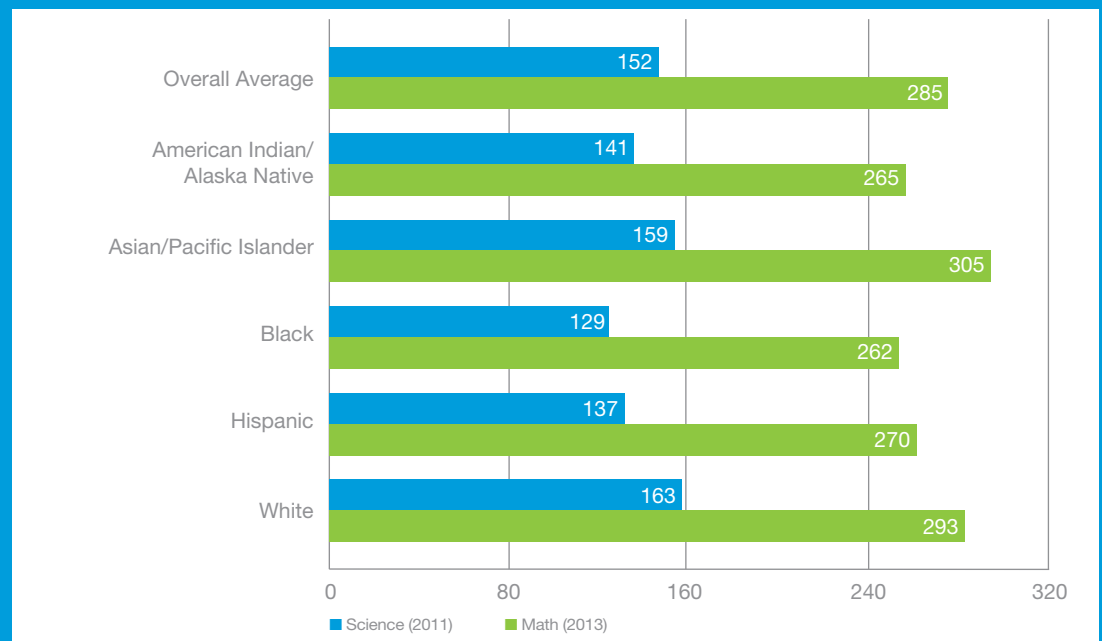
Key Challenges

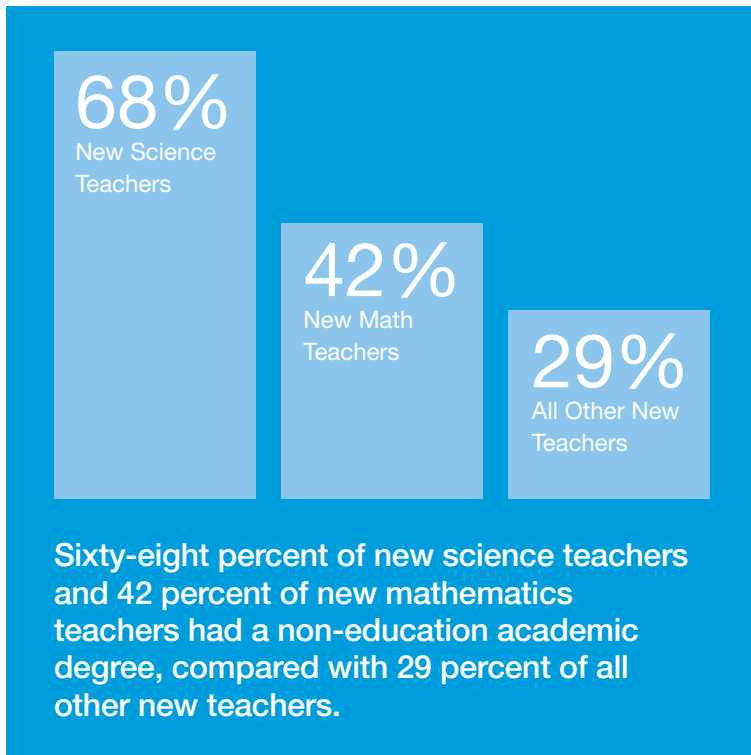
There are many deficits in K-12 STEM education, particularly for underrepresented minority (URM) students. On the National Assessment of

Educational Progress (NAEP), URMs in the eighth grade score far lower in math and science than their White and Asian peers (see Figure 1).

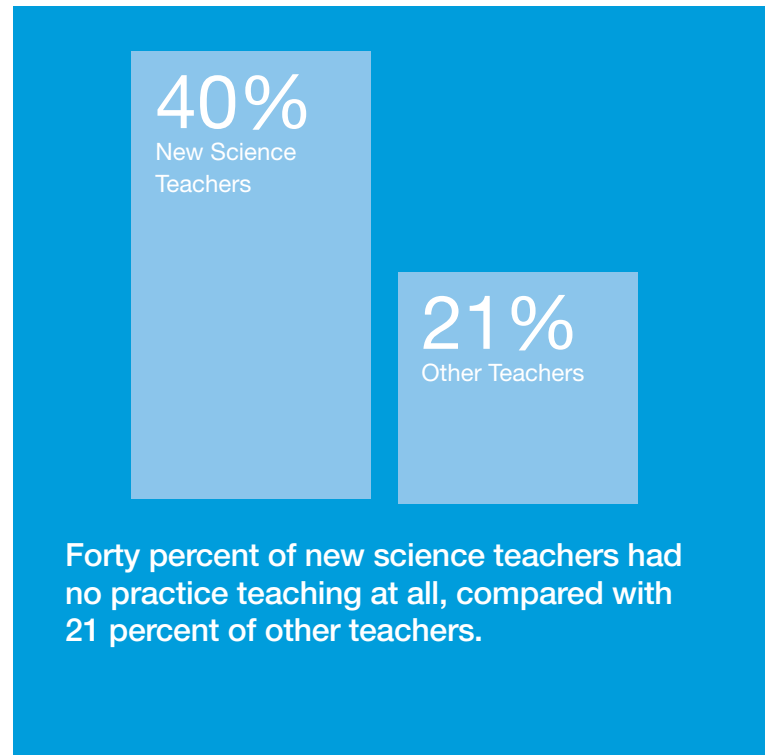
One key challenge is teacher preparation. **High-**

Figure 1.
NAEP Math and Science Scores, Eighth Grade Students





(Ingersoll, Merrill, & May, 2012)



(Ingersoll, Merrill, & May, 2012)

minority secondary schools have a higher percentage of math classes taught by teachers without a certification or without a math major than low minority schools do (Education Trust, n.d.). STEM teachers must be steeped in their discipline to be effective in the classroom. **STEM teachers are also less likely to have received pedagogical preparation**, which is correlated to teacher retention. While beginning math and science teachers are more likely to have received their bachelor's degrees from the most selective colleges and universities, they are also more likely to have received a degree outside of education (Ingersoll, Merrill, & May, 2012).

Another challenge is the lack of diversity in the teaching profession. Achinstein, Ogawa, Sexton, and Freitas (2010) note that **minorities represent 40 percent of the student population in public schools, but represent only 17 percent of public school teachers**. They also note that minority teachers are more likely to work in urban schools serving high minority populations. Research

has shown that the conditions of these schools reduce teacher retention rates, and, unsurprisingly, minority teachers experience higher rates of turnover than their peers. Teachers cited a lack of support for culturally relevant teaching, and other factors, as reasons for departing (Achinstein, Ogawa, Sexton, & Freitas, 2010).

There is a great need for both content and pedagogical training for STEM teachers, and recruitment efforts for minority teachers in these subject areas. Alternative teacher certification programs have shown promise in helping to diversify the teaching community. Both traditionally and alternatively trained teachers **need high-quality professional development** that adequately prepares them to work with a diverse range of students. This preparation is needed for teachers who are entering the discipline, and for current STEM teachers, who are struggling to close the achievement gap between URMs and their peers. Training and professional development may help to improve student achievement and increase teacher retention.

References

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