BHEF BUSINESS-HIGHER EDUCATION FORUM®

BHEF Research Brief

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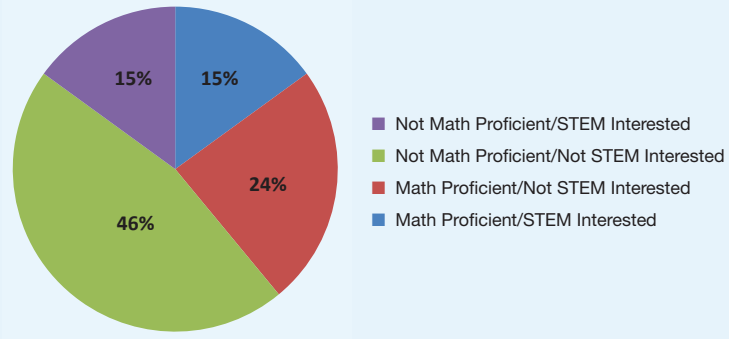
Addressing the STEM Workforce Challenge: Kentucky

To compete in the global economy, the United States needs a far deeper pool of college graduates well-educated in science, technology, engineering, and mathematics (STEM) than it is currently generating. Projections show that STEM-related work opportunities will grow by about 17 percent over the next decade and that almost all of those jobs will require at least a college degree.[1] Kentucky, like all states, must play a role in filling these jobs, but few of its students are currently positioned to pursue careers in STEM fields.

Figure 1: Kentucky 12th Graders by Math Proficiency and STEM Interest



The majority of Kentucky 12th graders lack interest in STEM education and careers. Seventy percent of the state's high school seniors fall into this category (See Figure 1), about the same as 12th graders nationally.

A small percentage of Kentucky's high school seniors are both proficient in math[2] and interested in pursuing STEM education and careers. Just 15 percent of Kentucky 12th graders are proficient in math and interested in STEM, similar to their peers nationally.

Some Kentucky 12th graders are STEM interested but lack the math proficiency needed to succeed. Students who graduate high school with proficiency in math are typically prepared to pursue STEM majors in college.[3] Yet 15 percent of Kentucky's high school seniors are STEM interested but lack the math proficiency needed for success, a pattern similar in the nation.

A larger percentage of Kentucky's male students are prepared for STEM than females. Only 11 percent of 12th grade females were both proficient in math and interested in STEM on the ACT, compared with 19 percent of males (See Table 1).

Table 1: Kentucky 12th Graders: Math Proficiency and STEM Interest, by Gender

	Math Proficient/ STEM Interested	Math Proficient/ Not STEM Interested	Not Math Proficient/ Not STEM Interested	Not Math Proficient/ STEM Interested
Female	11%	22%	50%	16%
Male	19%	27%	40%	14%

These analyses are derived from a Kentucky subset of a 2008 longitudinal data set provided to BHEF by ACT, that provides student interest and proficiency scores on 10th grade (Plan) and 12th grade (ACT) exams (part of what is known as the College and Career Readiness System), along with demographic data (n=17,940). Only students with scores from both exams are included in this dataset. The scores reported in this brief are based on 12th grade math proficiency and interest in a STEM major.

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Kentucky's African American seniors are less likely than Caucasian students to be math proficient and STEM interested. Only six percent of African American students fall into this category, compared with 15 percent of Caucasian students (See Figure 2).[4]

Kentucky's students who are both math proficient and STEM interested are more likely to enroll in four-year than two-year colleges. Only five percent of proficient and interested 12th graders in the state enroll in two-year colleges, compared with the 20 percent who enroll in four-year colleges (See Figure 3). These data are similar to the national trend.

Figure 2: Kentucky 12th Graders, by Race/Ethnicity, Math Proficiency and STEM Interest

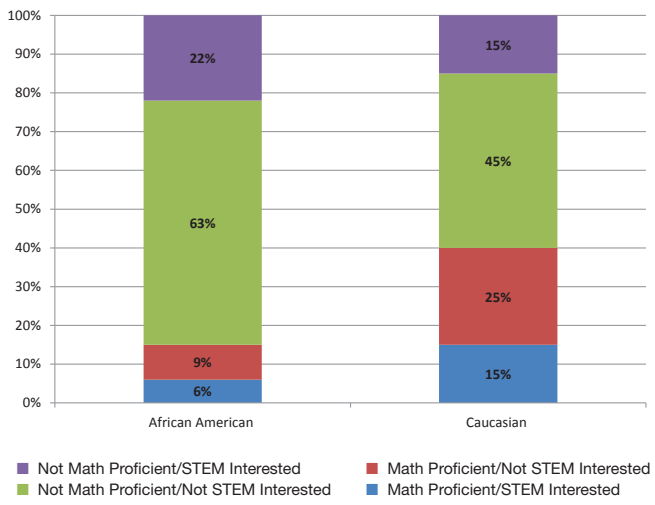
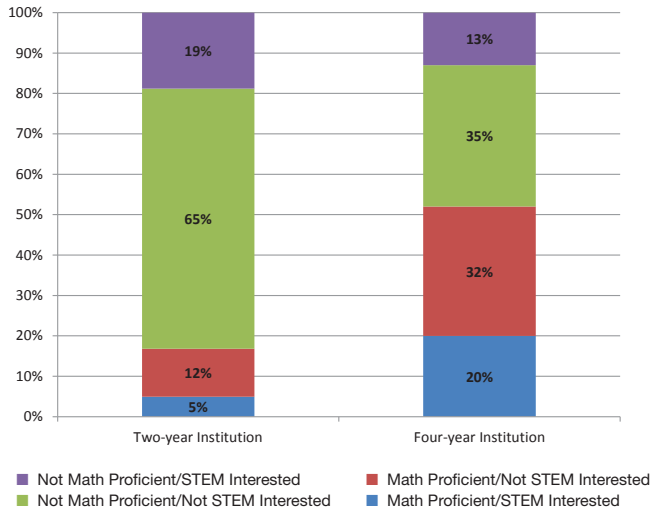


Figure 3: Kentucky Postsecondary Enrollment, by Math Proficiency and STEM Interest



Some Kentucky college students are interested in STEM but lack the math proficiency to succeed. Nineteen percent of two-year and thirteen percent of four-year college students meet these criteria; this is about the same as the national pattern.

Many of Kentucky's STEM interested college students are within striking distance of math proficiency. Fifty-five percent of the state's students enrolled in two- and four-year institutions who are STEM interested but not math proficient scored within four points of math proficiency on the 12th grade ACT.

The state's STEM-interested students enrolled in four-year colleges are more likely than those in two-year colleges to be approaching math proficiency. Sixty-one percent of Kentucky's STEM interested students already enrolled in four-year colleges scored four points of proficiency on the ACT, compared with 42 percent of the students who are enrolled in two-year colleges.

Kentucky has an opportunity to increase its STEM-ready workforce. The large percentage of STEM interested students already enrolled in college who are very close to math proficiency represents a fruitful area for partnerships between business and higher education. In addition, such rich resourcing could increase the diversity of the state's STEM playing field. Finally, Kentucky should consider developing strategies that build awareness of the benefits of STEM education and careers, starting with students who are already proficient in math but currently not interested in pursuing STEM.

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[1] Carnevale, A.P., Smith, N., & Stohl, J. (2010). *Help wanted: Projections of jobs and education requirements through 2018.* Washington, DC: The Center on Education and the Workforce.

[2] Proficiency in math is defined here as a score of 22 or more out of 36 possible points on the ACT mathematics subtest. This brief uses proficiency in math as an indicator of general college readiness for a STEM major.

[3] Bettinger, E.P., Evans, B.J., & Pope, D.G. (2011). *Improving college retention and performance the easy way: Unpacking the ACT exam.* Cambridge, MA: National Bureau of Economic Research.

[4] Latino/Hispanic, Native American, and Asian American student numbers in Kentucky were too small to be reported in this brief.