

## STEM Report

Research indicates it is the teacher in the classroom that matters most; not buildings, not technology, not programs. Excellent teachers who are held to rigorous standards are the key to improving science, technology, engineering, and math in Kentucky.

Eastern Kentucky University is raising standards in teacher education by requiring teacher candidates to have a 2.75 grade point average. Other states have raised their grade point average to a 3.0 in teacher education and Kentucky needs to evaluate whether this will help provide rigor and provide an early foundation for science, technology, engineering, and math (STEM).

Elementary teachers do not have strong STEM backgrounds and offer a weak beginning for students. Kentucky needs to evaluate whether elementary education curriculum in higher education should require more STEM courses as a graduation requirement to ameliorate the concern.

It is clear that teachers must have a better understanding of math in order to graduate more engineers. The Commonwealth may want to require all elementary education teachers to be competent in calculus. Graduate programs also need to advance the cognitive abilities of teachers in the STEM content areas. Currently with the Kentucky rank system, a teacher can take advanced coursework in pedagogy leading to a master's degree without taking any advanced STEM content. Kentucky might want to evaluate the efficacy of requiring master of education programs to be content driven with at least eighteen hours in a STEM area. Currently, very few teachers in the public schools have eighteen graduate hours in their content area of expertise. Even math and science teachers typically have a master's degree in an area outside of their discipline.

Eastern Kentucky University has the only lab school in the Commonwealth and is one of one hundred nation-wide. This school is consistently in the top ten in math and science at the high school and middle school level. It is used as a demonstration school for all teacher candidates who graduate from Eastern Kentucky University. With supplemental funding, Model could be used for research and assessment of new programs in the STEM area before they are implemented in other schools. It could be a showcase for cutting edge, highly effective teaching methodologies for the Commonwealth. This experimental pedagogy could be chosen by experts, assessed, refined, reported, and showcased.

Eastern Kentucky University has also been an active partner in the Appalachia Math and Science Partnership with the University of Kentucky. Science professors have worked closely with public school teachers to provide workshops to teach inquiry methods of instruction. These workshops have been most successful when they have been co-designed with practitioners. It is important that we work together to make this partnership sustainable and affordable. Through the Southeast/South central Cooperative Eastern Kentucky University currently provides professional development to twenty-five school districts in our region.

Dual credit courses may be another way to improve STEM capabilities in high school students. University courses taught in high schools, with the rigor found in courses like College Algebra, help provide a smooth transition to college. Kentucky law provides that students can earn high school and college credit concomitantly. School districts

would like for Universities to offer remedial courses in their high schools. Remedial math could be offered before students enter college. Currently fifty percent of Kentucky students need remedial courses after they arrive on campus.