



There is a crisis in the American workforce: the American dream is slipping away from the next generation of workers. Too few students today are acquiring the skills of critical thinking, problem solving, planning and execution to become college or career ready for the 21st century workforce. These skills are learned in science, technology, engineering and mathematics (or “STEM”) studies, making STEM education critically important to America’s future. A recent Bayer survey reported that 59% of businesses are losing productivity because of a lack of STEM-skilled employees. According to the national organization Change the Equation, there are currently 1.9 STEM job openings for every qualified STEM applicant. In Indiana the story is similar: 2.4 STEM openings for every qualified STEM applicant. Meanwhile, schools in Indiana have a shortage of qualified teachers for STEM classes and have reduced the time spent on science each week since 2008. Indiana is forecast to have nearly 120,000 openings for STEM jobs in 2018, but graduation rates from post-secondary certificate and degree programs will likely fall well-short of meeting the demand. The critical thinking and problem-solving skills learned from studying STEM disciplines are necessary to solve the problems – and address the opportunities – of the 21st century. A focus on STEM education can restore access to the American dream of a good job with good wages; the time for Indiana to act is now.

The I-STEM Resource Network has a vision: Indiana can be a national leader in student achievement and demonstratively improve college and career readiness in the STEM disciplines. The I-STEM Resource Network is a partnership of public and private higher education institutions, K-12 schools, businesses, and government, hosted by Purdue University. I-STEM was started in 2006 and includes committees comprised of educational content experts and practitioners who come together to design and employ programs to address STEM issues. I-STEM supports K–12 teachers and education leaders working to implement high academic standards towards STEM literacy for all students. It also provides Indiana education leaders with new knowledge about teaching and learning.

I-STEM serves the primary and secondary schools in Indiana with both student and teacher programs. I-STEM also engages the school and district leadership for strategic planning, gaining feedback and improving performance. I-STEM is actively focused on enhancing science in grades K-8 across Indiana. Additional efforts are focused on integrating mathematics and engineering into a combined STEM curriculum. On another level, I-STEM serves the businesses and institutions of higher education in Indiana by emphasizing career and college readiness in STEM disciplines. This includes alignment to state and national standards, policy inputs for statewide STEM support, and quantitative assessment measures in STEM subject areas.

The signature I-STEM program is the Indiana Science Initiative. The vision for the Indiana Science Initiative (ISI) is to systemically reform K-8 science education in Indiana using research-based science curricular materials that are implemented with instruction to support literacy strategies. Piloted in 2010, ISI includes 30 school districts statewide with 134 schools, over 2,000 teachers, and 54,000 students, and provides science curriculum for grades K-8, with an emphasis on supporting higher-need districts. Part of our ISI efforts includes three grant partner schools



where we also support science coaches, additional materials, professional development, and assessments. Materials management for ISI science kits is handled by Purdue University, which ships, returns and refurbishes approximately 400 tons of materials for ISI schools every year. As the operations side of ISI has been fine-tuned, I-STEM’s operational performance has improved significantly, achieving a quality rate of 44 parts per million (PPM) with over 8 million parts shipped during the school year.

Analysis of test scores shows ISI schools performing better on I-STEP+ science and English/Language Arts tests. ISI has analyzed ISTEP+ performance at 107 schools around the state which have used the ISI curriculum for grades K-8 for 2014. Results from these 107 schools were compared to matched non-ISI classrooms in Science, English language arts, and Mathematics. Science performance (as measured by the passing rate for the ISTEP+ test) improved 11% compared to non-ISI classrooms. Additionally, ELA passing rates improved 7% and mathematics improved 8%.

From a more qualitative aspect, teachers and administrators at ISI schools overall are very favorable about the program. The students love the science topics and are excited to have science class. The teachers receive specific training on use and assessment in the ISI program. They are engaged with their students and enjoy seeing their excitement and successes. And administrators see a strong science curriculum, linked to state standards, that exceeds what most districts would be able to do in isolation. Go to <http://www.indianascience.org> for more.



The Indiana STEM Action Coalition I-STEM leads the Indiana STEM Action Coalition which is focusing on specific policy imperatives developed by the national STEM organization Change the Equation. The Coalition's purpose is to develop specific policy recommendations for expanding quality STEM education based on best practices in other states and insight into Indiana's particular needs and resources. The Coalition now numbers over 100 people and includes representatives from schools, colleges and universities across the state as well as Project Lead the Way, the Indiana Chamber of Commerce, the Indiana Department of Education, many businesses, and the Indiana Department of Workforce Development.

Recently the Coalition completed the policy guidance for I-STEM. The goal is to provide knowledgeable, fact-based policy advice to Indiana's education decision makers so that education and workforce development policies promote STEM education aligned with research-based educational practices and STEM careers. The group used Change the Equation's Principles for STEM Policy to identify five principles to advance STEM education in Indiana:

- 1) Set high expectations for student learning in math and science
- 2) Ensure effective STEM teachers in every classroom and out-of-school setting
- 3) Develop, advance, and evaluate effective STEM strategies and programs
- 4) Align learning and curricular resources to standards
- 5) Provide students with relevant, up-to-date information and mentoring on STEM careers.



These policies have been adopted collectively to form the Indiana STEM Education Initiative which seeks to advance quality STEM education for every student, every school, every day.

I-STEM has many great corporate partners such as Lilly, Biocrossroads, Dow AgroSciences, OrthoWorx, Cook Medical, Cummins, Roche Diagnostics, Crane Naval Surface Weapons Center, and Rolls Royce. I-STEM welcomes partnerships with all the STEM businesses in Indiana.

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