

Community Need: According to the U.S. Department of Labor, more than 70% of jobs in the nation's labor market require a solid foundation in science, technology, engineering, and math (STEM) concepts.<sup>i</sup> In Montana, four of the five fastest job growth areas require a solid foundation in STEM content.<sup>ii</sup>

In fact, the science and engineering workforce has shown sustained growth for more than 50 years, growing from 182,000 jobs in 1950 to 5.4 million in 2009. This 5.9% annual growth rate is five times the 1.2% growth rate for the total workforce older than 18. The job growth slowed from 2000 to 2009 but its 1.4% annual growth still exceeded the 0.2% growth rate for the general workforce.<sup>iii</sup>

The U.S. Department of Labor projects that the U.S. will have more than 1.2 million job openings in STEM fields by 2018.<sup>iv</sup> The Department of Labor projects 16% of Bachelor's degrees will specialize in STEM by 2020.<sup>v</sup> And the 2012-2022 projections show that 75% of the fastest growing jobs require STEM education.<sup>vi</sup>

The National Center for Education Statistics (NCES) reports that 68% of 4<sup>th</sup> grade boys and 66% of 4<sup>th</sup> grade girls self-report liking science. The same is true for math. By 5<sup>th</sup> grade both boys and girls begin to lose interest.

The National Assessment of Educational Progress (NAEP) measures student proficiency in math and science on an annual basis. The latest data, 2011, shows 40% of 4<sup>th</sup> grade students across the U.S., and 45% of Montana students performed at or above proficiency in math.<sup>vii</sup>

When looking at our 2011 state-mandated test (MontCAS), 67% of 4<sup>th</sup> graders performed at or above proficiency in math. In 2013, 66% of our students performed at or above proficiency in math.<sup>viii</sup>

NCES-compiled NAEP 2011 science data for 8<sup>th</sup> grade students reveals 31% of U. S. students and 44% of Montana students performed at or above proficiency.<sup>ix</sup> The MontCAS Science Test reveals that 58% of our students in 2011 and 67% of the students in 2013 performed at or above proficient in science.

Nationally, only 45% of the high school graduates were college ready in math, 30% in science. Locally, Montana State University-Billings reported 32% of its College Algebra students fail the course. Thirty-seven percent fail Introduction to General Chemistry, 38% fail Our Physical World, 42% fail Principles of Living Systems, and 47% fail College Chemistry. They only retain 55% of their students from fall freshman year to fall sophomore year.

The school district knew it needed to improve student opportunities in the STEM areas. A STEM Leadership Committee formed in the fall 2013 to help determine the direction for a science initiative, identify a curriculum, and determine funding needs to pilot a new STEM curriculum in five elementary schools. As the Team explored various curricula, one stood out – Project Lead the Way (PLTW).

The District was already familiar with PLTW. The Billings Career Center, a magnet school for 10-12 grade students, began implementing their engineering pathway of three courses seven years ago, the biomedical sciences program two years ago. Students love the curriculum. To see what sort of lasting impact these courses played in student career choices, a telephone survey was conducted this fall. What we found astounded us. Nearly 40% of the students participated in the survey. Of these, 90% attended college. Of those in college, 59% are pursuing or have already attained an Engineering degree. Another 23% are pursuing or have attained a degree in a STEM field. This one program has resulted in 82% of its students in college continuing on in a STEM related field of study and career. The freshman to sophomore retention rate was 95% ! This convinced the STEM Team to pursue funding for the PLTW K-5 Launch curriculum.

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<sup>i</sup> U.S. Department of Labor, Bureau of Labor Statistics, Occupational Outlook Handbook, Fastest growing occupations between 2012-2022, [www.bls.gov/ooh/fastest-growing.htm](http://www.bls.gov/ooh/fastest-growing.htm).

<sup>ii</sup> Montana Department of Labor & Industry, Research and Analysis Bureau, *Montana Employment Projections, 2011-2021*.

<sup>iii</sup> National Alliance for Partnerships in Equity, [www.napequity.org/professional-development/counselor-training/stem-careers-students/](http://www.napequity.org/professional-development/counselor-training/stem-careers-students/)

<sup>iv</sup> U.S. Department of Labor, Bureau of Labor Statistics, November 2009, *Occupational employment projections to 2018*.

<sup>v</sup> U.S. Department of Labor, U. S. Bureau of Labor Statistics, 2010, *Help Wanted: Projections of Jobs and Education Requirements through 2018*.

<sup>vi</sup> U.S. Department of Labor, U.S. Bureau of Labor Statistics, Occupational Outlook Quarterly, Winter 2013-14, p10.

<sup>vii</sup> National Center for Education Statistics, Digest of Education Statistics, Table 164, [http://nces.ed.gov/programs/digest/d12/tables/dt12\\_164.asp](http://nces.ed.gov/programs/digest/d12/tables/dt12_164.asp).

<sup>viii</sup> Montana Office of Public Instruction, Growth and Enhancement of Montana Students (GEMS), Reports and Data, Parameter based report, MontCAS Proficiency Comparisons by Subgroup, <http://gems.opi.mt.gov/>

<sup>ix</sup> National Center for Education Statistics, The Nation's Report Card: Science, 2011 State Snapshot Report, Montana Grade 8 Public Schools.