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# STEM

SCHOOLS PROJECT

Science • Technology • Engineering • Math

*HOW SCHOOLS CREATE A STEM CULTURE*

## PROJECT OVERVIEW

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The STEM Schools Project documents strategies used by schools – public, middle and high schools, as well as a private high school – to implement project-based STEM (Science, Technology, Engineering & Math) programs like Project Lead The Way and a more widespread adoption of STEM teaching and learning across the entire school.

Case studies and reports will be released in the Summer of 2012. A Leadership Learning Network may be formed to share the project’s findings and help school leaders move their schools from schools with STEM programs to STEM-focused schools.

## THE PRIORITY FOR STEM LEARNING

Education leaders and policymakers across the United States are focused on improving the competitiveness of the U.S. workforce by enhancing and expanding STEM (science, technology, engineering and mathematics) education. The hope is that by developing a STEM-literate workforce comprised of individuals who are well-grounded in STEM-related skills, such as problem solving and creative thinking, America's economy will be more competitive and will experience sustained economic growth and individual prosperity.

In this vein, numerous state networks of schools, education advocates, and business-led organizations are working to develop and promote a “STEM” agenda. Many STEM-focused schools are being established, largely with support of national foundations and state and local funds set-aside for specialty schools.

### KEY ORGANIZATIONS INVOLVED

The project is funded through generous support from the Kern Family Foundation based in Waukesha, Wisconsin ([www.kffdn.org](http://www.kffdn.org)).

The Meeder Consulting Group, working from recommendations with the Project Lead The Way network and based on preliminary research and interviews, selected nine sites for visits during the Fall of 2011. These schools, seven high schools, one middle school, and one intermediate school district serving multiple districts, demonstrate the kind of practices that seem likely to build a STEM-rich learning environment.

One program that has risen to prominence through fast growth and implementation in 3,400 schools since its founding in 1998 is Project Lead The Way (described in more detail below). Project Lead The Way offers high quality STEM curriculum and teacher training, but it does not purport or attempt to transform the broader mission or orientation of an entire school.

## THE STEM SCHOOLS PROJECT

The STEM Schools Project asks two important questions:

*What factors contribute to a strong implementation of a STEM program like Project Lead The Way, AND,*

*How can a school move beyond having good STEM programs to becoming a school that embeds STEM teaching and learning across the school – in short, becoming a STEM-focused school?*

The purpose of the STEM Schools Project is to document promising practices in high schools and middle schools that are providing students a STEM-rich school experience, drawing upon a high quality implementation of Project Lead The Way's Pathway To Engineering and/or Biomedical Sciences programs. The Meeder Consulting Group research team has identified practices that focus on raising student achievement in STEM-related subjects and that "blur the lines" between the STEM disciplines to give students a more integrated and engaging learning experience.

### CASE STUDY SITES

- **Edison Middle School**  
Janesville, Wisconsin
- **Clearbrook-Gonvick High School**  
Clearbrook, Minnesota
- **Greenfield Central High School**  
Greenfield, Indiana
- **Humboldt High School**  
Humboldt, Iowa
- **Lenawee County Intermediate School District**  
Addison, Michigan
- **Pine River Backus High School**  
Pine River, Minnesota
- **Thomas Worthington High School**  
Worthington, Ohio
- **St. Thomas More High School**  
Milwaukee, Wisconsin (private Catholic school)
- **Wheeling High School**  
Wheeling, Illinois

The Meeder Consulting Group, working from recommendations within the PLTW network and based on preliminary research and interviews, selected nine site visits during the Fall of 2011. The sites were specifically selected from Mid-West states, since that corresponds with the funding footprint of the Kern Family Foundation in helping with start-up of local PLTW programs. The selected sites, seven high schools, one middle school, and an intermediate unit school district, demonstrate the kind of practices that seem likely to build a STEM-rich learning environment.

## PROJECT LEAD THE WAY

PLTW is a national, non-profit organization that provides rigorous and innovative STEM programs for middle schools and high schools. In 1998, PLTW began in 12 high schools in upstate New York as a program designed to address the shortage of engineering students at the college level. It has grown to a network of almost 3,400 middle and high schools in 50 states and the District of Columbia. More than 300,000 students are enrolled in PLTW courses.

The PLTW comprehensive curricula, which are collaboratively developed by PLTW teachers, university educators, engineering and biomedical professionals, and school administrators, emphasizes critical thinking, creativity, innovation, and real-world problem solving.

PLTW is founded on the belief that STEM education should engage students in activities-, projects-, and problem-based (APPB) learning. Through the PLTW curriculum, students learn to create, design, build, collaborate, and solve problems while applying what they learn in math and science. According to PLTW, these critical-reasoning and problem-solving skills enable students to succeed in a STEM career in the 21<sup>st</sup> century.

PLTW offers two programs at the high school level: Pathway To Engineering and Biomedical Sciences. The Gateway To Technology Program is offered in middle schools.

## PROJECT METHODOLOGY

The site visit were generally two-day events during which two consultants from the Meeder Consulting Group met with and interviewed key stakeholders associated with the schools (such as teachers, administrators, students, and

business partners), observed PLTW and STEM classes, and reviewed school data and documentation.

The purpose of the site visits was to:

- Meet with school leaders, teachers, students, business/community partners and education partners to learn about their perspectives on key issues related to student achievement, student learning, PLTW and STEM-learning;
- Develop an understanding of the school structure and curriculum;
- Document the current promising practices in place at the school, both general school improvement practices and STEM-specific practices; and
- Gather curriculum materials and data to document STEM integration, and the development of higher level skills of problem solving, analysis and synthesis, innovation, and teamwork.

The project team did not set out to identify correlations or cause and effect relationships between the implementation of PLTW and student achievement outcomes or between the implementation of PLTW and the implementation of school improvement strategies. Rather, the team sought to identify how schools implement PLTW and how they address broader STEM-related and school improvement strategies.

## FORTHCOMING REPORTS

**Case Studies.** For each of the site visits, Meeder Consulting prepared a detailed, but reader-friendly report describing the school's accomplishments, STEM strategies, and school improvement philosophy.

**Each of the case studies is organized into three overarching themes related to how schools use PLTW to spur STEM-related learning:**

- Create an Exceptional PLTW Implementation,
- Develop a School-wide STEM Culture, and
- Implement Related School Improvement Strategies.

**Final Report.** The final report, to be released in September 2012, will be focused on the strategies related to "Develop a School-wide STEM Culture." This report will include a more in-depth focus on those strategies observed at some of the case study sites that are most relevant to breaking down silos among STEM subjects, defining what STEM-literacy is, and helping teachers collaborate and utilize innovative and engaging instructional methods.

# CONTACT INFORMATION

**Hans Meeder, President, Meeder Consulting Group, LLC**

E: [Hans@Meederconsulting.com](mailto:Hans@Meederconsulting.com)

Ph: 410-740-2006

6713 Groveleigh Drive,

Columbia, MD 21046

[www.meederconsulting.com](http://www.meederconsulting.com)

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