

Benefits to Students

- Exposure to vigorous pre-engineering coursework
- Awareness of high-demand, high-wage careers
- Relevant application of mathematical and scientific principles
- Opportunity to solve real-world problems
- In-depth application of knowledge
- Exposure to latest computer software and equipment used by industry, colleges and universities
- Hands-on activities that utilize team effort
- Skills required for jobs and post-secondary education
- Improved performance in academic work
- Improved communications skills
- Articulated credit arrangement with New Hampshire Technical Institute

Benefits to Schools

- Efficiency in program planning, purchasing, training and curriculum development
- Free, regularly updated best practices curriculum
- Free, regularly updated resource guides for students
- Student assessment rubrics and other materials
- Consistent curriculum and training that help to with PLTW that supports the program's implementation and continued use
- A plan for selecting appropriate equipment, software and materials that incorporates a highly cost-effective bidding system
- An organizational structure that offers program support at the local, regional, state and national levels

Benefits to Business, Industry, and Colleges and Universities

- A program that addresses a national shortage of highly skilled engineers and technicians
- A program that will enhance economic and work-force development
- An opportunity to work with and support the local educational systems through local and regional partnership teams
- High school graduates who are prepared for college programs in engineering and technical fields.

*Training and Support for Teachers . . .

Teacher training is a critical component of any new instructional program. Project Lead The Way® has developed an intensive, comprehensive training program for teachers. This training model consists of three parts:

*Pre-assessment . . .

Significant attention is paid to gauge staffs readiness for training through a self-assessment. PLTW teachers analyze the results and recommend work, if necessary, to prepare them for the summer institute.

*Summer Training Institute . . .

The institute, an intensive two-week training program, prepares teachers to teach the course scheduled for the fall term. Graduate credit is available through the Rochester Institute of Technology

*Ongoing Training . . .

Teachers receive continuous support for skill improvement as they implement the program. PLTW manages electronic communication among teachers and staff at all PLTW sites to encourage them to work together to solve problems.

*Training and Support for Counselors . . .

PLTW understands that no another key to success is awareness. The Counselor conference is designed to inform school counselors about the program's benefits and about the various careers in technology and engineering that are available to students who pursue this training. Counselors receive PLTW materials, including brochures and videos to use with students and their parents.

Many opportunities await young people who complete an upgraded academic core and a career/technical concentration, such as pre-engineering technology. The Project Lead The Way (PLTW) pre-engineering program of study helps achieve this goal.

High-Demand, High-Wage Careers . . .

The United States is suffering from a severe shortage of engineers and well-educated technical workers. The nation has more than one million jobs available in these fields with few qualified candidates to fill them. One reason for this problem is that more than half of the students who enroll in post-secondary engineering and engineering/technology programs drop out because they were not adequately prepared in school.

"U.S. students generally do not get the comprehensive math and science courses in grades K-12 they need to succeed in an engineering program."
(Travis Egnen, chairman and chief executive of ITT Industries Inc. in USA Today)

Introducing students in middle school and high school to engineering and engineering technology will attract more of them to these fields and will allow them to determine (before college) whether they are interested in pursuing an engineering-related career. The PLTW graduate will be better prepared for engineering programs in college or technical school and will be more likely to succeed.

Rigorous and Relevant Curriculum

Project Lead The Way® Pre-engineering Program

- Meets national standards for math, science and technology education
- Offers a complete career/technical concentration with an emphasis on both mathematics and science
- Links demanding math and science courses with quality career/technical courses

Middle School Technology Program

Gateway to Technology

The middle school curriculum is designed to give students a broad overview of technology-related fields and processes. Because engineers use technology to solve problems, the course is 'activity-oriented'. It incorporates four 10-week units, each of which is developed specifically for grades six through eight. It is recommended that these units be taught in the following order:

Designs and Modeling The Magic of Electrons The Science of Technology Automation and Robotics

High School Sequential Program of Study . . .

The high school curriculum is a rigorous four-year sequence of courses that, when combined with college preparatory mathematics and science, allows students to explore careers in engineering and engineering technology. This exposure helps students prepare to enter a two-or four-year college or technical school; however, even students who do not intend to pursue further formal education will benefit greatly from the knowledge and logical thought processes taught in these courses.

High School Courses

*Introduction to Engineering Design

is an introductory course that develops students' problem-solving skills, with emphasis on visualization and communication skills using a computer and 3-D solid modeling software.

*Digital Electronics

is a course of study in applied digital logic, using electronic logic circuits that first are designed and then tested using the latest computer digital-logic modeling technology.

***Principles of Engineering**

is a broad-based survey course to help students understand engineering and engineering technology and identify career possibilities. Theoretical and hands-on problem-solving activities are emphasized.

***Computer Integrated Manufacturing**

builds on skills in computer modeling design and exposes students to the fundamentals of computerized manufacturing technology. The course covers prototyping, CNC equipment, CAM software, robotics, and flexible manufacturing systems.

***Engineering Design and Development**

involves two-to-four person teams that research an open-ended problem and then design and construct a solution to it. Each team must submit progress reports and a final research paper. The team members then defend the solution with an oral presentation before an outside review panel.

Standards-Driven: National Mathematics, Science and Technology Education

The project-based curriculum challenges students of all ability levels to use mathematic, scientific and technological principles in solving real-world problems. Students who complete the program will:

- Understand technology as a tool for problem-solving
- Understand the scientific process, problem-solving in engineering, and the application of technology in engineering
- Be prepared for the rigor of college-level programs in engineering or engineering technology
- Understand technological systems and how they interact with other systems
- Apply appropriate technological systems in analyzing and solving problems
- Use mathematical principles to solve problems
- Communicate effectively through reading, writing, listening and speaking
- Work well in teams

Expenses and Commitments—A Partnership

Project Lead The Way® provides:

- Free curriculum (regularly updated)
- Free resource guides for students (regularly updated)
- Curriculum review, revision and distribution
- Teacher assessment
- Summer teacher institutes (classrooms, instructors, curriculum, learning materials)
- Ongoing teacher training (instruction only)
- Counselor Conferences professional development and career awareness (accommodations, materials and facilities)
- Electronic communication among teachers and staff

- Increased purchasing power—coordinated bidding and purchasing of furniture, hardware, software and supplies
- Management personnel (supports nationwide implementation)
- Public relations materials for students and parents
- Systematic program evaluation
- Information and support for schools and teachers
- Technical support
- National leadership (Board of Directors and National Oversight committee)

Schools Provide:

- Equipment and software
- Each PLTW teacher with a laptop and software
- Pre-core training prior to Summer Training Institute (if necessary)
- Summer Training Institute-teacher expenses (stipends, room/board/incidentals, travel)
- Travel costs for Counselor Conference
- Future lab expansion when needed
- Annual budget for supplies and materials
- Implementation of the entire five-unit, PLTW curriculum of high school courses in four years or less and/or implementation of Gateway to Technology in three years or less
- Participation on local leadership and partnership teams
- Participation in evaluation of the program

Contact Information:

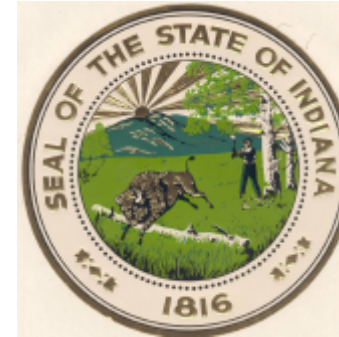
Project Lead the Way® is a 501 © (3) not-for-profit national corporation that forms partnerships among public schools, higher education, institutions and private sector to increase the quantity and quality of engineers graduating from our educational system.

Support for Project Lead The Way® activities is provided by a not-for-profit charitable foundation.

For More information on the Indiana PLTW Pre-engineering Initiative, contact:

Ken Thompson, Indiana Department of Education
Phone 317-234-0268
<e-mail kthompso@doe.state.in.us>
Dave Wilkinson, Indiana Department of Education
Phone 317-233-3604
<e-mail dwilkins@doe.state.in.us >
Greg Steele, Indiana Department of Education
Phone 317- 232-9105
<e-mail gsteale@doe.state.in.us

Indiana



Project Lead The Way®

Pre-Engineering Programs

Indiana Department of Education