National PLTW Overview

PLTW Mission

Create dynamic partnerships with our nation’s schools to prepare an increasing and more diverse group of students to be successful in science, engineering and engineering technology programs.

Updated: December 2006 12/2006
What We Believe

Rigorous, integrated, project/problem based curricula and rigorous, comprehensive professional development empower teachers.
PLTW Progress

What has happened to Project Lead The Way in 9 years?
Growth Status

As of May 2006 PLTW has:
- 175,000+ students,
- located at 1750+ school sites,
- in 46 states & DC,
- being taught engineering curricula,
- by over 3000 teachers,
- all trained by PLTW,
- at 25 university sites.
Network Growth – Participating States

46 States & DC • 1700+ School Sites • Derby, England

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Program Growth

Middle School - Gateway To Technology

- Design and Modeling (9 wks)
- The Magic of Electrons (9 wks)
- The Science of Technology (9 wks)
- Automation and Robotics (9 wks)
- Flight and Space (9 wks) NASA
- **Technology in Motion (9 wks)

**in development

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Program Growth
High School - Pathway To Engineering

Foundation:
- Introduction to Engineering Design
- Principles of Engineering
- Digital Electronics

Specialization:
- Computer Integrated Manufacturing
- Civil Engineering and Architecture
- Biotechnical Engineering
- Aerospace Engineering

Capstone: Engineering Design and Development

Note: Course program requires college prep mathematics each year.
Program Growth

High School - Pathway To Biomedical Sciences

Foundation: Principles of Biomedical Science
Human Systems
Medical Interventions

Specialization: Biotechnical Engineering (Indiana Funded)
and/or
To Be Developed

Capstone: Scientific Research

Note: Program requires college prep mathematics & science each year.

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3-Phase Professional Development

**Core Training Summer Institute**
- Gateway To Technology (Middle School)
- Principles of Engineering
- Introduction To Engineering Design
- Digital Electronics
- Computer Integrated Manufacturing
- Civil Engineering/Architecture
- Biotechnical Engineering
- Aerospace Engineering
- Engineering Design and Development

**PLTW Continuous Training**
- Virtual Academy
- University Based PD
- Level II Training
- Master Teacher

Self-Assessment and Pre-Core Training
- Ready for core training
- Ready for teaching

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© PLTW 2003
Affiliate Universities
STI 2006 Training Locations

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STI 2006 - 24 University Partners
Career Clusters

Supported by:

- National Association of State Directors of Career Technical Education Consortium (NASDCTEc) / National Career Technical Education Foundation (NCTEF)
Agriculture, Food & Natural Resources
Architecture & Construction
Arts, A/V Technology & Communications
Business, Management & Administration
Education & Training
Finance
Government & Public Administration
Health Science
Hospitality & Tourism
Human Services
Information Technology
Law, Public Safety, Corrections & Security
Manufacturing
Marketing, Sales & Service
Science, Technology, Engineering & Mathematics
Transportation, Distribution & Logistics

www.careerclusters.org
PLTW Companion Textbooks

Thomson Delmar Learning will produce either adaptations of existing texts or new works that when combined with the PLTW curriculum materials form integrated learning packages.

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Proposed Textbook Series:

- GTT Fall 2008
- IED Fall 2007
- POE Fall 2009
- DE Fall 2007
- CIM Fall 2008
- CEA Fall 2009
- EDD Fall 2008
National Recognition

Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Educational Future

by the National Academy of Sciences, The National Academy of Engineering, and the Institute of Medicine of the National Academies October 2005

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National Recognition

K-12 curriculum materials modeled on world class standards. Foster high-quality teaching with world class curricula, standards and assessments of student learning. Convene a national panel to collect, evaluate and develop rigorous K-12 materials that would be available free of charge as a voluntary national curriculum. The model for this recommendation is the Project Lead The Way pre-engineering courseware.
“Students participating in PLTW courses are better prepared for college engineering programs than those exposed to more traditional curricula” p.16
Southern Regional Recognition

Project Lead the Way: A Pre-engineering Curriculum That Works (2005)

“When PLTW students are compared to similar students...PLTW students complete significantly more higher level mathematics and science courses.” (p. 3)
Illinois PLTW
2006-2007 Snapshot
Illinois PLTW Partners

- Illinois State Board of Education
- Illinois Dept. of Commerce and Economic Opportunity
- University of Illinois (Affiliate University)
- Bradley University (Associate University)
- Illinois PLTW Leadership Advisory Committee
42 sites offer PLTW courses:

- 39 High Schools offer PLTW courses (includes career center and college sites)
- 3 Middle Schools offer GTT courses

11 of these are new 2006-07

10-25 additional schools have indicated interest to join and to begin courses in 2007-08
Illinois HS PLTW Course Offerings 2006-07:

- 14 sites offering 1 course
- 13 sites offering 2 courses
- 12 sites offering 3 or more courses
<table>
<thead>
<tr>
<th>1st course</th>
<th>2nd course</th>
<th>3rd course</th>
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<tr>
<td>IED-20</td>
<td>IED-4</td>
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<td>POE-9</td>
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<td>Other-2</td>
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<tr>
<td>Other-1</td>
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*incomplete data*
Illinois Observations
About Course Elements
Course Description Layout – the following slides follow this format

- Recommendations for sequential order
- Career opportunities and future explorations that this course provides
- Mathematics courses that would be appropriate as a pre-requisite or taken concurrently
- Software/Hardware recommended/needed for the particular course
- Estimated Equipment/supply and textbook cost
Schools are required to pay Annual Autodesk Software lease fee to cover up to 100 seats:

- $3995 (covers IED, POE, GTT, CEA, CIM) or;
- $2,900 for first year HS Inventor/IED only or;
- $2,900 for Middle School GTT only

Additional software annual license for some courses:

- $650 per 25 seats DE (MultiSIM)
- $1,600 per 30 seats CIM Bundles
Introduction to Engineering Design (IED)

- Recommended as a 1st or 2nd Course
- Improve (re-engineer) existing products and invent new ones – communication is important
- Preferred mathematics level: Algebra 1, Geometry, especially when considering 3-D coordinate modeling
- Software/Hardware Needed: Autodesk Inventor
- Estimated Equipment/supply/textbook cost: $2,800

*excludes computer lab/network/furniture/projection equipment, annual software license fees, teacher laptop, and teacher Summer Training Institute registration ($2000) and housing/travel ($1000-1500 estimate)
*costs per class section

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Principles of Engineering (POE)

- Recommended as a 1st or 2nd Course
- Explore careers in engineering and technology through projects and activities
- Preferred mathematics level: Algebra 1, experience in geometry helps with understanding modeling and coordinates
- Software/Hardware Needed: Autodesk Inventor, MDSolids, Fischertechnicks, RoboPro
- Estimated Equipment/supply/textbook cost: $19,500

*excludes computer lab/network/furniture/projection equipment, annual software license fees, teacher laptop, and teacher Summer Training Institute registration ($2000) and housing/travel ($1000-1500 estimate)

*costs per class section

Updated: December 2006 12/2006
Digital Electronics (DE)

- Foundation Course
- Simulate circuit logic and control systems
- Preferred mathematics level: Algebra 2, especially Boolean Algebra
- Software/Hardware Needed: EMP11, WinCupl, Breadboard Kits
- Estimated Equipment/supply/textbook cost: $9,100

*excludes computer lab/network/furniture/projection equipment, annual software license fees, teacher laptop, and teacher Summer Training Institute registration ($2000) and housing/travel ($1000-1500 estimate)

*costs per class section

Updated: December 2006 12/2006
Civil Engineering and Architecture (CEA)

- Specialization Course
- Work in teams to introduce solutions to community-based projects
- Preferred mathematics level: Algebra, Geometry (in order to model and render and visualize 3-dimensional landscapes)
- Software/Hardware Needed: Autodesk Inventor, MDSolids
- Estimated Equipment/supply/textbook cost: $5,700

*excludes computer lab/network/furniture/projection equipment, annual software license fees, teacher laptop, and teacher Summer Training Institute registration ($2000) and housing/travel ($1000-1500 estimate)
*costs per class section

Updated: December 2006 12/2006
Computer Integrated Manufacturing (CIM)

- Specialization Course
- Use CNC and robotics to produce a product
- Preferred mathematics level: Algebra 2 – Trigonometry, Geometry
- Software/Hardware Needed: Autodesk Inventor, Fischertechnicks RoboCell, EdgeCam
- Estimated Equipment/supply/textbook cost: $51,700

*excludes computer lab/network/furniture/projection equipment, annual software license fees, teacher laptop, and teacher Summer Training Institute registration ($2000) and housing/travel ($1000-1500 estimate)
*costs per class section

Updated: December 2006 12/2006
Biotechnical Engineering (BTE)

- Specialization Course
- Explore careers in bio-medical engineering, genetics, and environmental engineering
- Preferred mathematics level: Algebra 2, Statistics and Probability
- Software/Hardware Needed: Unknown as of yet
- Estimated Equipment/supply/textbook cost: $10-15,000

*excludes computer lab/network/furniture/projection equipment, annual software license fees, teacher laptop, and teacher Summer Training Institute registration ($2000) and housing/travel ($1000-1500 estimate)

*costs per class section

Updated: December 2006 12/2006
Engineering Design and Development (EDD)

- Capstone Course
- Teams research patents and regulations with a mentor and defend their design of a model
- Preferred mathematics level: Algebra 2, Geometry, Trigonometry
- Software/Hardware Needed: Same as in previous courses in order to defend model
- Estimated Equipment/supply/textbook cost: $1,200

*excludes computer lab/network/furniture/projection equipment, annual software license fees, teacher laptop, and teacher Summer Training Institute registration ($2000) and housing/travel ($1000-1500 estimate)
*costs per class section
Gateway to Technology (GTT)

- Middle School Courses
- Units: Design and Modeling, Magic of Electrons, Science of Technology, Automation and Robotics, Flight and Space
- Preferred mathematics level: Rigorous 7th and 8th Grade Mathematics courses
- Software/Hardware Needed: Autodesk Inventor, MDSolids, Fischertechnicks, RoboPro
- Estimated Equipment/textbook/supply cost:
  - Design and modeling $2000
  - Magic of Electrons $4300
  - Science of Tech $3000
  - Automation and robotics $5500

*excludes computer lab/network/furniture/projection equipment, annual software license fees, teacher laptop, and teacher Summer Training Institute registration ($2000) and housing/travel ($1000-1500 estimate)

*costs per class section

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Perkins/ISBE CTE elective credit funding

- Approved plan (note new Pre-Engineering CIP option) which includes Illinois Plan and at least two training level or cooperative education courses
- Taught by CTE certified/highly qualified teacher (or a Provisional teacher) with 2000 hours paid relevant work experience

Three High School Credit Models

- Tech Ed credit
- Math/Science elective credit
- Hybrid—mix of elective credits, depending upon teacher qualifications
Illinois PLTW Certification

- Schools should be PLTW-certified within two years
- School self pre-assessment using national and Illinois information materials
- One-day site visit led by U of Illinois Affiliate
- January-April timeline usually (but fall visits possible for schools in year 2 or 3)
- Visit [www.pltw.illinois.edu/certification.htm](http://www.pltw.illinois.edu/certification.htm) for details and planning assistance

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Illinois PLTW Certification (continued)

- School plans to offer access to at least four courses (note change from prior 5-course requirement) within four years
- Local business/community partnership and counselor conference attendance requirement
- Students eligible to take college-level course test sections for possible college course credit options
Illinois PLTW Certification (continued)

- Middle school GTT recognition program administered by national PLTW
  - Schools to offer at least two of 5 GTT modules (Design and Automation/Robotics)
  - Complete self-assessment and submit project to National
  - Visit http://www.pltw.org/certifications.shtml
Certified Illinois high schools/career centers/college PLTW sites include:

- Morton High School
- Hononegah High School
- Danville High School
- East Peoria High School
- Illinois Central College
- Peoria Notre Dame High School

- Peoria Woodruff High School
- Princeville High School
- Byron High School
- LaSalle-Peru Area Career Center
- Moline High School
- Decatur Eisenhower High School

Recognized Illinois Middle School GTT site:
Winnebago Middle School
Illinois Business/Community Partnerships are Essential to Success

Moline High School PLTW involves John Deere executives and retirees in partnership activities
Illinois Business/Community Partnerships are Essential to Success

- Local business support
- Parent/family/general community support
- School districts, community colleges, career-to-work systems
- Autodesk - Illinois and regional reps work directly with schools and Illinois PLTW leaders to coordinate training sessions and communication systems

Updated: December 2006 12/2006
University of Illinois
Summer Training Institutes
Illinois PLTW Teachers Trained 2004-2006

- 85 teachers total
- Number of STI courses completed
  - 1 - 63 Teachers
  - 2 - 15 Teachers
  - 3 - 7 Teachers
- 2006 Summer Training Institute participation
  - 53 teachers from 38 Illinois schools attended STI sessions in Illinois (33) and out-of-state (20)
  - Mix of certified career technical education and math/science specialties
Estimated Costs

Summer Training Institute average costs per teacher per course:

- $2,000 STI tuition, plus
- $900-$1,200 housing/travel
University of Illinois Summer Training Institutes

**2005** - 38 teachers
- IED - 19 teachers at UIUC
- DE - 6 teachers at UIUC
- POE - 13 teachers at UIC

**2006** - 58 teachers
- (33 Illinois and 25 from other states)
- IED - 22 teachers at UIUC
- DE - 16 teachers at UIUC
- POE - 20 teachers at UIC

Updated: December 2006 12/2006
DE Summer Training Institute (2006)

Intense classroom instruction, with knowledgeable instructors, and partnered with independent assignments, helps to prepare teachers to teach PLTW curricula.
DE 2006 STI –
Luke Jeanmaire
(Oswego East HS)
demonstrates the DE
trainer "suitcase“
equipment.
DE Finished Product (2006)

Finished Birthday Problem in a kit

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IED Working together (2006)

Gary Blinkinsop & Jacob Conner both from Davenport, IA
High School work together on a problem before turning to AutoDesk Inventor
POE Stress Analyzer

POE Master Teacher Steve Rogers demonstrates the structural stress analyzer at University of Illinois Chicago 2006 STI session.
Marble Sorting in POE

Dave Scott (Davenport, IA) and Dara Randerson (Oswego East HS) collaborate on a strategy for building their marble sorter.

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Project Lead The Way
Digital Electronics - 2006 Summer Training Institute
University of Illinois at Urbana-Champaign

Project Lead The Way
Intro to Engineering Design - 2006 Summer Training Institute
University of Illinois at Urbana-Champaign
Project Lead the Way
Principles of Engineering – 2006
Summer Training Institute
University of Illinois - Chicago

DE Participants “Laughing it up” now that all the hard work is done

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Female Students - Recruiting More Young Women

A Female Student Describes her involvement and recruiting additional students.
Modeling and Communication

Students communicate their trials for creating engineering models on the computer and with actual materials. Here is a student working on a computer model of the physical model he will be building.
The Importance of Teamwork

Students describe the importance of teamwork for creating projects in IED

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Future PLTW Student

This young student stopped by to see the Illinois STI IED Session and was quite intrigued with Richard Keane, UIUC Instructor.
Important Illinois PLTW Dates and Activities 2006 - 07

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Important Illinois PLTW Dates and Activities (2006)

- November 1, 2006—Illinois PLTW Counselors, Teachers, Administrators Conference
- November 6, 2006—National PLTW website online registration begins for new schools.
- NOTE: Illinois “Education Agent” partnerships should wait and register in December in consultation with Affiliate Director Brenda Pacey assistance—this includes EFE Systems, Area Career Centers, and college/university sites offering courses in cooperation within a partnership
- November 17, 2006—Deadline for Kern Family Foundation Grants
- November 30, 2006—2007 STI needs assessment survey return date
- December 1, 2006—Deadline for Illinois DCEO High Technology School-to-Work Program Grants
- December 15, 2006—2007 Summer Training Institute Dates Announced

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Important Illinois PLTW Dates and Activities (2007)

- January-April, 2007—School Certification visits
- February/March, 2007—Regional Illinois PLTW “Success Stories and Teacher Tips” sessions 4:30-7 pm (dates and locations TBA)
- March 15, 2007—Deadline for new schools to submit signed PLTW agreement
- March 20, 2007—Planning Session for new PLTW school administrators/primary contacts program implementation (may be repeated on several dates on regional basis as necessary)
- April 1, 2007 (approximate)—Online registration begins for 2007 STI
- April/May 2007—Illinois PLTW/Autodesk regional technical assistance training and workshops for new and continuing schools—dates and locations to be announced
- Ongoing—U of I Affiliate Director and Bradley University Associate Representative visits to schools or regional planning groups upon request

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U of Illinois 2007 STI Planning

Tentative Illinois STI Dates (tentative—to be confirmed December 2006):

- June 17-29—GTT at UIUC
- July 8-20—DE and IED at UIUC
- July 8-20—possible second POE session (to be determined)
- July 22-August 3—IED and POE at UI Chicago
- Date TBA—BTE at UIUC

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Contact Info:

Brenda Pacey  
Illinois PLTW Affiliate Director  
University of Illinois Outreach and Public Service  
807 S. Wright, Suite 370, MC-307  
Champaign, IL 61820  
217/244-5217 FAX 217/244-3173  
bpacey@uillinois.edu

Steve Parrott  
Illinois PLTW State Leader  
Illinois State Board of Education  
100 North First Street  
Springfield, IL 62777  
217/782-4620 FAX 217/782-0710  
sparrott@isbe.net

Richard Greene  
Bradley University  
1501 W. Bradley Ave.  
Morgan Hall Room 109B  
Peoria, IL 61625  
309/677-2745 FAX 309/677-2853  
rlg@bradley.edu

For Illinois PLTW
news and updates, visit:  
www.pltw.illinois.edu
Presented by:
Brenda Pacey & James Dildine
University of Illinois PLTW

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Starved Rock Conference Center
Utica, Illinois

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