

Imagination,
innovation
& learning.



PLTW is re-energizing STEM education at middle schools and high schools throughout the country, providing students with 21st century skills.

Welcome to the innovation zone.



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The PLTW Innovation Zone (aka the classroom) is an engaging and thought-provoking space, where students develop critical thinking skills through hands-on project-based learning, preparing them to take on real-world challenges.

Innovation Zone Characteristics

- Cutting-edge technology, equipment and materials
- Collaboration
- Problem-solving rather than lectures
- Relevant subject matter
- Invested teachers
- College credit for high school courses

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Innovation For Everyone



PLTW programs engage, encourage and educate students of diverse backgrounds helping them all to become college and career ready – including students whose experience in the sciences and math has been less comprehensive, or who might find themselves uninterested in traditional STEM subjects.



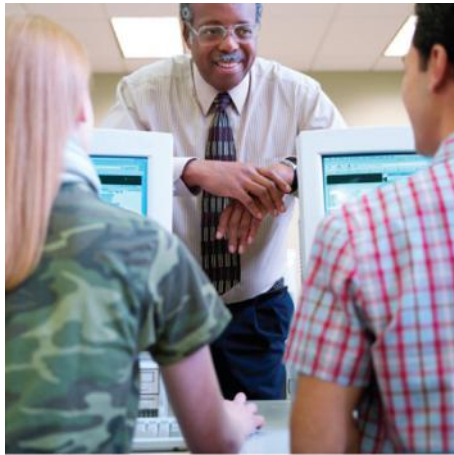
The Facts

- 350,000 students in more than 4,000 schools in all 50 states and the District of Columbia
- Over 13,000 teachers trained
- More than 100 University relationships, including Duke University, University of Minnesota, California State University, Purdue University, IUPUI
- Partnerships with Fortune 100 and 500 companies, and forward-thinking philanthropic organizations, including Autodesk, Intel, General Electric and Kern Family Foundation

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Flexibility

The PLTW program is designed to be flexible and customizable for schools. It allows teachers to use the PLTW curriculum and program training, along with their own ideas, experiences, and learning to ignite imagination and innovation in their own ways in the classroom.



More Participation. More Opportunities.

- PLTW's flexibility provides all schools an opportunity to participate – large or small, public or private, rural or suburban
- Schools and teachers customize implementation to fit their needs
- Numerous funding sources are available to support PLTW

The background features a light gray gear icon centered in the upper half, surrounded by several thick, curved lines that intersect to form a grid-like pattern. The overall aesthetic is clean and technical.

Outstanding Outcomes

Our Students Perform

- **PLTW Students Outperform Non-PLTW Students**
 - Significantly more Project Lead The Way students met the readiness goals on the 2008 High Schools That Work (HSTW) Assessment tests in reading, mathematics and science compared with HSTW students in similar career/technical fields and HSTW students in all career/technical fields.

(2009 Southern Region Educational Board Report)

Closing The Achievement Gap

- All of the PLTW students in this study begin middle school (6th grade) at lower proficiency in math, reading and science and with lower attendance rates than the control group of non-PLTW students. The study shows that by 8th grade, those gaps had been eliminated.

(University of Wisconsin, Milwaukee Report – December 2009)

- “Project Lead the Way has been an effective program during the past three years at narrowing the achievement gap for Hispanic/Latino students in all four core areas.”

(Analysis of Student Achievement and Programs 2007,
Galt Joint Union High School District)

PLTW High School Grads Are College and Career Ready

- A survey of PLTW seniors at the end of their senior year finds that 92% intend to pursue a four-year degree or higher, 51% intend to pursue a graduate degree, and 70% intend to study engineering, technology, or computer science. By comparison, 67% of all beginning postsecondary students intended to pursue a bachelor's degree or higher as reported by the National Center for Education Statistics. These results are consistent with results and conclusions for the past two years.

(True Outcomes – 2009)

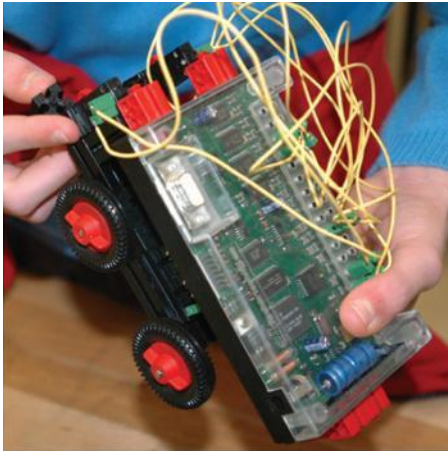
PLTW College Freshmen Stick With Innovation

- In 2006-2007, first-year retention (freshmen to sophomore) was 76% (76% stayed with their declared major). In contrast, 100% of Milwaukee Schools of Engineering's PLTW students remained in their declared major.

(Milwaukee School of Engineering 2008 Report)

Middle School
Gateway To Technology



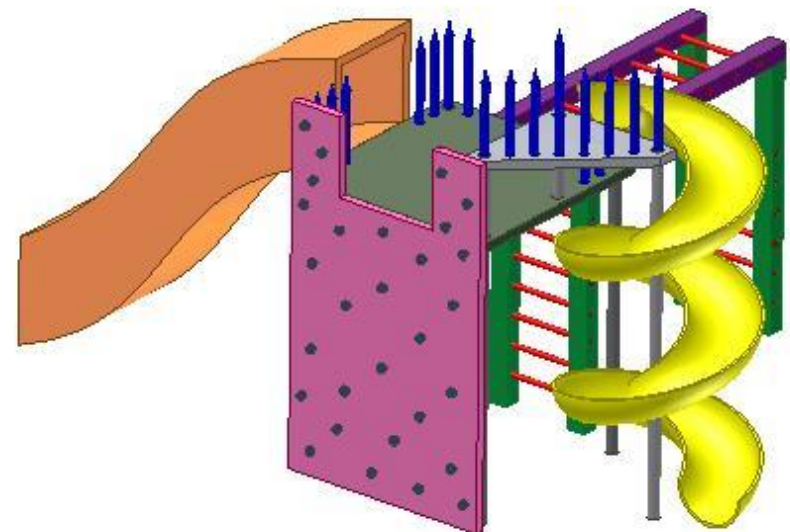
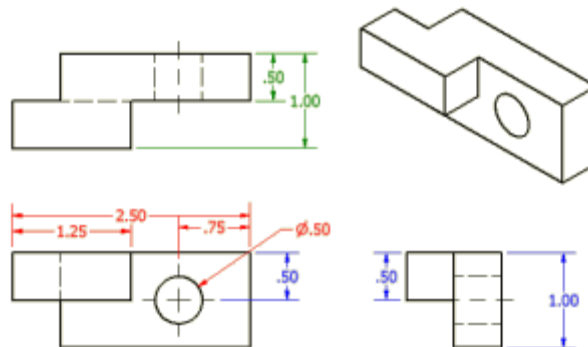


- **Design and Modeling**
 - Solid modeling software introduces students to the design process.
- **Automation and Robotics**
 - Students trace the history, development, and influence of automation and robotics.
- **Energy and the Environment**
 - Students investigate the importance of energy in our lives and the impact that using energy has on the environment.
- **Flight and Space**
 - Aeronautics, propulsion, and rocketry.
- **Science of Technology**
 - Impact of science on technology throughout history.
- **Magic of Electrons**
 - Students unravel the mystery of digital circuitry.

Unit 1: Design and Modeling (Required)

Lessons:

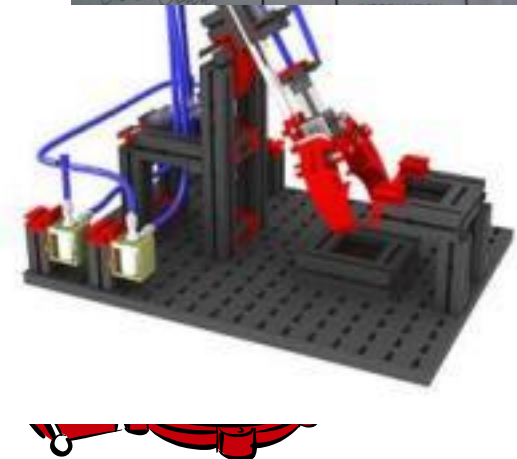
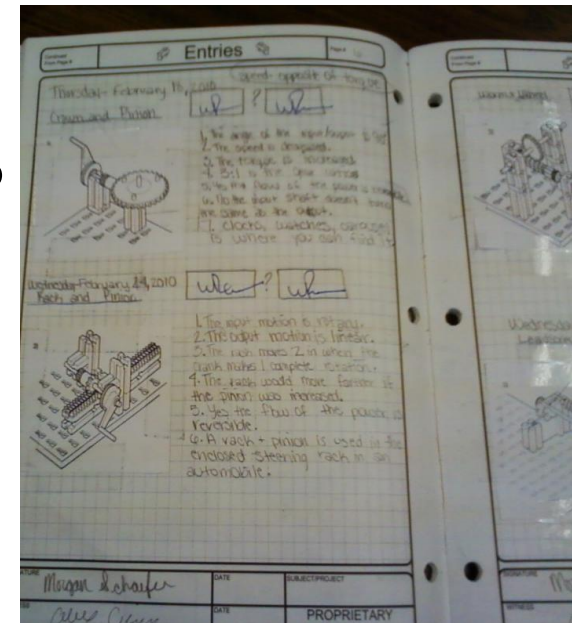
- What is Engineering?
- Design Process
- Measurement
- Sketching and Dimensioning Techniques
- Designing for Production



Unit 2: Automation and Robotics (Required)

Lessons:

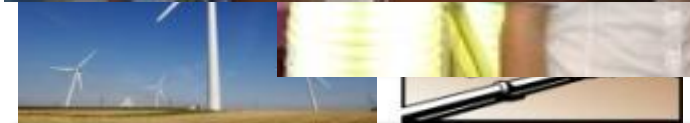
- What is Automation and Robotics?
- Mechanical Systems
- Automated Systems



Unit 3: Energy and the Environment

Lessons:

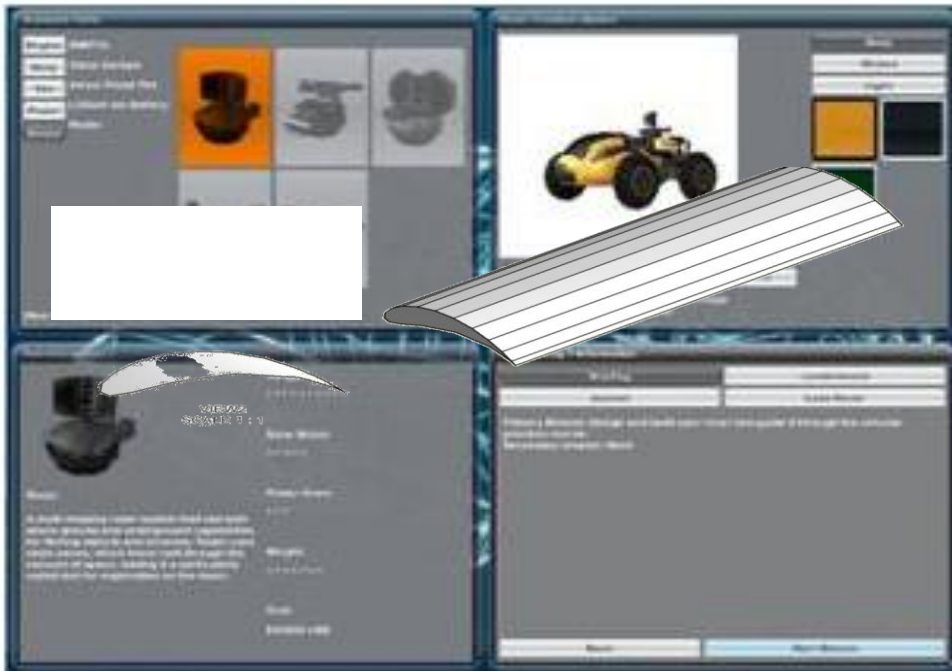
- Investigating Energy
- Sustainable Energy
- Making an Impact



Unit 4: Flight and Space

Lessons:

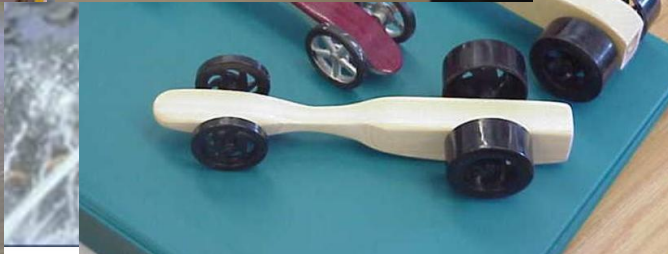
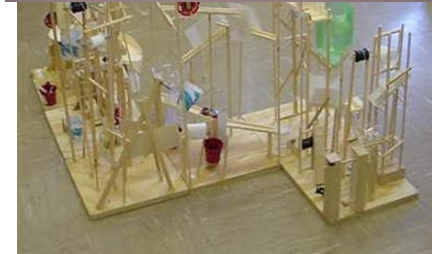
- History of Flight and Space
- Aeronautics
- Trav



Unit 5: Science of Technology

Lessons:

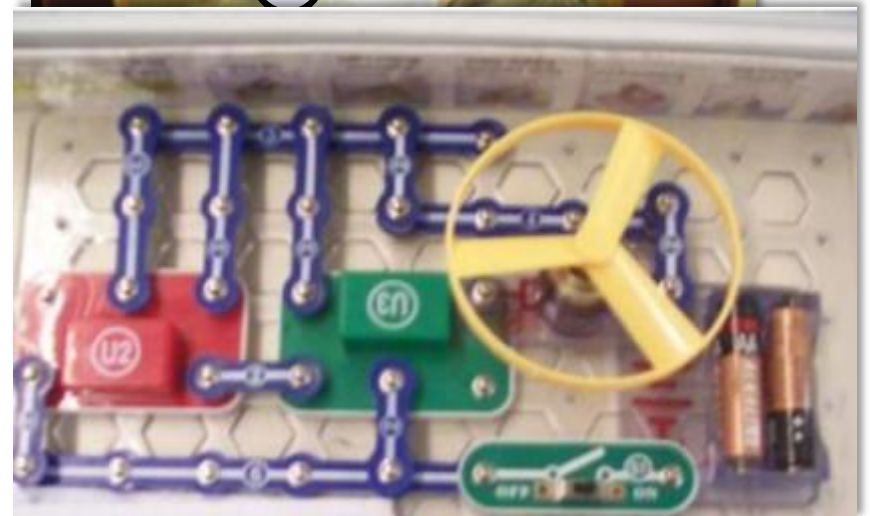
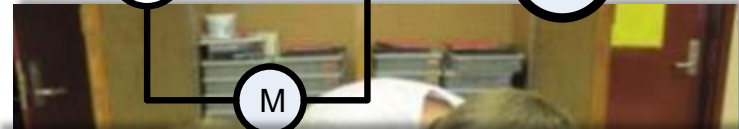
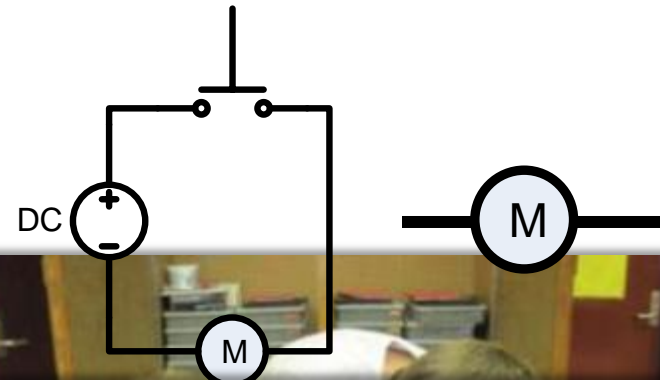
- Applied Chemistry
- Nanotechnology
- Applied Physics



Unit 6: Magic of Electrons

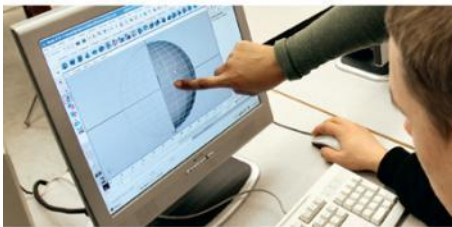
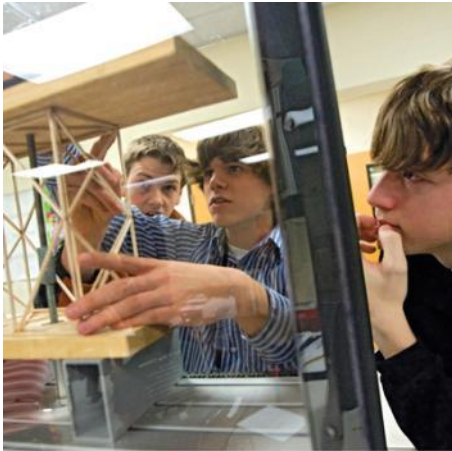
Lessons:

- What is Electricity?
- Electronics



High School
Pathway To Engineering

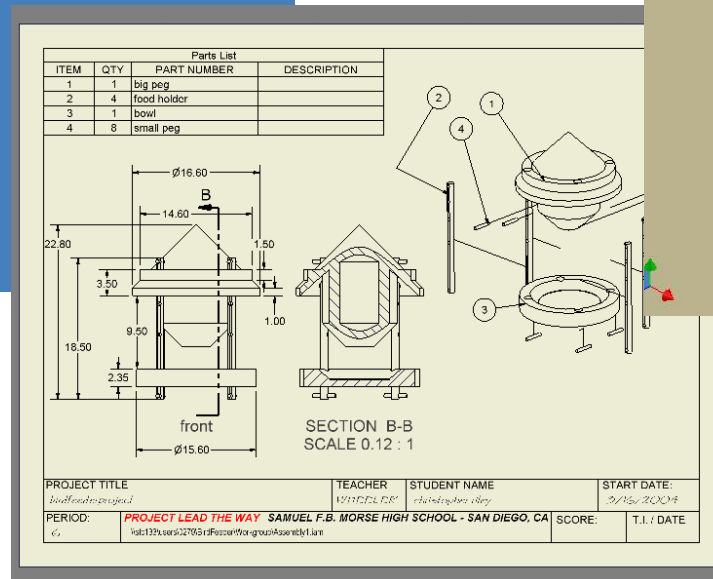
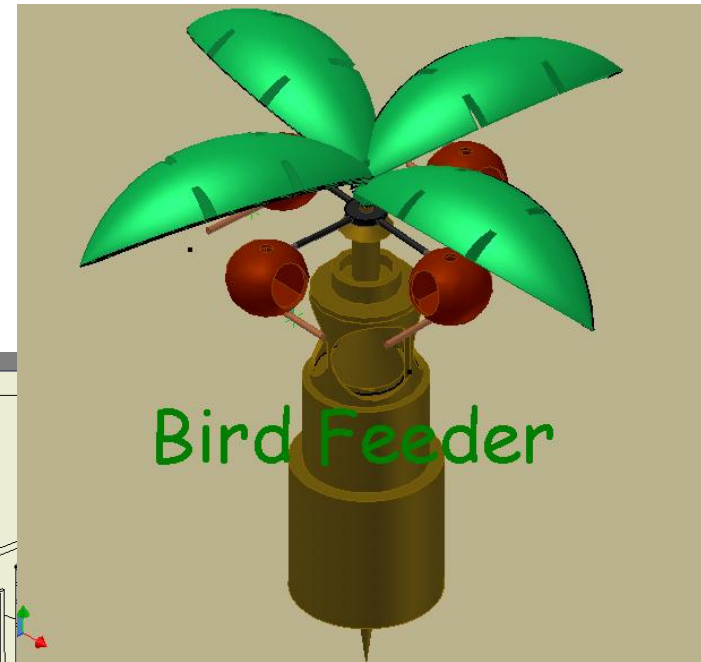
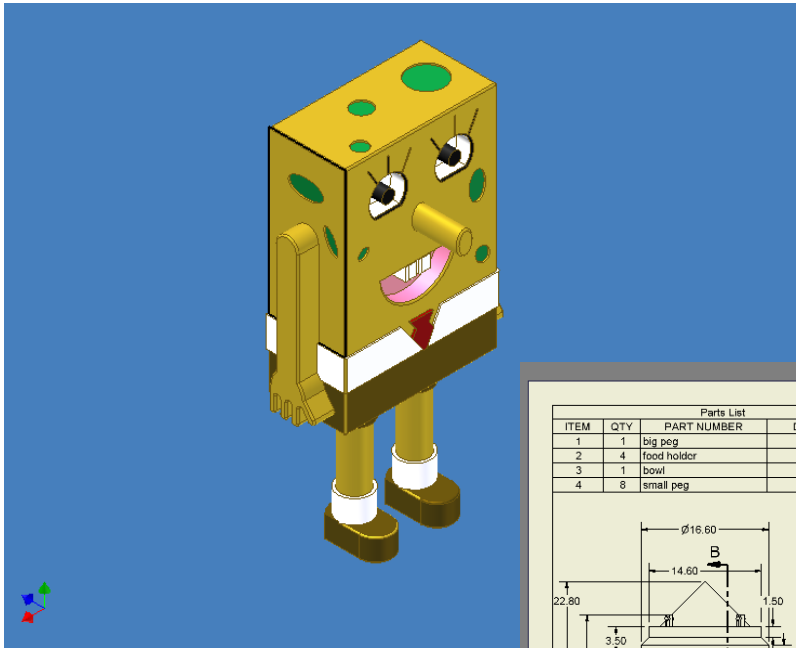




- **Introduction to Engineering Design (IED)**
 - 3D computer modeling software; study of the design process
- **Principles of Engineering (POE)**
 - Exploration of technology systems and engineering processes
- **Digital Electronics (DE)**
 - Use of computer simulation to learn the logic of electronics

- **Aerospace Engineering (AE)**
 - Aerodynamics, astronautics, space-life sciences, and systems engineering
- **Biotechnical Engineering (BE)**
 - Biomechanics, genetic engineering, and forensics.
- **Civil Engineering and Architecture (CEA)**
 - Students collaborate on the development of community-based building projects
- **Computer Integrated Manufacturing (CIM)**
 - Robotics and automated manufacturing; production of 3-D designs.
- **Engineering Design and Development (EDD)**
 - Teams of students, guided by community mentors, research, design, and construct solutions to engineering problems.

Foundation Course: Introduction To Engineering Design



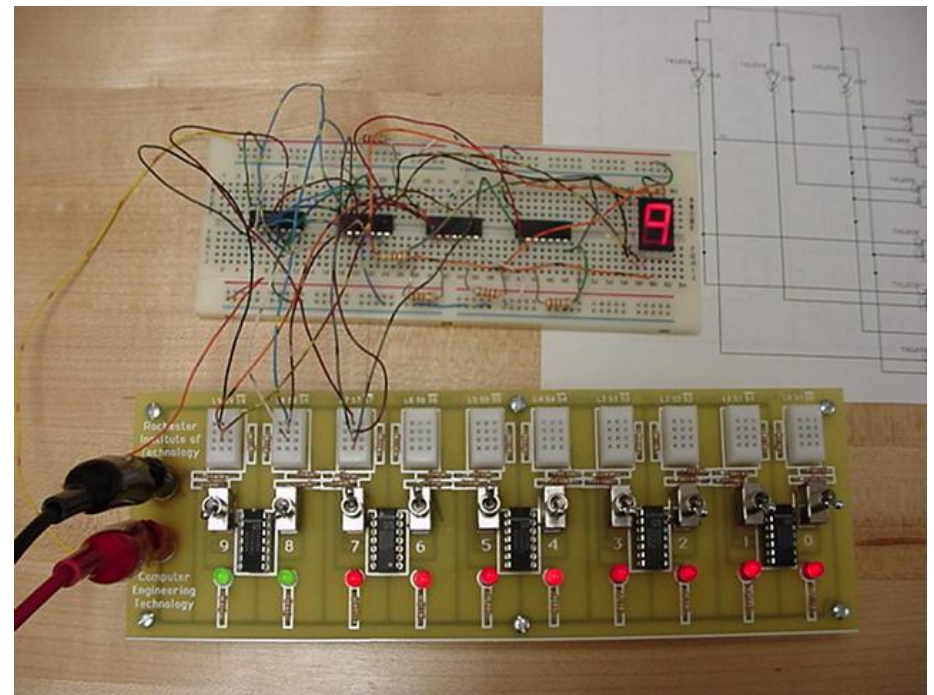
Foundation Course: Principles Of Engineering

A Hands-on, project-based course that teaches:

- Engineering as a Career
- Materials Science
- Structural Design
- Applied Physics
- Automation/Robotics
- Embedded Processors
- Drafting/Design



Foundation Course: Digital Electronics



Design > Simulate > Prototype > Fabricate

Specialization Course: Civil Engineering and Architecture



- Soils
- Permits
- Design
- Structural Analysis

Cuban
Restaurant



And a Neighborhood Park



Aerospace Engineering

- Design and build an airfoil.
- Test it in a wind tunnel.
- Create a 3D solid model of the airfoil in AutoDesk Inventor.

View: Edge Top Side-3D Find
Display: Streamlines Moving Frozen Geometry

Student Version **Reset**

Stall Model English Units
Input Shape/Angle
Output Performance
Geom Data

Lift 5.114 lbs

Airfoil Shape Airfoil

Angle-deg 4.0
Camber-%c 5.0
Thick-%crd 17.0

Joukowski Airfoil
Camber = 5.0 % chord , Thickness = 17.0 % chc
Chord = 0.5 ft , Span = 0.5 ft ,
Angle of attack = 4.0 degrees ,
Standard Earth Atmosphere
Ambient Pressure = 14.171 lb/sq in ,
Ambient Velocity = 100 mph ,
Upper Surface

X	Y	P	V
-0.522	0.048	14.203	92
-0.51	0.072	14.026	136

Specialization Course: Computer Integrated Manufacturing



Capstone Course: Engineering Design and Development



Juried Presentations

Problem Solving in Teams



High School
Biomedical Sciences



Course #1: Principles of the Biomedical Sciences

- Curriculum consists of 8 units
 - Human Body Systems
 - Heart Attack
 - Diabetes
 - Sickle-cell Disease
 - Hypercholesterolemia
 - Infectious Disease
 - Grant Proposal

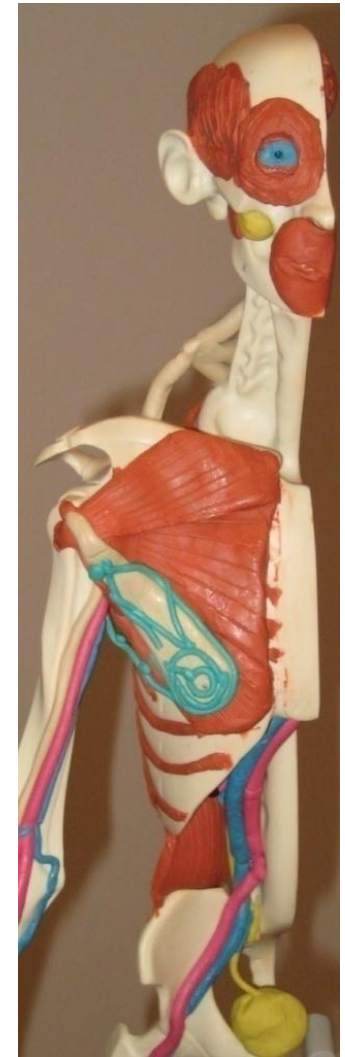
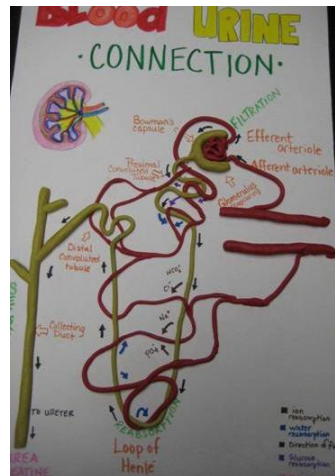
An Experiment on an All-Hydrophilic Polypeptide

[positive charge-red; negative charge-green; neutral-white; hydrophobic-pink; hydrophilic-cyan; water-blue; oil-yellow]



Course #2: Human Body Systems

- Basic human physiology, especially in relationship to human health. A central theme is how the body systems work together to maintain internal balance and good health.



Course #3: Medical Interventions

- Curriculum consists of 4 units
 - How to Fight Infection
 - How to Screen What Is in Your Genes
 - How to Conquer Cancer
 - How to Prevail When Organs Fail

Course #4: Biomedical Innovation

- Curriculum consists 8 problems:
 - Design of an Effective Emergency Room
 - Exploring Human Physiology
 - Design of a Medical Innovation
 - Investigating Water Contamination
 - Combating a Public Health Issue
 - Molecular Biology in Action (Optional)
 - Forensic Autopsy (Optional)
 - Independent Project (Optional)



- **Principles of the Biomedical Sciences (PBS)**

- Study of human body systems and health conditions

- **Human Body Systems (HBS)**

- Exploring science in action, students build organs and tissues on a skeletal manikin and play the role of biomedical professionals to solve medical mysteries.

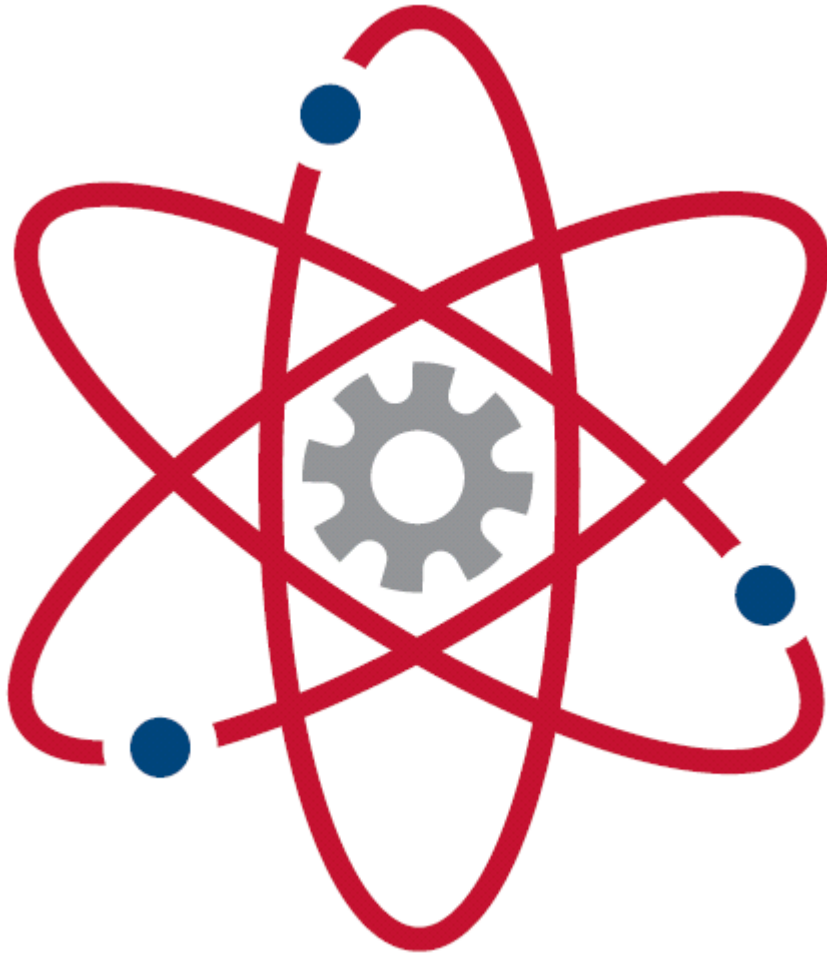
- **Medical Interventions (MI)**

- Investigation of interventions involved in the prevention, diagnosis and treatment of disease.

- **Biomedical Innovation (BI)**

- Students design innovative solutions for the health challenges of the 21st century

Teacher Professional Development



- Readiness Training
- Core Training
- Ongoing Training

readiness training

Designed to develop a baseline for all teachers prior to attending Core Training through the assessment of skill sets and delivery of any necessary remedial training.





core training

Lovingly referred to as PLTW's "boot camp," this intense training focuses on the PLTW teaching model and course content.



core training

Designed to empower teachers with the confidence, understanding, and knowledge necessary to teach the curriculum. A teacher is only able to teach a course after successful completion of Core Training.

ongoing training

Designed to provide additional training for teachers to further their understanding of related course tools, content, and concepts after the completion of Core Training.



Join Us In Helping To Lead The Way

- Vision: To ignite the spark of ingenuity, creativity and imagination within students
- Helping America succeed in the increasingly high-tech and high-skill global economy
- Contacts:
 - Kelli MacGregor- IDOE
 - Kevin Taylor & Rene Bailey-Purdue
 - Jeff Watt & Angel Campbell- IUPUI
 - Terri Schulz -PLTW