Preparing students for the global economy

An Activities-, Project-, Problem-Based Learning Approach
Who We Are

Project Lead The Way is the nation's leading provider of science, technology, engineering, and math (STEM) programs. Through world-class K-12 curriculum, high-quality teacher professional development, and outstanding partnerships, PLTW is helping students develop the skills needed to succeed in the global economy.
As a 501(c)(3) nonprofit organization, we deliver PLTW programs to more than 5,000 schools in all 50 states and the District of Columbia.

PLTW’s success in preparing students with the knowledge and skills they need to succeed has been recognized by colleges and universities, Fortune 500 businesses, and numerous national organizations.
WHY PLTW?

From 2008 to 2018, STEM occupations are expected to grow by 17 percent - far more quickly than jobs in other fields. By 2018, the United States will have more than 1.2 million unfilled STEM jobs.¹

Project Lead The Way is transforming STEM education in the classroom, both for teachers and students, in order to meet this critical workforce need.

¹ United States Department of Commerce
Among other significant findings, independent research studies reveal that:

- PLTW students outperform their peers in school
- are better prepared for post-secondary studies
- are more likely to consider careers as scientists, technology experts, engineers, mathematicians, healthcare providers, and researchers compared to their non-PLTW peers
All PLTW high school courses are *standards-based* and are aligned to:

- State Standards for Mathematics and English Language Arts

and

- PLTW has also created alignments between other sets of standards and courses
The PLTW Classroom

Students learn content in context through:

• Case-based scenarios
• Hands-on learning
• Activities, projects, and problems
• Real world application
• Open-ended problems
Teacher as facilitator—
Student as director of learning
... and the classroom becomes a collaboration space

PLTW Classrooms:
• Launch critical thinking
• Challenge students to make mistakes
• Integrate technology into the classroom
• Encourage teachers and students to learn together
Biomedical Science Curriculum

The PLTW Biomedical Sciences Curriculum Engages and Prepares Students for Careers in Medicine, Healthcare, and Science
Curriculum Attributes

- Cutting-edge technology, equipment and materials
- Student engagement on multiple levels
- Students create, design, build, discover, collaborate, and solve problems through applying what they learn in math and science
- Exposure to areas of study not typically pursued
- Students gain a foundation and proven path to college and career success
Biomedical Careers

- Physician
- Nurse
- Dentist
- Veterinarian
- Pharmacist
- Paramedic
- Dietician
- Surgeon

- Research Scientist
- Health Information Manager
- Medical Technologist
- Medical Technical Writer
- Physician Assistant
- Biomedical Engineer
- Pharmaceutical Manufacturing Engineer
Foundation Courses

• 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

Capstone Course

• Biomedical Innovation (BI)
  ➢ Students design innovative solutions for the health challenges of the 21st century
Principles of Biomedical Science

• Designed to provide an overview of the biomedical sciences and lay the foundation for subsequent courses.

• Students explore concepts of biology and medicine to determine factors that led to the death of a fictional person.

• While investigating the case, students examine autopsy reports, investigate medical history, and explore medical treatments that might have prolonged the person’s life.

• The activities and projects introduce students to human physiology, basic biology, medicine, and research processes while allowing them to design their own experiments to solve problems.

• Engineering principles including the design process, feedback loop, and the relationship of structure to function, are also incorporated.
PBS Units of Study

- **Unit 1**: The Mystery
- **Unit 2**: Diabetes
- **Unit 3**: Sickle Cell Disease
- **Unit 4**: Heart Disease
- **Unit 5**: Infectious Diseases
- **Unit 6**: Post Mortem
Students learn about chromosomes and DNA by making a chromosome spread using HeLa cells.
Students dissect a sheep’s heart to understand how the heart operates and the function of structures in the heart.

Students demonstrate the use of technology as an important tool in the Biomedical Sciences by using various Vernier probes and LoggerPro3 software to collect cardiovascular data.
Students recognize that the electrical activity of the heart can be measured and recorded by an electrocardiogram (EKG or ECG), and analyze EKG readings and relate resultant data to heart function.
Project Lead The Way Chooses Canvas by Instructure for its Learning Platform

PLTW made improvements in its information technology infrastructure to better serve its network of schools, teachers, and students. Previously, PLTW provided written documents that teachers would download to teach the STEM courses. Now the learning activities are embedded directly into Canvas, from videos to group exercises because the Canvas platform is flexible and allows the teacher to define the learning experience.
LMS Teacher View

- Lesson Overview
- Key Terms
- Activity Listing
- Teacher Resources
- Student Resource Documents
- Generic Assessment Rubrics
- Answer Keys/Samples
- Standards Alignment
LMS Student View

- Lesson Overview
- KeyTerms
- Activity Listing
- Teacher Resources
- Student Resource Documents
- Generic Assessment Rubrics
Clicking on Activity in Activity Listing opens up
Introduction to activity and links to all necessary protocols, documents, and resource materials
Evidence of Student Learning

- **Scientific Notebook**
  A formal record kept by a practicing scientist to record procedures, thoughts, and results

- **Portfolio**
  A compilation of best practices; includes a brief autobiography, activities and projects presented with an abstract descriptors, results, and reflection

- **Career Journal**
  Includes name of career, education/training required, responsibilities and daily activities, salary range, documentation of sources, and self-reflection
Students will create an online portfolio for the work they complete throughout the PBS course and any subsequent courses in the BMS curriculum. They will create pages in the portfolio to separate their work, and add work to the portfolio as it is completed. The link to the portfolio can then be sent to potential employers, internship providers, and colleges as evidence of experience with lab techniques and procedures, as well as biomedical knowledge.
Assessment

Student-centered Balanced Assessment

- PLTW supports a balanced approach to assessment, integrating both formative and summative assessments.
- Through a balanced assessment approach, assessment is an ongoing activity. Students demonstrate their knowledge throughout the course by completing activities, projects, and problems using a variety of assessment tools, such as performance rubrics and reflective questioning, to deepen and expand their knowledge and skills.
- PLTW's assessment experts apply industry best practices and methods to design, test, and implement End of Course (EoC) assessments for PLTW courses. The EoC assessment gives students an objective evaluation of their achievement, and stakeholders data to make informed decisions.
- Many colleges, universities, and other organizations use students’ EoC scores for student recognition opportunities.
Our Mission: To prepare students for the global economy, ensuring that PLTW students are the most innovative and productive in the world
Committed to nurturing student creativity and curiosity while further developing their communication, collaboration, and critical thinking skills necessary for success
Helping America succeed in the increasingly high-tech and high-skill global economy
Goal: 1,000,000 students and 10,000 schools by 2015-2016
Visit www.pltw.org to learn more

When students succeed, we all succeed.