PLTW LAUNCH. AMAZING DISCOVERIES START HERE.

ELEM.

HELPING YOUNG MINDS DISCOVER THE WONDER OF SCIENCE, TECHNOLOGY, ENGINEERING, AND MATH

Through PLTW Launch, Project Lead The Way's program for kindergarten through fifth grade, students learn important, future-changing lessons, like it's okay to take risks and make mistakes, and it's great to employ critical thinking. As technology becomes part of classroom life, students become more comfortable with it. As teachers and students learn and discover together, education becomes far more engaging.

A PLTW CLASSROOM IS AN ACTIVE CLASSROOM

Students ask questions, explore ideas, and solve problems. Through activity-, project-, and problem-based learning grounded in research-based practices, students develop an affinity for STEM subjects, while teachers lay the groundwork for academic success.

THE EARLIER STUDENTS DEVELOP AN INTEREST IN STEM, THE BETTER

Sixty-five percent of scientists and graduate students developed their interest in science in elementary school, according to one study. Engaging students now builds confidence, grows interest, and puts them on course for strong accomplishments in middle school, high school, and beyond.

AT PLTW, WE WANT TO HELP YOU BRING THE EXCITEMENT OF STEM TO YOUR KINDERGARTEN THROUGH FIFTH GRADE STUDENTS

We need educators in schools to join us at PLTW in giving students a chance to love STEM at a younger age. Because we're educators, we understand your concerns, restrictions, and needs, and we designed PLTW elementary to work with you.

CURRICULUM THAT ALIGNS TO STATE AND NATIONAL STANDARDS

From the very beginning, PLTW Launch was conceived to work with current standards. It aligns to Common Core State Standards for Math and English Language Arts, Next Generation Science Standards, and other national and state standards.

MODULES GIVE YOU THE FLEXIBILITY AND CUSTOMIZATION YOU NEED

The PLTW Launch is set up in modules that follow the design process. While modules are aligned to certain grade level standards, teachers and schools have the flexibility to bring on the modules that they want, when they want, at the grade level they want.

SELECT MODULE TITLES*	ALIGNED TO GRADE
Structure and Function: Pushes and Pulls	Kindergarten
Light and Sound	1st Grade
Materials Science: Properties of Matter	2nd Grade
Motion and Stability: Science of Flight	3rd Grade
Energy: Collisions	4th Grade
Robotics: Power of Automation	5th Grade

*Table shows just a sample of the modules available

AMAZING DISCOVERIES ARE HERE FOR EDUCATORS, TOO

From the moment you bring PLTW Launch into your school, you become part of a wide network of middle schools, high schools, post-secondary institutions, and corporate partners that believe in the value of the program. We are committed to helping this program succeed for students and you. We offer:

- A three-phased approach to professional development that makes it easy to get up to speed and incorporate PLTW into your existing learning plan
- The ability to share ideas and best practices with a professional learning community
- Access to our school and technical support teams and much more

Register today. Visit www.pltw.org/launch or contact us at schoolsupport@pltw.org for more information.




PLTW | Launch

ENCOURAGE EXPLORATION OF THE UNKNOWN WHILE IGNITING STUDENTS' INTEREST AND CONFIDENCE IN STEM

Today's students need to possess certain knowledge and skills to thrive, no matter their chosen life and career paths. Being comfortable taking risks, adept at collaboration, confident in the face of significant challenges, and skilled at carving out unique solutions are just a few of these essential skills. With access to hands-on, project-based STEM curriculum that emphasizes critical thinking and problem solving, these professional and life skills are easily within reach of tomorrow's leaders.

The opportunities in STEM are tremendous. By 2018, the United States will have more than 1.2 million unfilled STEM jobs. STEM occupation options are varied, including aerospace engineer and zoologist, computer programmer and architect, which affords students a multitude of options, no matter their interests. Despite this vast landscape of opportunity, a staggering 75 percent of students talented in math and science decide not to pursue STEM in college.

If young people are to pursue this world of possibility, they need inspiration. They need to see how what they learn is relevant to their lives.

How do we prepare and inspire students to hold onto their natural curiosity in the world around them and continue STEM learning in high school and beyond?

PLTW Gateway

Middle school is the perfect time for students to explore and learn that there is more than one way to reach a solution. PLTW Gateway™ provides engineering and biomedical science curriculum for middle school students that challenges, inspires, and offers schools variety and flexibility.

Through topics like robotics, flight and space, and DNA and crime scene analysis, middle school students engage their natural curiosity and imagination in creative problem solving. PLTW's Gateway program is a strong foundation for further STEM learning in high school and beyond, challenging students to solve real-world problems, such as cleaning up oil spills and designing sustainable housing solutions. Using the same advanced software and tools as those used by the world's leading companies, students learn how to apply science, technology, engineering, and math to their everyday lives.

PLTW Gateway is divided into eight independent, nine-week units, assuming a 45-minute class period. The Gateway program is designed to be taught in conjunction with a rigorous academic curriculum. Schools that offer the program implement both Foundation Units and may add any combination of the Specialization Units.

U.S. Dept. of Commerce Economics and Statistics Administration, 2011; Infographic: The Math-Science Shortage, Getting Smart, 2011

M. S.

PLTW Gateway Curriculum

Foundation Units

Design & Modeling

Students apply the design process to solve problems and understand the influence of creativity and innovation in their lives. They work in teams to design a playground and furniture, capturing research and ideas in their engineering notebooks. Using Autodesk® design software, students create a virtual image of their designs and produce a portfolio to showcase their innovative solutions.

Automation & Robotics

Students trace the history, development, and influence of automation and robotics as they learn about mechanical systems, energy transfer, machine automation, and computer control systems. Students use the VEX Robotics® platform to design, build, and program real-world objects, such as traffic lights, toll booths, and robotic arms.

Specialization Units

Energy & the Environment

Students think toward the future as they explore sustainable solutions to our energy needs and investigate the impact of energy on our lives and the world. They design and model alternative energy sources and evaluate options for reducing energy consumption.

Flight & Space

The exciting world of aerospace comes alive through Flight & Space. Students explore the science behind aeronautics and use their knowledge to design, build, and test an airfoil. Custom-built simulation software allows students to experience space travel.

Science of Technology

Science impacts the technology of yesterday, today, and the future. Students apply the concepts of physics, chemistry, and nanotechnology to STEM activities and projects, including making ice cream, cleaning up an oil spill, and discovering the properties of nano-materials.

Magic of Electrons

Through hands-on projects, students explore electricity, the behavior and parts of atoms, and sensing devices. They learn knowledge and skills in basic circuitry design and examine the impact of electricity on the world around them.

Green Architecture

Today's students have grown up in an age of "green" choices. In this unit, students learn how to apply this concept to the fields of architecture and construction by exploring dimensioning, measuring, and architectural sustainability as they design affordable housing units using Autodesk's® 3-D architectural design software.

Medical Detectives

Students play the role of real-life medical detectives as they analyze genetic testing results to diagnose disease and study DNA evidence found at a "crime scene." They solve medical mysteries through hands-on projects and labs, investigate how to measure and interpret vital signs, and learn how the systems of the human body work together to maintain health.

LET'S CHALLENGE OUR STUDENTS TO ENGINEER A BETTER WORLD

The influence of engineering is extensive. Engineering drives lofty innovations, such as space flight, and accessible yet significant breakthroughs, like greener household appliances. Today's students have limitless potential to build on such progress – when equipped with a strong early interest, critical-thinking skills, and problem-solving competencies.

With current projections indicating that more than 1.2 million U.S. jobs in science, technology, engineering, and math (STEM) will go unfilled by 2018, the time to expand the engineering talent pool is now.

Engaging student interest is imperative, as studies have shown that 75 percent of students talented in math and science during their K – 12 years decide not to pursue STEM in college. In addition, the field of engineering is grappling with an underutilization of potential resources: Only 13 percent of American engineers are women, while underrepresented minorities account for just 12 percent of the engineering workforce.

How can we engage student interest and equip all students with the skills needed for a brighter future?

H.S.

PLTW Engineering

PLTW Engineering™ is more than just another high school engineering program. It is about applying engineering, science, math, and technology through a project-based, hands-on approach to solve complex, open-ended problems in a real-world context. Students focus on the process of defining and solving a problem, not on getting the "right" answer. They learn how to apply STEM knowledge, skills, and habits of mind to make the world a better place through innovation.

PLTW students have said that PLTW Engineering influenced their post-secondary decisions and helped shape their future; PLTW students are shown to study engineering and other STEM careers at a rate significantly higher than their non-PLTW peers.

Even for students who do not plan to pursue engineering after high school, the PLTW Engineering program provides opportunities to develop highly transferable skills in collaboration, communication, and critical thinking, which are relevant for any coursework or career.

U.S. News STEM Solutions Summit, 2012; Infographic: The Math-Science Shortage, Getting Smart, 2011; U.S. Census Bureau, "Disparities in STEM Employment by Sex, Race, and Hispanic Origin", 2013

H.S.

PLTW Engineering Curriculum

Foundation Courses

IED **Introduction to Engineering Design** *1 year*
Students dig deep into the engineering design process, applying math, science, and engineering standards to hands-on projects. They work both individually and in teams to design solutions to a variety of problems using 3-D modeling software and use an engineering notebook to document their work.

POE **Principles of Engineering** *1 year*
Through problems that engage and challenge, students explore a broad range of engineering topics, including mechanisms, the strength of structures and materials, and automation. Students develop skills in problem solving, research, and design while learning strategies for design process documentation, collaboration, and presentation.

Specialization Courses

AE **Aerospace Engineering** *1 year*
This course propels students' learning in the fundamentals of atmospheric and space flight. As they explore the physics of flight, students bring the concepts to life by designing an airfoil, propulsion system, and rockets. They learn basic orbital mechanics using industry-standard software. They also explore robot systems through projects such as remotely operated vehicles.

BioE **Biological Engineering** *1 year*
Beginning in the 2015-16 school year with Core Training in Summer 2015
BioE develops students' thinking skills and prepares them for emerging careers through topics such as genetic engineering, biofuels, and biomanufacturing. *BioE will replace Biotechnical Engineering (BE), which PLTW will continue to offer until the end of the 2016-17 school year. BE End of Course Assessments will no longer be available after spring 2015.*

CEA **Civil Engineering and Architecture** *1 year*
Students learn important aspects of building and site design and development. They apply math, science, and standard engineering practices to design both residential and commercial projects and document their work using 3D architecture design software.

CIM **Computer Integrated Manufacturing** *1 year*
Manufactured items are part of everyday life, yet most students have not been introduced to the high-tech, innovative nature of modern manufacturing. This course illuminates the career opportunities related to understanding manufacturing. At the same time, it teaches students about manufacturing processes, product design, robotics, and automation.

DE **Digital Electronics** *1 year*
From smart phones to appliances, digital circuits are all around us. This course provides a foundation for students who are interested in electrical engineering, electronics, or circuit design. Students study topics such as combinational and sequential logic and are exposed to circuit design tools used in industry, including logic gates, integrated circuits, and programmable logic devices.

Capstone Course

EDD **Engineering Design and Development** *1 year*
The knowledge and skills students acquire throughout PLTW Engineering come together in EDD as they identify an issue and then research, design, and test a solution, ultimately presenting their solution to a panel of practicing engineers. Students apply the professional skills they have developed to document a design process, and they complete EDD ready to take on any post-secondary program or career.

THE WORLD'S BIGGEST HEALTH CHALLENGES, INVESTIGATED IN YOUR CLASSROOM

From nausea to neuroscience, from fevers to forensics, the ever-advancing world of medicine spans from the common to the exceptional. The biomedical field has never been for the faint of heart or mind. However, countless professionals are relied on daily to ensure our physical, mental, and emotional health. The students of today will take the place of those professionals tomorrow, and they will need to be ready to respond to health challenges of the future – many that do not even exist today.

Knowledge in biomedical sciences paves the way for a wide range of careers. A small sample of recent graduates who completed at least one PLTW Biomedical Science™ course reveals the array of opportunities: some students pursued postsecondary studies in microbiology, pharmacy, chemistry, nursing, nutrition and dietetics, or neurobiology; others enrolled in medical or dental school; and others began careers in forensic science or started research projects focused on immunology and cancer. These careers are personally and professionally rewarding. They are also challenging and require a deep understanding of how to apply science, technology, engineering, and math (STEM) to solve complex problems.

How do we prepare students to investigate medical cases, understand treatment and intervention options, and seek solutions to the world's biggest health challenges?

PLTW Biomedical Science

The rigorous and relevant four-course PLTW Biomedical Science sequence allows students to investigate the roles of biomedical professionals as they study the concepts of human medicine, physiology, genetics, microbiology, and public health. Students engage in activities such as investigating the death of a fictional person to learn content in the context of real-world cases. They examine the structures and interactions of human body systems and explore the prevention, diagnosis, and treatment of disease, all while working collaboratively to understand and design solutions to the most pressing health challenges of today and the future.

Each course in the Biomedical Science sequence builds on the skills and knowledge students gain in the preceding courses. Schools offer the three PLTW Biomedical Science foundation courses over a period of three academic years from the start of implementation and may also offer the capstone course.

PLTW Biomedical Science Curriculum

Foundation Courses

BMS **Principles of Biomedical Science** *1 year*
In the introductory course of the PLTW Biomedical Science program, 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.

HBS **Human Body Systems** *1 year*
Students examine the interactions of human body systems as they explore identity, power, movement, protection, and homeostasis. Exploring science in action, students build organs and tissues on MANIKEN® skeletal models; use data acquisition software to monitor body functions, such as muscle movement, reflex and voluntary action, and respiration; and take on the roles of biomedical professionals to solve real-world medical cases.

MI **Medical Interventions** *1 year*
Students follow the life of a fictitious family as they investigate how to prevent, diagnose, and treat disease. Students explore how to detect and fight infection; screen and evaluate the code in human DNA; evaluate cancer treatment options; and prevail when the organs of the body begin to fail. Through cases, students learn about a range of interventions related to immunology, surgery, genetics, pharmacology, medical devices, and diagnostics.

Capstone Course

BI **Biomedical Innovation** *1 year*
In the final course of the PLTW Biomedical Science sequence, students build on the knowledge and skills gained from previous courses to design innovative solutions for the most pressing health challenges of the 21st century. Students address topics ranging from public health and biomedical engineering to clinical medicine and physiology. They have the opportunity to work on an independent research project with a mentor or advisor from a university, medical facility, or research institution.