Project Lead The Way
Preparing students for the global economy

Berrien Springs Public Schools
Partnering with
I & M Cook Nuclear Plant, Lakeland Care and Whirlpool
Opening Amazing Opportunities for the Future!

Project Lead The Way (PLTW) is the nation’s leading provider of STEM (Science, Technology, Engineering, Math) programs in K-12 schools. The world-class curriculum and high-quality teacher professional development model, combined with an engaged network of educators and corporate and community partners, help students develop the skills necessary to succeed in our global economy. 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. The opportunities for students through PLTW are nothing short of amazing!

Advantages for the Economy/Community
The U.S. Department of Commerce estimates that jobs in science, technology, engineering, and math (STEM) will grow 17 percent by 2018—nearly double the growth for non-STEM fields. By 2018, the U.S. will have more than 1.2 million unfilled STEM jobs because there will not be enough qualified workers to fill them. STEM is where jobs are today and where the job growth will be in the future.

Advantages for Students
Project Lead The Way offers a different approach to learning and teaching. Through activity-, project-, and problem-based curriculum, PLTW gives students a chance to apply what they know, identify problems, find unique solutions, and lead their own learning. For teachers, the engaging, rigorous professional development model provides them with tools to empower students and transform the classroom into a collaboration space where content comes to life. Even for students who do not plan to pursue engineering or biomedical sciences after high school, the PLTW programs provide opportunities to develop highly transferable skills in collaboration, communication, and critical thinking, which are relevant for any coursework or career.

PLTW at Berrien Springs High School - Engineering
PLTW Engineering is more than just another high school engineering program. Students apply engineering, science, math, and technology to solve complex, open-ended problems in a real-world context. Students focus on the process of defining and solving a problem, not 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, using industry-leading technology and software, similar to what is used in the world’s top companies. The challenging field of engineering comes alive with PLTW.

PLTW at Berrien Springs High School - Biomedical Sciences
The PLTW Biomedical Sciences program is a sequence of courses following the hands-on, real-world, problem-solving approach to learning. Students explore the concepts of human medicine and are introduced to bioinformatics, including mapping and analyzing DNA. Through activities, like dissecting a heart, students examine the processes, structures and interactions of the human body, often playing the role of biomedical professionals to solve mysteries. Think CSI meets ER. They also explore the prevention, diagnosis and treatment of disease working collaboratively to investigate and design innovative solutions for the health challenges of the 21st century such as fighting cancer with nanotechnology.

PLTW at Berrien Springs Middle School
Middle School is the perfect time for students to explore and learn there is more than one way to reach a solution. PLTW’s Gateway program provides engineering and biomedical science curriculum for middle school students that challenges, inspires, and offers schools variety and flexibility. They use industry-leading technology to solve problems while gaining skills in communication, collaboration, critical-thinking, and creativity (the Berrien Springs 4 C’s!)
Real-World Connections
Whirlpool and I & M Cook Nuclear Plant have partnered with PLTW Engineering and Lakeland Care is connected with the PLTW Biomedical Sciences. Opportunities for students and teachers may include:

- Teachers and students at the workplace:
  - Advocate for STEM programming and career options
  - Organize facility tours for PLTW classes
  - Host events such as competitions or Gateway Summer Camp activities
  - Provide job shadowing or pre-internship opportunities for students

- Professionals in the classroom:
  - Encourage the importance of STEM-related courses and careers
  - Mentor student project teams
  - Provide liaison communication between the classroom and work
  - Evaluate educational plans and make recommendations
  - Judge student projects, offer feedback and suggestions
  - Participate in career exploration interviews
  - Provide needed resources as available
  - Provide support, knowledge and specific skills for teachers, assist in planning

High School Courses
High School students can enter PLTW courses as elective courses, in addition to required science courses. Some of the courses are eligible for college credit through Eastern Michigan University. Students complete an application to be considered for acceptance into the PLTW program.

- **Engineering Courses**
  - Specialization Courses: Biological Engineering, Computer Integrated Manufacturing, Civil Engineering and Architecture, Digital Electronics (others may be available)

- **Biomedical Sciences Courses**
  - Foundation Courses: Principles of the Biomedical Sciences (2014-15 start-up), Human Body Systems, Medical Interventions
  - Capstone Course: Biomedical Innovation

Gateway Modules (Middle School)
Middle School modules will be offered as part of the science classes and during exciting summer science camps.

- Foundation Units: Design and Modeling & Automation & Robotics (2014-15 start-up modules)

https://www.pltw.org/

http://www.pltwmichigan.org/
Gateway is divided into independent units to be taught in conjunction with a rigorous science curriculum or in Gateway Summer Camps for students in grades 6-8.

**Foundation Units (Included with 8th grade science)**
- **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 VEX Robotics® platform to design, build, and program real-world objects such as traffic lights, toll booths, & robotic arms.

**Specialization Units (Modules taught in elective and required science courses, and Gateway Summer Camps)**
- **Energy & the Environment**: Students are challenged to think big and 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 and 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® 3D 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.

After the Berrien Springs PLTW program is certified (likely in 2016), students will have opportunities to earn college credits through several universities in both Biomedical Sciences and Engineering courses, following the successful completion of coursework and the final exams.

**PLTW Biomedical Science: The Roles of Professionals**

**Foundation Courses (Year Long High School Courses)**
- **Principles of the Biomedical Sciences**: 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. Starts Fall 2014
- **Human Body Systems**: 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 a skeletal Maniken®; 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. Starts Fall 2015
- **Medical Interventions**: 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 real-world cases, students are exposed to a range of interventions related to immunology, surgery, genetics, pharmacology, medical devices, and diagnostics. Starts Fall 2016
Capstone Courses (Year Long High School Courses)

- **Biomedical Innovation**: 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 design project with a mentor or advisor from a university, medical facility, or research institution.

**PLTW Engineering**: Design for a Successful Future

Foundation Courses (Year Long High School Courses)

- **Introduction to Engineering Design**: 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 3D modeling software, and use an engineering notebook to document their work. Starts Fall 2014
- **Principles Of Engineering**: 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. Starts Fall 2015

Specialization Courses (Year Long High School Courses)

Examples of possible courses:

- **Civil Engineering and Architecture**: 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. Some students have seen these designs come to life through partnerships with local housing organizations.
- **Computer Integrated Manufacturing**: 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 opportunities related to understanding manufacturing. At the same time, it teaches students about manufacturing processes, product design, robotics, and automation. Students can earn a virtual manufacturing badge recognized by the National Manufacturing Badge system.
- **New! Computer Science and Software Engineering**: Open doors in any career with computer science! In CSE, students create apps for mobile devices, automate tasks in a variety of languages, and find patterns in data. Students collaborate to create and present solutions that can improve people’s lives, and weigh the ethical and societal issues of how computing and connectivity are changing the world.
- **Digital Electronics**: 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.
- **Other Courses may be added depending on demand.**

**Did you know?**

- 97% of PLTW seniors intend to pursue a 4 year degree or higher (national average is 67%)
- 80% of PLTW engineering seniors intend to study engineering, technology or computer science
- PLTW students achieve significantly higher in reading, math and science
- PLTW engineering alumni are studying engineering and technology at 5-10 times the average rates
- PLTW students have higher retention rates in college engineering, sciences and related programs
- PLTW is a GREAT OPPORTUNITY for Berrien Springs students

**Berrien Springs High School was one of eight Michigan schools selected to receive a PLTW grant for 2014-2017 from General Motors!**