Project Lead the Way (PLTW)
Engineering Essentials
Grade 9-12 Science Elective
Full-Year Course

Course Description

Project Lead the Way (PLTW) Engineering Essentials is a full-year course designed to be a high school student's first exposure to engineering. In Engineering Essentials, students explore the work of engineers and their role in the design and development of solutions to real-world problems. The course introduces students to concepts that are applicable across multiple engineering disciplines and empowers them to build technical skills through the use of a variety of engineering tools, such as geographic information systems (GIS), 3-D solid modeling software, and prototyping equipment. Students learn and apply the engineering design process to develop mechanical, electronic, process, and logistical solutions to relevant problems across a variety of industry sectors, including health care, public service, and product development and manufacturing.

Essential Standards

- Identify a real-world engineering problem and develop creative solutions using an iterative engineering design process
- Design and implement an experimental protocol to investigate phenomena and knowledge used to compare alternative solutions
- Examine the ethical perspectives, sustainability considerations, and personal impacts which inform engineering decision making
- Develop multiple types of models to represent real objects and phenomena in order to understand and evaluate the benefits and limitations of engineering designs
- Apply mathematical reasoning and problem solving to a variety of mechanical systems commonly used in engineering
- Qualitatively and quantitatively describe the flow of energy through electrical systems commonly used in engineering
- Apply the design process to design, simulate, and breadboard a circuit to solve an engineering problem
- Apply systems thinking to consider how an engineering problem and its solution may be thought of as containing subsystems and as being a subsystem of a larger system
- Use geographic information systems (GIS) tools to analyze data and inform solutions made to improve the well-being of a local community