

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 engineers. Students apply the professional skills they have developed to document a design process to standards, ready to take on any post-secondary program or career.

Engineering Design and Development (EDD) is the capstone course in the PLTW high school engineering program. It is an open-ended engineering research course in which students work in teams to design and develop an original solution to a well-defined and justified open-ended problem by applying an engineering design process.

Students will perform research to select, define, and justify a problem. After carefully defining the design requirements and creating multiple solution approaches, teams of students select an approach, create, and test their solution prototype. Student teams will present and defend their original solution to an outside panel. While progressing through the engineering design process, students will work closely with experts and will continually hone their organizational, communication and interpersonal skills, their creative and problem solving abilities, and their understanding of the design process.

Engineering Design and Development is a high school level course that is appropriate for 12th grade students. Since the projects on which students work can vary with student interest and the curriculum focuses on problem solving, EDD is appropriate for students who are interested in any technical career path. EDD should be taken as the final capstone PLTW course since it requires application of the knowledge and skills introduced during the PLTW foundation courses.

The Engineering Design and Development course of study includes:

Engineering Design Processes

- Project Management
- Documenting an Engineering Design Process
- Teamwork and Professional Skills
- Problem Identification and Justification
- Research
- Intellectual Property
- Design Requirements
- Project Proposals
- Design
- Virtual Design and Testing
- Preliminary Design Reviews
- Prototyping
- Testing a Prototype
- Presenting the Process and Results

The structure of Engineering Design and Development is aligned to the Engineering Design Process Portfolio Rubric. Students in this course are encouraged to format their Engineering Design Process Portfolio according to the Components and Elements defined within this rubric.

Student may also wish to capture the Engineering Design Process Portfolio through the online Innovation Portal eportfolio system. This free collaborative tool allows students to share their work securely with key stakeholders and experts in order to receive feedback throughout the design process.

Below is the Engineering Design and Development course structure.

Component 0: Project Management

- (α) – The EDD Design Process and Project Management
- (β) – Documenting the Engineering Design Process
- (γ) – Teams, Timelines, and Contacting Experts
- (δ) – Project Evaluations and Classroom Management
- (ε) – Intellectual Property

Component 1 – Research

- Element A – Identification and Justification of the Problem
- Element B – Documentation and Analysis of Prior Solution Attempts
- Element C – Presentation and Justification of Solution Requirements

Component 2 – Design

- Element D – Design Concept Generation, Analysis, and Selection
- Element E – Application of STEM Principles and Practices
- Element F – Consideration of Design Viability

Component 3 – Prototype and Test

- Element G – Construction of a Testable Prototype
- Element H – Prototype Testing and Data Collection Plan
- Element I – Testing, Data Collection, and Analysis

Component 4 – Evaluation of Project and Process

- Element J – Documentation of External Evaluation
- Element K – Reflection on the Design Project
- Element L – Presentation of Designer's Recommendations

Component 5 – Reflection and Presenting the Design Process

- Element M – Presentation of the Project and Project Portfolio
- Element N – Writing Like an Engineer

Component 6 – Going Beyond EDD

Many opportunities exist for students to receive tangible value for their work beyond the classroom walls. These opportunities range from competitions, scholarships, and university admission notoriety, to interest from business representatives to further develop the ideas created in EDD classrooms.

This section of the curriculum is dedicated to providing resources, examples, and suggestions for helping your students obtain tangible value for their work. Below you will find examples of student success stories related to College Recognition, Competitions, and Business Opportunities.

- Design and Problem Solving Competitions
- Scholarship and Internship Opportunities
- Product and Business Development Opportunities
- Patents
- Admission Preference or College Level Recognition