Course resumes showcase the technical skills students obtain in each PLTW course. Each resume outlines the computational skills, analytical skills, and knowledge acquired in the course. Course resumes also detail student experience with tools, software, lab work, and engineering design. The detailed skills listed within course resumes illustrate the immediate, applicable contributions that students can make within a workplace.

Design Process Experience

- Solve a problem using an iterative engineering design process
- Work collaboratively on a team to design a product or solve a problem
- Document in detail the engineering design process used to solve a problem or design a product
- Develop a detailed and comprehensive design brief
- Brainstorm to generate creative ideas and potential solutions to a problem
- Carry out a plan to compare alternate solutions and select the best solution path
- Evaluate a design solution with respect to design requirements

Experimental Design and Testing Experience

- Design an experimental protocol to investigate a phenomenon
- Develop a test plan to compare alternate solutions
- Collect and analyze data to draw conclusions
- Accurately represent experimental data using visualization techniques and statistical models

Modeling Experience

- Create concept sketches to represent ideas
- Create technical drawings to represent solutions
- Create hand-drawn and scaled technical drawings
- Create and/or modify 3-D solid computer models
- Develop models (including conceptual, graphical, mathematical, physical, and computer) and simulations to represent information, objects, systems, and processes.
- Use CAD software to develop parametric models, calculate beam deflection, determine life cycle and assessments, and analyze a pulley system.

Computational and Analytical Skills

- Use data to inform decisions and make predictions
- Apply abstraction to generalize a problem and solutions
- Collect, organize, and analyze data to help define a problem
- Use algorithms to create solutions
- Write programming code for a project involving a sequence or system of tasks
- Use a variety of methods for identifying and correcting errors in a program code

Project Management Experience

- Project scheduling and collaboration
- Act as a project lead to solve an engineering problem

Transportable Skills

- Team collaboration
- Peer review and feedback
- Project management
- Problem-solving
- Oral communication and presentation
- Technical writing
- Ethical reasoning

COURSE KNOWLEDGE

Careers
- Engineering career research
- STEM careers related to engineering
- Awareness of education and skills required for professional practice
- Professional understanding of the need for multidisciplinary solutions to complex global challenges
- Financial considerations of post-secondary education
- Technology advancements and implications of AI in the workforce
- Professional ethics

Product Design
- Technical Drawings and Modeling
- Manufacturing techniques and optimization
- Tolerance Analysis

Material Choice and Testing
- Material analysis
- Failure testing
- Statistics
- Materials Choice

Energy
- Energy, work, and power fundamentals
- Maximizing efficiency
- Maximizing power
- Energy sources and application

Simple and Compound Machines
- Mechanisms and simple machines
- Mechanical advantage
- Gear ratio
- Compound gears
- Types of motion
- Converting types of motion

Programming
- Open and closed loop systems
- Potentiometer, bumper and limit switch, distance sensor, servo motor, and optical sensors
- Artificial intelligence and machine learning

Electrical Circuits
- Ohms Law
- Parallel and series circuits
- Equivalent Resistance
- Kirchhoff's Law

Fluid Power

- Hydraulic systems
- Pneumatic systems
- Flow Rate
- Pascal's Law
- Fluid power
- Flow velocity
- Bernoulli's Principle
- Absolute power
- Absolute temperature
- Boyle's Law
- Charles' Law
- Gay-Lussac's Law

Kinematics

- Displacement
- Velocity
- Acceleration
- Vertical motion
- Horizontal projectile motion

Statics

- Beam deflection
- Free body diagrams
- Force vectors
- Stress and Strain
- Tensile Testing
- Moments
- Method of joints
- Material properties

Transportation

- Flow rate
- Roadway capacity
- Optimal speed limit
- Critical lane volume