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.

CAD and Drafting Experience
- Create and/or modify 3D solid computer models of complex parts
- Create 3D solid computer models of part assemblies
- Create technical CAD drawings of complex parts and assemblies from 3D solid models
- Animate a 3D solid CAD assembly model to accurately simulate mechanical motion
- Create hand drawn isometric sketches
- Identify errors and omission in technical sketches and drawings

Design Process Experience
- Design a mechanical product/system to solve a problem using an engineering design process
- Document in detail the engineering design process used to create a mechanical solution to a problem
- Develop user-driven, specific and measurable design requirements to specify a successful design or problem solution
- Create a detailed and comprehensive design brief
- Brainstorm/recommend improvements to a mechanical consumer product based on reverse engineering
- Design, develop and implement a testing protocol to test at least one aspect of an engineering solution or design
- Produce a technical presentation to communicate a solution to a mechanical problem or product design
- Work collaboratively on a design team to design a solution to a problem

Computational and Analytical Skills
- Use a spreadsheet application to find a trend line (mathematical model) to represent data and interpret the model within the context of the data using grade appropriate mathematics
- Use appropriate techniques to optimize a design or problem solution
- Collect and analyze data to make predictions and inform engineering decisions
- Perform precision measurement using common engineering tools
- Use material properties to help identify an unknown material
- Choose and justify material choice for a design or solution
- Determine a mathematical equation that describes a relationship between two quantities and use it to define parametric relationships in CAD
- Describe a mechanical system with respect to its structure, behavior and function
- Optimize the structure and/or function of a mechanical system
- Identify frictional forces in a mechanism and revise the design to reduce friction to improve function and/or efficiency
- Use computer, mathematical and physical representations to model behaviors of a mechanical system or process and communicate thinking. Describe the purpose and limitations of each model.
- Design an electromechanical system to control motion and automate a device
- Use Hooke's Law to determine the behavior of a spring

The information included in this document is subject to change. As with all course materials, we will continue to update as more information becomes available.

Professional Skills
- Team collaboration
- Project management
- Problem-solving
- Communication skills
  - Presentation skills
  - Technical writing
- Ethical practice
- Global perspective
- Sccr᠆rcvhɔw

Tools and Software
- Microsoft Office (Excel, Word, PowerPoint) or similar
- 3D solid modeling software - Autodesk Fusion 360 (or other 3D solid modeling application)
- Dial calipers
- 3D prototyper
- VEX prototyping equipment

Course Knowledge
- Careers
  - Engineering disciplines
  - STEM careers related to course content
  - Professional ethics
- Design Process
  - Define the problem – design brief
  - Generate concepts – brainstorming and decision matrices
  - Develop a solution – technical drawing
  - Construct and test a prototype
  - Evaluate a solution
  - Present a solution
  - Product life cycle
  - Design teams
- Technical Sketching and Drawing
  - Isometric views
  - Orthographic projections
  - Alternate views - sectional views and detail views
  - Working drawings
- Measurement
  - Linear measurement
  - Unit conversion
  - Precision and Accuracy
  - Dimensioning
  - Tolerance, fit and allowance
  - Physical property analysis

Course Knowledge, continued
- Statistics
  - Measures of central tendency
  - Measures of variation
  - Box plots
  - Histograms
  - Normal Distribution
  - Inferential Reasoning
- Modeling in Engineering
  - Graphical modeling
  - Mathematical modeling
  - Computer 3D solid modeling
  - Physical modeling and prototyping