**Pequea Valley School District**

**STEM Department**

**Unit: CNC Manufacturing Course: STEM9 Grade: 9th**

|  |
| --- |
| **Planning the Focus Based on the Desired Result**  **What do you want all students to know, understand and do by the end of the unit?** |
| **Unit Essential Question(s)** How has computer-aided manufacturing affected society’s ability to produce products?  STEM9   * Computer Manufacturing vs. Traditional Manufacturing * G-Coding * Troubleshooting Coding * Engineering and Design Process * Calculating Slope |
| **Keystone Eligible Content/PA Core Standard**  **3.2.10.B** Apply process knowledge and organize scientific and technological phenomena in varied ways  **3.2.10.D** Identify and Apply the technological design process to solve problems.  **3.7.10.A** Identify and safely use a variety of tools, basic machines, materials, and techniques to solve problems and answer questions  **3.8.10.C** Evaluate possibilities consequences and impacts of scientific and technological solutions |
| **Pacing: Approximate number of class sessions per unit**  14 Days |
| **Tier 3 Vocabulary (Content specific vocabulary)**  **G-Code**  **CAM (Computer-Aided Manufacturing)**  **Troubleshooting**  **Slope**  **CNC**  **Coordinate Plane**  **X,Y, and Z Axes**  **Point of Origin**  **Router** |
| **Know -** What do students need to **know** in order to be able to do and understand? ***List concepts, such as facts, formulas, key vocabulary and knowledge “nuggets”.***   * **Learners will know how to create basic G-Code commands.** * **Learners will know how to plot points on a 3-dimensional plane.** * **Learners will know how to use a CNC router.** * **Learners will be able to troubleshoot coding.** * **Learners will be able to use slope to solve complex problems.** |
| **Understand -** What do students need to **understand**? What is the **big idea**? ***List broad concepts or “big ideas” in a statement of enduring understanding.***   * **Learners will understand how computer-aided manufacturing has impacted the manufacturing industry.** * **Learners will be able to troubleshoot a problem and find the best solution.** |
| **Learning Outcome -** What do students need to be able to **accomplish** by the unit’s end? ***List skills and competencies.***   * **CNC Project - Learners will utilize the CNC router to create a vertical marble maze with appropriate slopes to create a challenging puzzle.** * **Summative Assessment - Learners will complete a practical exam drafting G-codes.** |
| **Assessments:**   * Project is Aligned to the Algebra Keystone |
| **Software/Resources:** |

Authentic Learning Experiences: Learners have the opportunity to tour Charles and Alice to learn about computer-aided manufacturing.