**Pequea Valley School District**

**STEM Department**

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

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| **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
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| **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.**
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| **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.**
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| **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.**
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| **Assessments:*** Project is Aligned to the Algebra Keystone
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| **Software/Resources:** |

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