## Engineering Design I (Grades 9-12)

<table>
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<tr>
<th>Unit</th>
<th>Length of Time</th>
<th>Concepts &amp; Competencies</th>
<th>Common Assessments</th>
<th>Academic Standards (PA Core if applicable)</th>
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| Unit 1| 3 weeks        | Understanding Engineering & Drafting  
Distinguishing the difference between Engineering and Drafting.  
Exploring Careers related to Engineering and Design & Drafting. | ➢ Each student will take a 5-question quiz based on a PowerPoint presentation and notes they took during this unit. |                                             |
| Unit 2| 2 weeks        | Measurement  
Successfully complete a mechanical drawing using half and full scale measurement. | ➢ Each student will take a pre-test and post-test assessment. |                                             |
| Unit 3| 30 weeks       | Orthographic Projection Drafting  
Identify and use basic drafting tools and instruments necessary to complete a mechanical drawing.  
Use the mechanical drafting process to complete an Orthographic Projection drawing.  
Use proper paper setup techniques in order to complete a mechanical drawing.  
Apply proper line types when finishing a mechanical drawing. | ➢ Student work will be assessed using a grade rubric developed for these drafting assignments. |                                             |
| Unit 4| 20 weeks       | 3 Dimensional Design Using SolidWorks  
Create a PART using 3D design software.  
Accurately dimension a drawing using 3D design software. | ➢ Student work will be assessed using a grade rubric developed for these 3 dimensional design assignments. |                                             |
| Unit 5| 20 weeks       | Isometric Drafting  
Use the mechanical drafting process to complete an Isometric drawing.  
Identify and use basic drafting tools and instruments necessary to complete a mechanical drawing.  
Use proper paper setup techniques in order to complete a mechanical drawing.  
Apply proper line types when finishing a mechanical drawing. | ➢ Student work will be assessed using a grade rubric developed for these drafting assignments. |                                             |
| Unit 6| 20 weeks       | 3D Engineering Design Challenges  
Solve an open-ended design challenge using 3D software.  
Print a 3D part using a 3 dimensional printer. | ➢ Each student will have their 5 game parts assessed based on a |                                             |
grade rubric designed for this design challenge.