

<b>Course Title – Drafting and Design 1</b>	
<b>Implement start year – 2018-2019</b>	
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<b>Unit #3: Design Communication: Projections and Views</b>	
<b>Transfer Goal –</b> Students will be able to independently create various drawing types to accurately document and convey their design ideas.	
<b>Stage 1 – Desired Results</b>	
<p style="text-align: center;"><b><u>Established Goals</u></b></p> <p style="text-align: center;"><b><u><a href="#">2014 New Jersey Student Learning Standards, Strand(s)/CPI #</a></u></b></p> <p>8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.  A. Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.</p>	<p style="text-align: center;"><b><u>21<sup>st</sup> Century Themes</u></b>  <b><u>( <a href="http://www.21stcenturyskills.org">www.21stcenturyskills.org</a> )</u></b></p> <p><input checked="" type="checkbox"/> Global Awareness  <input type="checkbox"/> Financial, Economic, Business and Entrepreneurial Literacy  <input type="checkbox"/> Civic Literacy  <input type="checkbox"/> Health Literacy  <input checked="" type="checkbox"/> Environmental Literacy</p>

**21<sup>st</sup> Century Skills**

*Learning and Innovation Skills:*

- Creativity and Innovation
- Critical Thinking and Problem Solving
- Communication and Collaboration

*Information, Media and Technology Skills:*

- Information Literacy
- Media Literacy
- ICT (Information, Communications and Technology) Literacy

*Life and Career Skills:*

- Flexibility and Adaptability
- Initiative and Self-Direction
- Social and Cross-Cultural Skills
- Productivity and Accountability
- Leadership and Responsibility

8.2 Technology Education, Engineering, Design, and Computational Thinking - Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.

C. Design: The design process is a systematic approach to solving problems.

- 8.2.12.C.7 Use a design process to devise a technological product or system that addresses a global problem, provide research, identify trade-offs and constraints, and document the process through drawings that include data and materials.

9.1 21st-Century Life & Career Skills All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.

9.1.12.A.1

Apply critical thinking and problem-solving strategies during structured learning experiences.

**Enduring Understandings:**

*Students will understand that . . .*

*EU 1*

a 3D object can be accurately depicted and viewed in two dimensions.

*EU 2*

dimensions are necessary to accurately communicate a drawing.

**Essential Questions:**

*EU 1*

- How can you show the size and appearance of a 3D object in 2 dimensions?
- How can projection lines transfer features between views?

*EU 2*

- How are measurement and accuracy important in life?
- Why does a designer need to communicate a drawing's dimensions?
- Why are ANSI standards necessary?

<p><i>EU 3</i> pictorial drawings show the object as it would appear in real life.</p>	<p><i>EU 3</i></p> <ul style="list-style-type: none"> <li>• How can a pictorial drawing be more beneficial than an orthographic drawing?</li> <li>• Why would a designer use a pictorial drawing to communicate a design?</li> </ul>
<p><b>Knowledge:</b> <i>Students will know . . .</i></p> <p><i>EU 1</i></p> <ul style="list-style-type: none"> <li>• that orthographic projection allows you to create multiple views of an object.</li> <li>• the three basic views of an object are front, top, and side views.</li> <li>• different line types such as hidden, projection, construction, and center.</li> </ul> <p><i>EU 2</i></p> <ul style="list-style-type: none"> <li>• dimensions show specific size and the detail of an object.</li> <li>• dimensions follow international standards.</li> </ul> <p><i>EU 3</i></p> <ul style="list-style-type: none"> <li>• pictorial drawings include isometric, oblique, and perspective.</li> <li>• isometric drawings are based on 120° axis and utilize 30° lines.</li> </ul>	<p><b>Skills:</b> <i>Students will be able to . . .</i></p> <p><i>EU 1</i></p> <ul style="list-style-type: none"> <li>• utilize the glass box theory to visualize the independent views of an object.</li> <li>• develop and draw an orthographic projection using appropriate line types.</li> <li>• project a third view from a 2 view drawing.</li> <li>• create a 3 view drawing when giving a pictorial view.</li> </ul> <p><i>EU 2</i></p> <ul style="list-style-type: none"> <li>• identify and apply dimension lines, extension lines, and leaders.</li> <li>• determine the necessary dimensions for a given drawing.</li> <li>• place dimensions according to international standards so that they are accurate and legible.</li> </ul> <p><i>EU 3</i></p> <ul style="list-style-type: none"> <li>• identify the differences between the pictorial drawings.</li> <li>• produce an isometric drawing.</li> </ul>
<p><b>Stage 2 – Assessment Evidence</b></p>	
<p><b>Other Recommended Evidence:</b></p> <ul style="list-style-type: none"> <li>• Design Challenges</li> <li>• Teacher observations</li> </ul>	

- Project rubric(s)
- Worksheets
- Quizzes/tests
- CAD Drawing Packets
- Engineering notebook

### Stage 3 – Learning Plan

#### Suggested Learning Activities to Include Differentiated Instruction and Interdisciplinary Connections:

- Teacher led discussions on the proper orthographic drawing techniques (A)
- Demonstrate proper projection techniques by drawing real life objects with an emphasis on scale and proportion (M,T)
- Model glass box theory (A)
- Orthographic Projection worksheets (M)
- Reproduce advanced orthographic drawings (T)
- Teacher led discussion on the proper dimensioning techniques
- Demonstrate proper dimensioning techniques
- Practice new dimensioning skillsets (M)
- Compare and contrast correct use of dimensions to incorrect use of dimensions (A,M)
- Dimensioning example handouts (A,M)
- Teacher led discussions on the proper pictorial drawing techniques (A)
- Demonstrate proper pictorial techniques by drawing real life objects with an emphasis on scale and proportion (M,T)
- Pictorial drawing worksheets (M)
- Reproduce pictorial drawings (T)
- Create pictorial drawings given an orthographic drawing (M)
- Teacher led discussions on the Engineering Design Process (A)
- Create a solution to the Design Challenge using the engineering design process (M, T)