




**Introduction to Engineering Design**

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**September 2020**


Content	Skills	Learning Targets	Standards	Assessment	Resources & Technology
<p><b>CEQ: How do inventors and innovators impact, shape, and communicate with society?</b></p> <p>UEQ: How might we create the best possible solution to a problem?</p> <p>UEQ: What is an Engineer? </p> <p><b>A: Design Process</b></p> <p>A1: Design Challenges A2: Engineering a Deep Dive A3: Design Brief</p>	<p><b>A: Design Process</b></p> <p>A1: Sketching out original ideas A1: Building a solution to a problem A2: Design process understanding A3: Writing a formal design brief.</p>	<p><b>A: Design Process</b></p> <p>1. I can sketch out my ideas on paper 2. I can help to build a solution to a problem 3. I can identify the steps in the design process 4. I can write a design brief</p>		<p><b>A: Design Process</b></p> <p>A1: CFA- Unit 1 Vocab Worksheet A1: CFA- Cable Car Activity A1: CFA- Boat Build A1: CFA-Concept Sketching A1: CFA-Product Improvement A1 : CFA-Concept Sketching A2: CFA-The Deep Dive A3: CFA-Write a design brief A: CSA-Unit 1 Vocab Test A: CSA-Unit 1 Test</p>	<p><b>A: Design Process</b></p> <p>A1: Concept Sketching A1: Concept Sketching Rubric A1: Engineering Notebook A2: YouTube: “The Deep Dive” A2: Design Process PPT A3: Design Brief PPT A3: Google Doc Template (Design Brief)</p>


<p>UEQ: How can we clearly convey a design to someone unfamiliar with the problem?  UEQ: What is the difference between technical drawing and artistic drawing? </p> <p><b>B:Technical Sketching and Drawing</b></p> <p>B1: Isometrics  B2: Obliques  B3: Perspectives  B4: Multiviews</p>	<p><b>B:Technical Sketching and Drawing</b></p> <p>B1: Drawing Isometric  B2: Drawing Obliques  B3: Drawing Perspectives  B4: Drawing Multiviews</p>	<p><b>B:Technical Sketching and Drawing</b></p> <ol style="list-style-type: none"> <li>1. I can draw an isometric shape.</li> <li>2. I can draw a cabinet &amp; oblique shape.</li> <li>3. I can draw using perspective vanishing points.</li> <li>4. I can create a multiview drawing.</li> <li>5. I can understand line conventions.</li> </ol>		<p><b>B:Technical Sketching and Drawing</b></p> <p>B1: CFA-Unit 2 Vocab  B1: CFA- Isometric Drawings  B2: CFA-Oblique Drawings  B3: CFA- Perspective Drawings  B4: CFA- Multiview Drawings  B: CSA-Unit 2 Vocab Test  B: CSA-Unit 2 Test</p>	<p><b>B:Technical Sketching and Drawing</b></p> <p>B1: Isometric Paper, Orthographic Paper  B1: Isometric PPT  B2: Oblique PPT  B3: Perspective PPT  B4: Multiview PPT  B4: Line Conventions PPT</p>
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<p>UEQ: Why are accurate and precise measurements important?  UEQ: What are statistics?    <b>C: Measurement and Statistics</b></p> <p>C1: English and Metric Scales  C2: Dial Calipers  C3: Statistics</p>	<p><b>C: Measurement and Statistics</b></p> <p>C1: Using English Measurement  C1: Conversion of Units  C2: Dial Caliper Operation  C3: Application of Statistics</p>	<p><b>C: Measurement and Statistics</b></p> <ol style="list-style-type: none"> <li>1. I can read a ruler in English units</li> <li>2. I can convert to different units.</li> <li>3. I can read a dial caliper</li> <li>4. I can create a histogram</li> </ol>		<p><b>C: Measurement and Statistics</b></p> <p>C1: CFA-Linear Measurements  C1: Unit Conversions  C2: Dial Caliper Application  C3: Statistical Analysis</p>	<p><b>C: Measurement and Statistics</b></p> <p>C1: SI Units PPT  C1: Rulers  C1: Unit Conversions PPT  C1: Conversions Worksheet  C2: Dial Calipers  C2: Linear Measurement Activity.  C3: Intro to Statistics PPT  C3: Statistical Analysis (YouTube Video)  C1-3: Engineering Notebook</p>
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**October 2019**

Content	Skills	Learning Targets	Assessment	Resources & Technology
 <p><b>D: Modeling Skills</b></p> <p>UEQ: What is the role of modeling in the design process UEQ: How can we use technology to help create a finished product?</p> <p>D1: Intro to Inventor D2: Inventor Modeling D3: Designing a Phone Holder</p>	<p><b>D: Modeling Skills</b></p> <p>D1: Learning Inventor 2D Skills D1: Learning Inventor 3D Skills D2: Applying Inventor to draw parts D3: Developing an original project idea.</p>	<p><b>D: Modeling Skills</b></p> <ol style="list-style-type: none"> <li>1. I can use 2D Inventor drawing tools.</li> <li>2. I can use 3D Inventor drawing tools.</li> <li>3. I can model Inventor parts.</li> <li>4. I can design a holder for my phone.</li> </ol>	<p><b>D: Modeling Skills</b></p> <p>D1: CFA-2D/3D part models(Engineering notebook). D2: CFA-11 Shapes D3: CSA-Phone Holder Project</p>	<p><b>D: Modeling Skills</b></p> <p>D: Autodesk Inventor, Graphing Paper, Engineering Notebook. D1: 2D/3D Drawing Sheets D2: Puzzle Cube Dimensions D2: 11 Shapes D2/3: YouTube Tutorials D3: Phone Holder Rubric D3: Phone Holder Flowchart</p>

<p>UEQ: what is the advantage of using a CAD program over paper and pencil? </p> <p><b>E: Geometry of Design</b></p> <p>E1: 2-D shapes E2: 3-D Solids E3: Views/Tolerances E4: Dimensioning</p>	<p><b>E: Geometry of Design</b></p> <p>E1: Calculating 2D Geometry E1: Calculating shape properties E2: Using 3-D modeling tools E2: Calculating 3-D properties E3: Identify/apply different views E3: Utilize tolerances E4: Using different dimension styles</p>	<p><b>E: Geometry of Design</b></p> <ol style="list-style-type: none"> <li>1. I can calculate 2D geometry.</li> <li>2. I can use Inventor iProperties</li> <li>3. I can create a section view.</li> <li>4. I can create an auxiliary view.</li> <li>5. I can identify 3 types of tolerances</li> <li>6. I can tell the difference between hole types.</li> <li>7. I can use different dimension styles.</li> </ol>	<p><b>E: Geometry of Design</b></p> <p>E1: Unit 5/7 Vocab Worksheet. E1: CFA-Calculating properties of shapes E2: CFA-Calculating properties of solids E3: CSA-Arbor Press E4: CFA-Puzzle Part dimensioning activity E: CSA-Unit 5/7 Vocab Quiz. E: CSA-Unit 5/7 Test.</p>	<p><b>E: Geometry of Design</b></p> <p>E: Autodesk Inventor, Engineering Notebook. E1: 2D Geometry PPT E2: 3D Properties PPT E3: Hole, Hole Note PPT E3: Tolerances PPT E3: Views PPT E3: Arbor Press Drawings E4: Dimensioning PPT E4: Puzzle Part Drawings</p>
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**December 2019**

<b>Content</b>	<b>Skills</b>	<b>Learning Targets</b>	<b>Assessment</b>	<b>Resources &amp; Technology</b>
<b>F: Reverse Engineering</b>  F1: Chess Piece F2: Visual Analysis F3: Functional Analysis F4: Structural Analysis	F1: Accurately replicating a physical part. F2: Perform a Visual Analysis F3: Perform a Functional Analysis F4: Perform a Structural Analysis.	1. I can accurately measure, model and 3D print a chess piece. 2. I can visually describe a product. 3. I can perform a Functional Analysis 4. I can perform a structural Analysis.	<b>F: Reverse Engineering</b>  F1: CSA- Chess Piece F1: CFA-Unit 6 Vocab F2: CFA-Visual analysis Automoblox F3: CFA-Functional Analysis Automoblox F3: CFA-RE Printed Part F4: CSA-Automoblox Parts List. F: CSA-Unit 6 Vocab Quiz F: CSA-Unit 6 Test	<b>F: Reverse Engineering</b>  F: Engineering Notebook, Autodesk Inventor, 3D Printer F1: Chess Pieces F2: Visual Analysis PPT F2: Visual Analysis Google Doc Template F3: Functional Analysis PPT F3: Functional Analysis Google Doc F4: Disassembly Chart Template.

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**January**

<b>Content</b>	<b>Skills</b>	<b>Learning Targets</b>	<b>Assessment</b>	<b>Resources &amp; Technology</b>
<p>UEQ: How can assembly models, exploded assemblies, and animated assemblies of an object or a proposed design be used in the design process? </p> <p><b>G: Advanced Computer Modeling</b></p> <p>G1: Simple Box G2: Automata Box Phase 1 G3: Automata Box Phase 2</p>	<p><b>G: Advanced Computer Modeling</b></p> <p>G1: Draw/design a simple box. G1: Create a working drawing. G2: Draw/design an automata box G3: Design a working automata</p>	<p><b>G: Advanced Computer Modeling</b></p> <p>1. I can design a simple box 2. I can create a working drawing 3. I can design an automata box. 4. I can create movement using cams.</p>	<p><b>G: Advanced Computer Modeling</b></p> <p>G1: CFA-Simple Box G2: CFA-Working Drawing G2:CSA-Automata Phase 1 G3:CFA-Parametric parts G3:CSA-Automata Phase 2</p>	<p>\</p> <p><b>G: Advanced Computer Modeling</b></p> <p>H: Autodesk Inventor, Engineering Notebook, 3D Printer, PLTW Online Curriculum H2: Phase 1 rubric H3: Phase 2 rubric</p>