




Introduction to Engineering Design

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September 2022


Content	Skills	Learning Targets	Standards	Assessment	Resources & Technology
CEQ: How do inventors and innovators impact, shape, and communicate with society? UEQ: How might we create the best possible solution to a problem? UEQ: What is an Engineer?  A: Design Process A1: Design Challenges A2: Engineering a Deep Dive A3: Design Brief	A: Design Process A1: Sketching out original ideas A1: Building a solution to a problem A2: Design process understanding A3: Writing a formal design brief.	A: Design Process 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		A: Design Process 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	A: Design Process 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>UEQ: How can we clearly convey a design to someone unfamiliar with the problem?</p> <p>UEQ: What is the difference between technical drawing and artistic drawing? </p> <p>B:Technical Sketching and Drawing</p> <p>B1: Isometrics B2: Obliques B3: Perspectives B4: Multiviews</p>	<p>B:Technical Sketching and Drawing</p> <p>B1: Drawing Isometric B2: Drawing Obliques B3: Drawing Perspectives B4: Drawing Multiviews</p>	<p>B:Technical Sketching and Drawing</p> <p>1. I can draw an isometric shape. 2. I can draw a cabinet & oblique shape. 3. I can draw using perspective vanishing points. 4. I can create a multiview drawing. 5. I can understand line conventions.</p>		<p>B:Technical Sketching and Drawing</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:Technical Sketching and Drawing</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?</p> <p>UEQ: What are statistics?</p>  <p>C: Measurement and Statistics</p> <p>C1: English and Metric Scales C2: Dial Calipers C3: Statistics</p>	<p>C: Measurement and Statistics</p> <p>C1: Using English Measurement C1: Conversion of Units C2: Dial Caliper Operation C3: Application of Statistics</p>	<p>C: Measurement and Statistics</p> <p>1. I can read a ruler in English units 2. I can convert to different units. 3. I can read a dial caliper 4. I can create a histogram</p>		<p>C: Measurement and Statistics</p> <p>C1: CFA-Linear Measurements C1: Unit Conversions C2: Dial Caliper Application C3: Statistical Analysis</p>	<p>C: Measurement and Statistics</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 2021

Content	Skills	Learning Targets	Assessment	Resources & Technology
 <p>D: Modeling Skills</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>D: Modeling Skills</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>D: Modeling Skills</p> <p>1. I can use 2D Inventor drawing tools. 2. I can use 3D Inventor drawing tools. 3. I can model Inventor parts. 4. I can design a holder for my phone.</p>	<p>D: Modeling Skills</p> <p>D1: CFA-2D/3D part models(Engineering notebook). D2: CFA-11 Shapes D3: CSA-Phone Holder Project</p>	<p>D: Modeling Skills</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>E: Geometry of Design</p> <p>E1: 2-D shapes E2: 3-D Solids E3: Views/Tolerances E4: Dimensioning</p>	<p>E: Geometry of Design</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>E: Geometry of Design</p> <ol style="list-style-type: none"> 1. I can calculate 2D geometry. 2. I can use Inventor iProperties 3. I can create a section view. 4. I can create an auxiliary view. 5. I can identify 3 types of tolerances 6. I can tell the difference between hole types. 7. I can use different dimension styles. 	<p>E: Geometry of Design</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>E: Geometry of Design</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 2021

Content	Skills	Learning Targets	Assessment	Resources & Technology
F: Reverse Engineering 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.	F: Reverse Engineering 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	F: Reverse Engineering 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 2022

Content	Skills	Learning Targets	Assessment	Resources & Technology
<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>G: Advanced Computer Modeling</p> <p>G1: Simple Box G2: Automata Box Phase 1 G3: Automata Box Phase 2</p>	<p>G: Advanced Computer Modeling</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>G: Advanced Computer Modeling</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>G: Advanced Computer Modeling</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>G: Advanced Computer Modeling</p> <p>H: Autodesk Inventor, Engineering Notebook, 3D Printer, PLTW Online Curriculum H2: Phase 1 rubric H3: Phase 2 rubric</p>