

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCAB	PRIORITY
<b>DESIGN PROCESS</b>					
<ul style="list-style-type: none"> <li>Problem solving techniques</li> </ul>	<b>IED-1.1:</b> Describe and apply problem solving techniques.	<ul style="list-style-type: none"> <li>Perform the steps of the design process.</li> <li>Develop products.</li> <li>Analyze products.</li> <li>Develop systems.</li> <li>Analyze systems.</li> </ul>	<ul style="list-style-type: none"> <li>Classroom participation in discussion</li> </ul>	<ul style="list-style-type: none"> <li>Design process</li> <li>Products</li> <li>Techniques</li> </ul>	Critical
<ul style="list-style-type: none"> <li>General Design Process</li> </ul>	<b>IED-1.2:</b> Identify and describe the steps in the design process.	<ul style="list-style-type: none"> <li>Perform the steps of the design process which include: defining the problem, generating concepts, developing a solution, construct and test a prototype and evaluating and presenting solutions.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> <li>McGyvering review</li> <li>Practical quiz with a product</li> </ul>	<ul style="list-style-type: none"> <li>Concepts</li> <li>Solution</li> <li>Brainstorm</li> <li>Criteria</li> <li>Model</li> <li>Prototype</li> <li>Evaluate</li> </ul>	Critical
<ul style="list-style-type: none"> <li>Specific Design Process</li> </ul>	<b>IED-1.3:</b> Compare the design processes specific to the subject matter.	<ul style="list-style-type: none"> <li>Compare design process to subject matter.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>		Important
<ul style="list-style-type: none"> <li>Process Outcomes</li> </ul>	<b>IED-1.5:</b> Discuss the importance of the design process and how the process affects the outcome.	<ul style="list-style-type: none"> <li>Able to discuss importance.</li> <li>Apply process.</li> <li>Understand outcomes.</li> <li>Develop products.</li> <li>Analyze products.</li> <li>Develop systems.</li> <li>Analyze systems.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Proposal</li> <li>Refine</li> <li>Result</li> <li>Communicate</li> </ul>	Important

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCAB	PRIORITY
<b>DRAWING STANDARDS</b>					
<ul style="list-style-type: none"> <li>Line Types</li> </ul>	<b>IED-2.1:</b> Choose when different line types should be utilized during the drawing process.	<ul style="list-style-type: none"> <li>Choose line types.</li> <li>Utilizing line types.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Construction line</li> <li>Object line</li> <li>Center line</li> <li>Hidden line</li> <li>Dimension line</li> <li>Extension line</li> </ul>	Critical
<ul style="list-style-type: none"> <li>Annotation</li> </ul>	<b>IED-2.2:</b> Select appropriate annotation to appropriately document features within drawings.	<ul style="list-style-type: none"> <li>Produce appropriate hand written annotations as well as in CAD.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Sketch</li> <li>Shape</li> <li>Proportion</li> <li>Freehand</li> </ul>	Important
<ul style="list-style-type: none"> <li>Measurement Tools</li> </ul>	<b>IED-2.4:</b> Verify sizes and shapes of objects utilizing differing measurement tools.	<ul style="list-style-type: none"> <li>Use a ruler and a dial caliper to verify sizes of objects.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Measure</li> <li>Ruler</li> <li>Dial Caliper</li> <li>Size</li> <li>Shape</li> </ul>	Important
<b>DRAWING STANDARDS</b>					
<ul style="list-style-type: none"> <li>Views of Working Drawings</li> </ul>	<b>IED-2.5:</b> Identify appropriate views and be able to select which should be utilized in a given situation.	<ul style="list-style-type: none"> <li>Know when to use normal views and specialty views when creating working drawings.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Section</li> <li>Auxiliary</li> </ul>	Important
<ul style="list-style-type: none"> <li>Isometric Drawings</li> <li>Orthographic Drawings</li> <li>Perspective Views</li> </ul>	<b>IED-2.6:</b> Develop drawings in isometric, orthographic, and perspective views.	<ul style="list-style-type: none"> <li>Produce industry standard sketches.</li> <li>Produce industry standard drawings.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Isometric</li> <li>Orthographic</li> <li>Oblique</li> <li>Pictorial</li> </ul>	Important

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCAB	PRIORITY
<b>PROJECT MANAGEMENT</b>					
<ul style="list-style-type: none"> <li>Engineering Notebook</li> </ul>	<b>IED-4.1:</b> Justify the necessity of producing an engineering notebook.	<ul style="list-style-type: none"> <li>Generate and document multiple ideas or solution paths to a problem through brainstorming.</li> <li>Explain the contributions of engineers from different engineering fields in the design and development of a product, system, or technology.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Engineering notebook</li> <li>Sketch</li> <li>Document</li> </ul>	Important
<ul style="list-style-type: none"> <li>Engineering Notebook</li> </ul>	<b>IED-4.3:</b> Develop a working engineering notebook according to appropriate standards.	<ul style="list-style-type: none"> <li>Follow appropriate engineering notebook techniques to create entries.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>		Important
<ul style="list-style-type: none"> <li>Design Brief</li> </ul>	<b>IED-4.4:</b> Understand, develop, and implement design briefs in relation to a design problem.	<ul style="list-style-type: none"> <li>Create design brief to aid in development of a solution to a design problem.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Design brief</li> </ul>	Important
<b>ENGINEERING DESIGN</b>					
<ul style="list-style-type: none"> <li>Design Effects on Society</li> </ul>	<b>IED-5.4:</b> Recognize historical and current events related to engineering design and their effects on society.	<ul style="list-style-type: none"> <li>Recognize historical and current events related to engineering design.</li> <li>Understand the positive and negative effects these events have had on society.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>		Important
<ul style="list-style-type: none"> <li>Design Equipment</li> </ul>	<b>IED-5.5:</b> Understand the effective use of engineering design equipment.	<ul style="list-style-type: none"> <li>Use different drafting equipment including compass, protractor, triangles and CAD.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Design equipment</li> </ul>	Important

<b>CONTENT</b>	<b>STANDARD INDICATORS</b>	<b>SKILLS</b>	<b>ASSESSMENT</b>	<b>VOCAB</b>	<b>PRIORITY</b>
<b>ENGINEERING DESIGN</b>					
<ul style="list-style-type: none"> <li>Roles of Engineering</li> </ul>	<b>IED-5.6:</b> Recognize and identify the role of engineering and engineered products in society.	<ul style="list-style-type: none"> <li>Recognize role of engineers.</li> <li>Identify different roles of engineers.</li> <li>Understand how engineered products impacts society.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>		Important
<ul style="list-style-type: none"> <li>Good design applications</li> </ul>	<b>IED-5.7:</b> Identify the qualities of good design and their relationship to the design's user.	<ul style="list-style-type: none"> <li>Identify qualities of good design.</li> <li>Identify the relationship of design to the design's user.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>		Important
<b>MODELING</b>					
<ul style="list-style-type: none"> <li>Conceptual Ideas</li> </ul>	<b>IED-6.1:</b> Communicate conceptual ideas through written and verbal formats.	<ul style="list-style-type: none"> <li>Communicate conceptual ideas by developing pictorial and orthographic drawings, and creating and using design briefs.</li> <li>Use the skills needed to give a presentation and write a technical report.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Isometric</li> <li>Orthographic</li> <li>Multi-view</li> <li>Design brief</li> <li>Principles</li> <li>Elements</li> <li>Message analysis</li> <li>Reverse engineering</li> <li>Typography</li> </ul>	Important

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<b>AESTHETICS</b>					
<ul style="list-style-type: none"> <li>Relationship of Art to Design</li> </ul>	<b>ED-7.1:</b> Identify the knowledge and skills gained in art experiences that transfer to the design process.	<ul style="list-style-type: none"> <li>Understand and develop dimension drawings.</li> <li>Know dimensioning guidelines.</li> <li>Use CAD software.</li> <li>Identify ANSI or ASME dimensioning standards.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Dimension</li> <li>Analysis</li> <li>Engineering organizations</li> <li>Tolerance</li> <li>Market research</li> <li>Survey</li> <li>Technical writing</li> </ul>	Important

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<b>Design Process</b>					
<ul style="list-style-type: none"> <li>Design Process</li> </ul>	<p><b>IED-1.4:</b> Apply and adapt the design loop as a guide in creating a solution.</p>	<ul style="list-style-type: none"> <li>Perform the steps of the design process for multiple products.</li> <li>Show outcomes developed through the use of the design process.</li> </ul>	<ul style="list-style-type: none"> <li>Puzzle cube project</li> <li>Ultimate grill design brief</li> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Design process</li> <li>Iteration</li> <li>Concepts</li> <li>Solution</li> <li>Brainstorm</li> <li>Criteria</li> <li>Model</li> <li>Prototype</li> <li>Evaluate</li> </ul>	Critical
<b>Drawing Standards</b>					
<ul style="list-style-type: none"> <li>Geometry as design</li> </ul>	<p><b>IED-2.7:</b> Evaluate when geometric shapes can be utilized as a part of a design.</p>	<ul style="list-style-type: none"> <li>Identify and define technical drawing representations including isometric, orthographic projection, oblique, and perspective views.</li> </ul>	<ul style="list-style-type: none"> <li>Puzzle cube parts sketches</li> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Drawing</li> <li>Grid</li> <li>Scale</li> <li>Shape</li> <li>View</li> </ul>	Important
<ul style="list-style-type: none"> <li>Geometry in Design</li> </ul>	<p><b>IED-2.8:</b> Determine how and where calculations can be made to quantify the size and locations of designs.</p>	<ul style="list-style-type: none"> <li>Determine the minimum number and types of views necessary to fully detail a part.</li> <li>Choose and justify the choice for the best orthographic projection of an object to use as a front view on technical drawings.</li> </ul>	<ul style="list-style-type: none"> <li>Puzzle cube drawings</li> <li>Puzzle cube dimensions</li> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Drawing</li> <li>Grid</li> <li>Scale</li> <li>Shape</li> <li>View</li> </ul>	Important

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<b>Modeling</b>					
<ul style="list-style-type: none"> <li>Coordinate System</li> </ul>	<b>IED-6.5:</b> Identify the six degrees of freedom.	<ul style="list-style-type: none"> <li>Understand the geometric relationship between planes and axis.</li> <li>Create drawings in the appropriate planer axis.</li> </ul>	<ul style="list-style-type: none"> <li>CAD modeling-part creation</li> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>X-axis</li> <li>Y-axis</li> <li>Z-axis</li> <li>Rotation</li> <li>Plane</li> <li>Coordinate</li> </ul>	Important
<ul style="list-style-type: none"> <li>Assemblies</li> </ul>	<b>IED-6.6:</b> Differentiate between assemblies and subassemblies and their appropriate use.	<ul style="list-style-type: none"> <li>Understand what an assembly is and how to create one.</li> <li>Understand what a subassembly is and how to create one</li> </ul>	<ul style="list-style-type: none"> <li>CAD modeling-assembly</li> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	

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<b>DESIGN PROCESS</b>					
<ul style="list-style-type: none"> <li>General Design Process</li> </ul>	<p><b>IED-1.2:</b> Identify and describe the steps in the design process.</p>	<ul style="list-style-type: none"> <li>Perform the steps of the design process:                             <ul style="list-style-type: none"> <li>Define problem.</li> <li>Generate concepts.</li> <li>Develop a solution.</li> <li>Construct and test prototype.</li> <li>Evaluate solution.</li> <li>Present solution.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> <li>McGyvering review</li> <li>Practical quiz with a product</li> </ul>	<ul style="list-style-type: none"> <li>Concepts</li> <li>Solution</li> <li>Brainstorm</li> <li>Criteria</li> <li>Model</li> <li>Prototype</li> <li>Evaluate</li> </ul>	Critical
<ul style="list-style-type: none"> <li>The Design Process</li> </ul>	<p><b>IED-1.4:</b> Apply and adapt the design loop as a guide in creating a solution.</p>	<ul style="list-style-type: none"> <li>Perform the steps of the design process for multiple products.</li> <li>Show outcomes developed through the use of the design process.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Design process</li> <li>Iteration</li> </ul>	Critical
<ul style="list-style-type: none"> <li>Process Outcomes</li> </ul>	<p><b>IED-1.5:</b> Discuss the importance of the design process and how the process affects the outcome.</p>	<ul style="list-style-type: none"> <li>Able to discuss importance.</li> <li>Apply process.</li> <li>Understand outcomes.</li> <li>Develop products.</li> <li>Analyze products.</li> <li>Develop systems.</li> <li>Analyze systems.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Proposal</li> <li>Refine</li> <li>Result</li> <li>Communicate</li> </ul>	Important



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<b>DRAWING STANDARDS</b>					
<ul style="list-style-type: none"> <li>Line Types</li> </ul>	<b>IED-2.1:</b> Choose when different line types should be utilized during the drawing process.	<ul style="list-style-type: none"> <li>Choose line types.</li> <li>Utilizing line types.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Construction line</li> <li>Object line</li> <li>Center line</li> <li>Hidden line</li> <li>Dimension line</li> <li>Extension line</li> </ul>	Critical
<ul style="list-style-type: none"> <li>Annotation</li> </ul>	<b>IED-2.2:</b> Select appropriate annotation to appropriately document features within drawings.	<ul style="list-style-type: none"> <li>Produce appropriate hand written annotations as well as in CAD.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Sketch</li> <li>Shape</li> <li>Proportion</li> <li>Freehand</li> </ul>	Important
<ul style="list-style-type: none"> <li>Annotation (tolerances)</li> </ul>	<b>IED-2.3:</b> Recognize and explain the various tolerances and their purpose.	<ul style="list-style-type: none"> <li>Recognize the different types of tolerances.</li> <li>Apply different types of tolerances to different products.</li> <li>Evaluate the purpose of a tolerance.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Tolerance</li> <li>Unilateral</li> <li>Bilateral</li> </ul>	Additional
<ul style="list-style-type: none"> <li>Measurement Tools</li> </ul>	<b>IED-2.4:</b> Verify sizes and shapes of objects utilizing differing measurement tools.	<ul style="list-style-type: none"> <li>Use a ruler.</li> <li>Use a dial caliper.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Ruler</li> <li>Dial Caliper</li> </ul>	Important
<ul style="list-style-type: none"> <li>Appropriate Views of Working Drawings</li> </ul>	<b>IED-2.5:</b> Identify appropriate views and be able to select which should be utilized in a given situation.	<ul style="list-style-type: none"> <li>State when to use normal views and specialty views when creating working drawings.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Section</li> <li>Auxiliary</li> <li>Detailed</li> <li>Broken</li> </ul>	Important

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<b>REVERSE ENGINEERING</b>					
<ul style="list-style-type: none"> <li>Analyses (visual, functional, structural)</li> </ul>	<b>IED-3.1:</b> Perform product analyses (visual, functional, and structural) on a product.	<ul style="list-style-type: none"> <li>Recognize and apply Elements and Principles of visual analysis.</li> <li>Critique a products function through non-destructive as well as destructive techniques.</li> <li>Analyze material to be used for the manufacturing of a product.</li> </ul>	<ul style="list-style-type: none"> <li>Disassembly chart</li> <li>Annotated notebook</li> <li>Physical testing results</li> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Elements <ul style="list-style-type: none"> <li>Line</li> <li>Color</li> <li>Texture</li> <li>Scale</li> </ul> </li> <li>Principles <ul style="list-style-type: none"> <li>Unity</li> <li>Rhythm</li> <li></li> </ul> </li> <li>Black box</li> </ul>	Important
<ul style="list-style-type: none"> <li>System or Product Improvement</li> <li>Design process</li> </ul>	<b>IED-3.2:</b> Differentiate between invention and innovation.	<ul style="list-style-type: none"> <li>Use the design process to design and develop an enhancement to a product or develop a new product.</li> </ul>	<ul style="list-style-type: none"> <li>Create an enhancement on an existing product</li> <li>Create a new product</li> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Innovate</li> <li>Invention</li> <li>Create</li> <li>Research</li> </ul>	Important
<ul style="list-style-type: none"> <li>System or Product Improvement</li> <li>Reverse Engineering</li> </ul>	<b>IED-3.3:</b> Distinguish the relationship between reverse engineering and the next step of product/system improvement.	<ul style="list-style-type: none"> <li>Understand and implement the reverse engineering process to improve a product.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Aesthetic</li> <li>Principles</li> <li>Elements</li> <li>Graphic design</li> <li>Pictograph</li> <li>Reverse Engineering</li> </ul>	Important

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<b>REVERSE ENGINEERING</b>					
<ul style="list-style-type: none"> <li>System or Product Improvement</li> </ul>	<b>IED-3.4:</b> Use information from product analyses to create an innovation to a system or product.	<ul style="list-style-type: none"> <li>Through analysis of a product, determine what improvements need to be made.</li> <li>Reverse Engineer a new product utilizing the design process.</li> </ul>	<ul style="list-style-type: none"> <li>New/enhanced product creation</li> </ul>		Important
<b>PROJECT MANAGEMENT</b>					
<ul style="list-style-type: none"> <li>Intellectual property</li> </ul>	<b>IED-4.2:</b> Identify the requirements for and role of intellectual property in design.	<ul style="list-style-type: none"> <li>Understand and explain how the basic theories of ethics relate to engineering.</li> <li>Understand the role of the engineering notebook with regards to intellectual property</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Arbitration</li> <li>Attorney General</li> <li>Ethics</li> <li>Ethical</li> <li>Negotiation</li> </ul>	Important
<ul style="list-style-type: none"> <li>Engineering Notebook</li> </ul>	<b>IED-4.3:</b> Develop a working engineering notebook according to appropriate standards.	<ul style="list-style-type: none"> <li>Follow appropriate engineering notebook techniques to create entries.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Annotate</li> <li>Design Statement</li> <li>Invention</li> <li>Innovation</li> <li>Brainstorm</li> <li>Research</li> </ul>	Important
<ul style="list-style-type: none"> <li>Design Brief</li> </ul>	<b>IED-4.4:</b> Understand, develop, and implement design briefs in relation to a design problem.	Providing information to answer: <ul style="list-style-type: none"> <li>What purposes do the objects creation serve?</li> <li>What are the designers thinking?</li> <li>What problems do they address?</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>		Important

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<b>PROJECT MANAGEMENT</b>					
<ul style="list-style-type: none"> <li>Technical Reports</li> </ul>	<b>IED-4.5:</b> Understand the purpose of technical reports.	<ul style="list-style-type: none"> <li>Explain the purpose of a technical report</li> <li>Prepare a technical document</li> <li>Restate the parts of a technical document</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> <li>Create a technical report to turn in with the Final Design Challenge</li> </ul>	<ul style="list-style-type: none"> <li>Abstract</li> <li>Appendices</li> <li>Symbols</li> <li>Acronyms</li> </ul>	Important
<ul style="list-style-type: none"> <li>Teamwork</li> </ul>	<b>IED-4.6:</b> Collaborate on various projects by working in design teams.	<ul style="list-style-type: none"> <li>Understand how teams function</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> <li>Participate appropriately on a team</li> </ul>		Additional
<b>ENGINEERING DESIGN</b>					
<ul style="list-style-type: none"> <li>Design Principles</li> </ul>	<b>IED-5.1:</b> Recognize and explain the design principles.	<ul style="list-style-type: none"> <li>Understand and communicate the design principles through product design.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>		Important
<ul style="list-style-type: none"> <li>Design Elements</li> </ul>	<b>IED-5.2:</b> Recognize and explain the design elements.	<ul style="list-style-type: none"> <li>Understand and communicate the design elements through product design.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>		Important
<ul style="list-style-type: none"> <li>Design Effects on Society</li> </ul>	<b>IED-5.4:</b> Recognize historical and current events related to engineering design and their effects on society.	<ul style="list-style-type: none"> <li>Recognize historical and current events.</li> <li>Relate events to engineering design.</li> <li>Understand effects on society.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>		Important

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCAB	PRIORITY
<b>ENGINEERING DESIGN</b>					
<ul style="list-style-type: none"> <li>Roles of Engineering</li> <li>Impact of Engineered Products on Society</li> </ul>	<b>IED-5.6:</b> Recognize and identify the role of engineering and engineered products in society.	<ul style="list-style-type: none"> <li>Recognize role of engineers.</li> <li>Identify different roles of engineers.</li> <li>Understand how engineered products impacts society.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>		Important
<ul style="list-style-type: none"> <li>Good design applications</li> </ul>	<b>IED-5.7:</b> Identify the qualities of good design and their relationship to the design's user.	<ul style="list-style-type: none"> <li>Identify qualities of good design.</li> <li>Identify the relationship of design to the design's user.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>		Important
<ul style="list-style-type: none"> <li>Design Process Results from Constraints</li> </ul>	<b>IED-5.9:</b> Understand that these qualities are the result of choices made and constraints applied during the design process.	<ul style="list-style-type: none"> <li>Understand the relationship between ethics of engineering design and the designers role in the design process.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>		Additional
<b>MODELING</b>					
<ul style="list-style-type: none"> <li>Communication <ul style="list-style-type: none"> <li>Verbal</li> <li>Written</li> </ul> </li> </ul>	<b>IED-6.1:</b> Communicate conceptual ideas through written and verbal formats.	<ul style="list-style-type: none"> <li>Develop pictorial drawings.</li> <li>Develop orthographic drawings.</li> <li>Create and use a design brief.</li> <li>Understand and use skills needed to give a presentation.</li> <li>Understand and use skills needed to write a technical report.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Isometric</li> <li>Orthographic</li> <li>Multi-view</li> <li>Design brief</li> <li>Principles</li> <li>Elements</li> <li>Message analysis</li> <li>Reverse engineering</li> <li>typography</li> </ul>	Important

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCAB	PRIORITY
<b>AESTHETICS</b>					
<ul style="list-style-type: none"> <li>Relationship of Art to Design</li> </ul>	<p><b>IED-7.1:</b> Identify the knowledge and skills gained in art experiences that transfer to the design process.</p>	<ul style="list-style-type: none"> <li>Understand and develop dimension drawings.</li> <li>Know dimensioning guidelines.</li> <li>Use CAD software.</li> <li>Identify ANSI or ASME dimensioning standards.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Dimension</li> <li>Analysis</li> <li>Engineering organizations</li> <li>Tolerance</li> <li>Market research</li> <li>Survey</li> <li>Technical writing</li> </ul>	Important
<ul style="list-style-type: none"> <li>Symbols, Elements, &amp; Principles</li> </ul>	<p><b>IED-7.2:</b> Analyze the effective use of symbols, elements, principles, and media using appropriate terminology.</p>	<ul style="list-style-type: none"> <li>Know symbols, elements, and principles of design.</li> <li>Use media appropriately displaying symbols, elements, and principles of design.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>		Additional
<ul style="list-style-type: none"> <li>Subject Matter, Symbols, &amp; Ideas of a Consumer</li> </ul>	<p><b>IED-7.6:</b> Select subject matter, symbols, and ideas to communicate statements to the consumer.</p>	<ul style="list-style-type: none"> <li>Be able to communicate subject matter to a consumer.</li> </ul>	<ul style="list-style-type: none"> <li>Engineering Notebook</li> <li>Formative assessment</li> <li>Summative assessment</li> </ul>		Additional
<ul style="list-style-type: none"> <li>Philosophical Inquiry of Aesthetic Issues</li> </ul>	<p><b>IED-7.7:</b> Engage in philosophical inquiry into the nature of aesthetic issues, independently or with others.</p>	<ul style="list-style-type: none"> <li>Identify the steps to philosophical inquiry.</li> <li>Perform philosophical inquiry of aesthetic issues.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>		Additional

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCAB	PRIORITY
<b>AESTHETICS</b>					
<ul style="list-style-type: none"> <li>Revision and Refinement</li> </ul>	<p><b>IED-7.10:</b> Demonstrate thoughtful revision and refinement of original design solutions based upon reflection, critique, practice, and research</p>	<ul style="list-style-type: none"> <li>Demonstrate thoughtful revision and refinement of original design solutions based upon reflection, critique, practice, and research.</li> </ul>	<ul style="list-style-type: none"> <li>Reverse Engineering</li> <li>Formative assessment</li> <li>Summative assessment</li> </ul>		Additional
<ul style="list-style-type: none"> <li>Establishing Criteria in Portfolio Level Work</li> </ul>	<p><b>IED-7.11:</b> Examine and establish criteria for judging excellence in work and revise and refine work through analysis, synthesis, peer critique, and self--evaluation, utilizing established criteria for the purpose of creating portfolio level work.</p>	<ul style="list-style-type: none"> <li>Examine and establish criteria for judging excellence in work and revise and refine work.</li> <li>Create a collection of works in a portfolio.</li> </ul>	<ul style="list-style-type: none"> <li>Final Design Challenge</li> <li>Formative assessment</li> <li>Summative assessment</li> </ul>		Additional
<ul style="list-style-type: none"> <li>Evaluation of Effectiveness for Personal Work</li> </ul>	<p><b>IED-7.12:</b> Evaluate the effectiveness of elements and principles in other design solutions and use this evaluation to inform personal work.</p>	<ul style="list-style-type: none"> <li>Evaluate the effectiveness of elements and principles in other design solutions.</li> <li>Review personal work to understand the application of elements and principles.</li> </ul>	<ul style="list-style-type: none"> <li>Final Design Challenge</li> <li>Formative assessment</li> <li>Summative assessment</li> </ul>		Additional

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCAB	PRIORITY
<b>DESIGN PROCESS</b>					
<ul style="list-style-type: none"> <li>General Design Process</li> </ul>	<p><b>IED-1.2:</b> Identify and describe the steps in the design process.</p>	<ul style="list-style-type: none"> <li>Perform the steps of the design process:                             <ul style="list-style-type: none"> <li>Define problem</li> <li>Generate concepts</li> <li>Develop a solution</li> <li>Construct and test prototype</li> <li>Evaluate solution</li> <li>Present solution</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> <li>McGyvering review</li> <li>Practical quiz with a product</li> </ul>	<ul style="list-style-type: none"> <li>Concepts</li> <li>Solution</li> <li>Brainstorm</li> <li>Criteria</li> <li>Model</li> <li>Prototype</li> <li>Evaluate</li> </ul>	Critical
<ul style="list-style-type: none"> <li>Application of the Design Process</li> </ul>	<p><b>IED-1.4:</b> Apply and adapt the design loop as a guide in creating a solution.</p>	<ul style="list-style-type: none"> <li>Perform the steps of the design process for multiple products.</li> <li>Show outcomes developed through the use of the design process.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Design process</li> <li>Iteration</li> </ul>	Critical
<ul style="list-style-type: none"> <li>Process Outcomes</li> </ul>	<p><b>IED-1.5:</b> Discuss the importance of the design process and how the process affects the outcome.</p>	<ul style="list-style-type: none"> <li>Able to discuss importance.</li> <li>Apply process.</li> <li>Understand outcomes.</li> <li>Develop products.</li> <li>Analyze products.</li> <li>Develop systems.</li> <li>Analyze systems.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Proposal</li> <li>Refine</li> <li>Result</li> <li>Communicate</li> </ul>	Important



CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCAB	PRIORITY
<b>DRAWINGS STANDARDS</b>					
<ul style="list-style-type: none"> <li>Line Types</li> </ul>	<b>IED-2.1:</b> Choose when different line types should be utilized during the drawing process.	<ul style="list-style-type: none"> <li>Choose line types.</li> <li>Utilizing line types.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Construction line</li> <li>Object line</li> <li>Center line</li> <li>Hidden line</li> <li>Dimension line</li> <li>Extension line</li> </ul>	Critical
<ul style="list-style-type: none"> <li>Annotation</li> </ul>	<b>IED-2.2:</b> Select appropriate annotation to appropriately document features within drawings.	<ul style="list-style-type: none"> <li>Produce appropriate hand written annotations as well as in CAD.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Sketch</li> <li>Shape</li> <li>Proportion</li> <li>Freehand</li> </ul>	Important
<ul style="list-style-type: none"> <li>Measurement Tools</li> <li>Understanding Size &amp; Shape</li> </ul>	<b>IED-2.4:</b> Verify sizes and shapes of objects utilizing differing measurement tools.	<ul style="list-style-type: none"> <li>Use a ruler.</li> <li>Use a dial caliper.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Ruler</li> <li>Dial Caliper</li> </ul>	Important
<ul style="list-style-type: none"> <li>Understanding Appropriate Views of Working Drawings</li> </ul>	<b>IED-2.5:</b> Identify appropriate views and be able to select which should be utilized in a given situation.	<ul style="list-style-type: none"> <li>State when to use normal views and specialty views when creating working drawings.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Section</li> <li>Auxiliary</li> <li>Detailed</li> <li>Broken</li> </ul>	Important
<ul style="list-style-type: none"> <li>Utilizing Geometry as part of design</li> </ul>	<b>IED-2.7:</b> Evaluate when geometric shapes can be utilized as a part of a design.	<ul style="list-style-type: none"> <li>Identify and define technical drawing representations including isometric, orthographic projection, oblique, and perspective views.</li> </ul>	<ul style="list-style-type: none"> <li>Puzzle cube parts sketches</li> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Angle</li> <li>Area</li> <li>Axis</li> <li>Center of Gravity</li> <li>Centroid</li> <li>Density</li> <li>Mass</li> <li>Volume</li> </ul>	Important

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCAB	PRIORITY
<b>DRAWINGS STANDARDS</b>					
<ul style="list-style-type: none"> <li>Calculate Geometry for use in Design</li> </ul>	<b>IED-2.8:</b> Determine how and where calculations can be made to quantify the size and locations of designs.	<ul style="list-style-type: none"> <li>Determine the minimum number and types of views necessary to fully detail a part.</li> <li>Choose and justify the choice for the best orthographic projection of an object to use as a front view on technical drawings.</li> </ul>	<ul style="list-style-type: none"> <li>Puzzle cube drawings</li> <li>Puzzle cube dimensions</li> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Angle</li> <li>Area</li> <li>Axis</li> <li>Center of Gravity</li> <li>Centroid</li> <li>Density</li> <li>Mass</li> <li>Volume</li> </ul>	Important
<b>PROJECT MANAGEMENT</b>					
<ul style="list-style-type: none"> <li>Creating an Engineering Notebook</li> </ul>	<b>IED-4.3:</b> Develop a working engineering notebook according to appropriate standards.	<ul style="list-style-type: none"> <li>Follow appropriate engineering notebook techniques to create entries.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Brainstorm</li> <li>Constraint</li> <li>Design</li> <li>Problem Identification</li> <li>Research</li> <li>Validity</li> </ul>	Important
<ul style="list-style-type: none"> <li>Design Brief</li> </ul>	<b>IED-4.4:</b> Understand, develop, and implement design briefs in relation to a design problem.	<p>Providing information to answer:</p> <ul style="list-style-type: none"> <li>What purposes do the objects creation serve?</li> <li>What are the designers thinking?</li> <li>What problems do they address?</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Client</li> <li>Company</li> <li>Consumer</li> <li>Problem Statement</li> <li>Design Statement</li> <li>Constraints</li> <li>Criteria</li> </ul>	Important
<ul style="list-style-type: none"> <li>Charts/Time Management</li> </ul>	<b>IED-4.7:</b> Develop a Gantt chart to manage the time and progress of a project.	<ul style="list-style-type: none"> <li>Generate documents such as charts to provide information and data to provide better productivity.</li> </ul>	<ul style="list-style-type: none"> <li>Charts and timelines</li> </ul>	<ul style="list-style-type: none"> <li>Chart</li> <li>Diagram</li> <li>Gantt</li> <li>Histogram</li> <li>Timeline</li> </ul>	Additional

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCAB	PRIORITY
<b>PROJECT MANAGEMENT</b>					
<ul style="list-style-type: none"> <li>Managing a Portfolio</li> </ul>	<b>IED-4.8:</b> Develop a portfolio to organize and display evidence of work.	Produce a collective work that demonstrates: <ul style="list-style-type: none"> <li>Growth in skill.</li> <li>Competencies.</li> <li>Project development.</li> </ul>	<ul style="list-style-type: none"> <li>Portfolio</li> </ul>		Critical
<b>ENGINEERING DESIGN</b>					
<ul style="list-style-type: none"> <li>Ethics in Engineering Design</li> </ul>	<b>IED-5.3:</b> Justify the importance of ethics in engineering design.	<ul style="list-style-type: none"> <li>Understand how choices in design effect safety.</li> <li>Determine how to design sustainability in products.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>	<ul style="list-style-type: none"> <li>Ethical</li> <li>Mediation</li> <li>Negotiation</li> <li>Protocol</li> </ul>	
<ul style="list-style-type: none"> <li>Design Quality</li> </ul>	<b>IED-5.8:</b> Examine a design with respect to its quality and usability.	<ul style="list-style-type: none"> <li>Identify qualities of good design.</li> <li>Identify the relationship of design to the designers use.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> </ul>		Important
<b>MODELING</b>					
<ul style="list-style-type: none"> <li>Materials of Prototype Creation</li> </ul>	<b>IED-6.2:</b> Select the appropriate modeling materials to complete a 3-dimensional prototype or mock-up.	<ul style="list-style-type: none"> <li>Identify appropriate material for product.</li> <li>Understand and apply appropriate joinery.</li> <li>Know how to develop a model to be 3D printed.</li> <li>Utilize finite element analysis to determine appropriate material choice based on strength.</li> </ul>	<ul style="list-style-type: none"> <li>Formative assessment</li> <li>Summative assessment</li> <li>Create a prototype or mock-up</li> </ul>	<ul style="list-style-type: none"> <li>Scale</li> <li>Proportion</li> <li>Parametric Modeling</li> </ul>	Important
<ul style="list-style-type: none"> <li>Prototype Creation</li> </ul>	<b>IED-6.3:</b> Evaluate a sketch and generate a model using appropriate modeling materials.	<ul style="list-style-type: none"> <li>Know how to read a drawing and build a prototype or mock-up.</li> </ul>	<ul style="list-style-type: none"> <li>Create a model or mock-up</li> </ul>	<ul style="list-style-type: none"> <li>Hand-Made</li> <li>Prototype</li> <li>Final Product</li> <li>Rapid Prototyping</li> </ul>	Important

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCAB	PRIORITY
<b>MODELING</b>					
<ul style="list-style-type: none"> <li>• Prototype Constraints</li> </ul>	<b>IED-6.4:</b> Recognize and explain constraints in regard to modeling.	<ul style="list-style-type: none"> <li>• Explain restrictions based upon functional and structural analysis.</li> </ul>	<ul style="list-style-type: none"> <li>• Create a model or mock-up</li> </ul>		Additional
<b>AESTHETICS</b>					
<ul style="list-style-type: none"> <li>• New Products</li> </ul>	<b>IED-7.3:</b> Construct insightful, convincing interpretations of products or systems by identifying problematic features, forming theories, and evaluating alternative theories.	<ul style="list-style-type: none"> <li>• Design and construct a new product based upon artistic fundamentals.</li> </ul>	<ul style="list-style-type: none"> <li>• New product design (engineering notebook)</li> <li>• New product creation (prototype)</li> </ul>	<ul style="list-style-type: none"> <li>• writing</li> </ul>	Important
<ul style="list-style-type: none"> <li>• Review of Work</li> </ul>	<b>IED-7.4:</b> Engage in critical reading, writing, and discourse to improve understanding of own work and that of others.	<ul style="list-style-type: none"> <li>• Review articles to develop deeper understanding.</li> <li>• Individualized research on topics of their own interest to enhance their product development.</li> </ul>	<ul style="list-style-type: none"> <li>• Article Critiques</li> <li>• Design Brief</li> </ul>		Additional
<ul style="list-style-type: none"> <li>• Presentation of Work</li> </ul>	<b>IED-7.5:</b> Demonstrate skill in perception from real life to present convincing representation of objects or subject matter.	<ul style="list-style-type: none"> <li>• Applying real life artistic fundamentals to solve visual problems.</li> <li>• Communicate ideas for a product or a system graphically and orally.</li> </ul>	<ul style="list-style-type: none"> <li>• Brochure</li> <li>• Presentation</li> <li>• Technical document</li> <li>• Poster</li> </ul>		Additional
<ul style="list-style-type: none"> <li>• Subject Matter</li> </ul>	<b>IED-7.8:</b> Make informed choices about specific subject matter or concepts and defend those choices when given a range of objects or spaces.	<ul style="list-style-type: none"> <li>• Understand subject matter through visual, functional, and structural analysis.</li> <li>• Understand the life cycle of subject matter.</li> </ul>	<ul style="list-style-type: none"> <li>• Develop final design</li> </ul>		Important

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCAB	PRIORITY
<b>AESTHETICS</b>					
<ul style="list-style-type: none"> <li>Symbols and Metaphors</li> </ul>	<b>IED-7.9:</b> Appropriate symbols and metaphors from art and design and describe their origin, function, and value in the solutions.	<ul style="list-style-type: none"> <li>Be able to extend understanding of artistic fundamentals to subject matter.</li> </ul>	<ul style="list-style-type: none"> <li>Reverse engineering project</li> <li>Final design project</li> </ul>		Additional
<ul style="list-style-type: none"> <li>Competent, Effective, Solutions</li> </ul>	<b>IED-7.13:</b> Create multiple solutions in works that demonstrate competence in producing effective relationships between elements, media, and function.	<ul style="list-style-type: none"> <li>Know and understand how to implement design elements into products for beauty and function.</li> <li>Demonstrate the relationship of form and function through unity in design.</li> </ul>	<ul style="list-style-type: none"> <li>Reverse engineering project</li> <li>Final design project</li> </ul>		Important
<ul style="list-style-type: none"> <li>Design Solution with Elements and Principles</li> </ul>	<b>IED-7.14:</b> Create design solutions that use specific elements, principles, and functions to solve problems and communicate ideas.	<ul style="list-style-type: none"> <li>Determine how to implement design elements and principles as well as overall function to a subject matter.</li> </ul>	<ul style="list-style-type: none"> <li>Reverse engineering project</li> <li>Final design project</li> </ul>		Important
<ul style="list-style-type: none"> <li>Design Solution with Media</li> </ul>	<b>IED-7.15:</b> Create design solutions that demonstrate skill and understanding of different media, processes and communicate ideas.	<ul style="list-style-type: none"> <li>Develop solutions to a product design that demonstrates skill and understanding of different media, processes and communicate ideas.</li> </ul>	<ul style="list-style-type: none"> <li>Reverse engineering project</li> <li>Final design project</li> </ul>		Additional
<ul style="list-style-type: none"> <li>Challenging Visual Problems</li> </ul>	<b>IED-7.16:</b> Begin, define, and solve challenging visual problems, demonstrating skill and in-depth understanding of media and processes.	<ul style="list-style-type: none"> <li>Understand, define, and create solutions to problems, demonstrating skill and in-depth understanding of media and processes.</li> </ul>	<ul style="list-style-type: none"> <li>Reverse engineering project</li> <li>Final design project</li> </ul>		Additional