ESCONDIDO UNION HIGH SCHOOL DISTRICT

Wood Innovation & Design

Approved by the Board of Education on August 2, 2022
Mission and Vision

We relentlessly pursue, with optimism, equitable support for all students to navigate a changing world by providing rigorous and relevant learning experiences that strengthen their capacity as

- Open-minded and invested collaborators;
- Effective and thoughtful communicators;
- Resourceful and creative problem solvers;
- Curious and analytical critical thinkers;
- Informed and compassionate community members.

EUHSD curriculum identifies what students should know and be able to do by grade level in a comprehensive, standards-based course of study. Curriculum may be updated, as needed, based on student academic achievement data, research and best practices, and input from stakeholders. The EUHSD curriculum contains the following information:

- **Course Description** – provides a description of the overarching content and goals of the course and is used in the Course Catalog.
- **Course Information** – provides information specific to length of course, course number, transcript abbreviation, credits earned.
- **Course Requirements** – provides information specific to credits, prerequisites, UC/CSU requirements, and grade level of the course.
- **Course Material(s)** – Instructional materials used in course.
- **Scope and Sequence** – provides the standards-based units of instruction including the Learning Objective and Sample Performance Tasks and Assessments.

To ensure all courses empower every student, specifically emerging multilingual students, to graduate prepared for college, career, and life, all EUHSD courses will:

- Incorporate the English Language Development state standards adopted by the CA Department of Education in 2012. Visit the following website to learn more about the new descriptors and corresponding standards: [https://www.cde.ca.gov/sp/el/er/documents/eldstndspublication14.pdf](https://www.cde.ca.gov/sp/el/er/documents/eldstndspublication14.pdf)
- Highlight specific strategies designed to meet the needs of emerging multilingual students as outlined in the 2014 CA Department of Education ELA-ELD Framework and the 2017 CA EL Roadmap. Visit the following URL to learn more about the new Frameworks: [https://www.cde.ca.gov/ci/rl/cf/documents/elaeldfwchapter11.pdf](https://www.cde.ca.gov/ci/rl/cf/documents/elaeldfwchapter11.pdf). To learn more about the CA EL Roadmap, visit the following website: [https://www.cde.ca.gov/sp/el/rm/](https://www.cde.ca.gov/sp/el/rm/)

Escondido Union High School District prohibits discrimination, harassment, intimidation, and bullying based on actual or perceived ancestry, age, color, disability, gender, gender identity, gender expression, nationality, race or ethnicity, religion, sex, sexual orientation, pregnancy, marital or parental status or association with a person or group with one or more of these actual or perceived characteristics.

Dr. Courtney Goode, Assistant Superintendent of Human Resources, Equity and Title IX Compliance Officer
302 N. Midway Drive, Escondido, CA 92027
Office: (760) 291-3281, Email: cgoode@euhsd.org
Course Description
Wood Innovation & Design will introduce students to an innovative product design curriculum that is related to woodworking that includes a focus on design factors such as aesthetics, format, geometric shape and form, perspective drawing, scale, proportion, and presentation techniques. This course incorporates product innovation and design (S.T.E.A.M.) and offers a cross curriculum collaboration between Art & Design and Product Design & Woodworking Engineering. Students will use computers and shop machinery as a medium/tool for design of project components such as: designing, rendering, sketching, inventing, model making, CAD, 3D printing, 3D modeling, lasers, and woodworking. This course exposes students to tools, machines, safety training, and processes, and enables students to experience the process of translating an idea into a finished product. This is the first course in a pathway of courses designed to engage students and develop college and career readiness skills within the Building and Construction Trades Industry Sector.

Course Information
| Semester A: | Course Number: 6478 | Transcript Abbreviation: WOOD INV DSGN A (P) | Credits: 5 | Weighted: No |
| Semester B: | Course Number: 6479 | Transcript Abbreviation: WOOD INV DSGN B (P) | Credits: 5 | Weighted: No |

Course Requirements
| Length of Course: | Yearlong | Course Learning Environment: | Classroom Based | Type of Grade: | Letter Grade |
| Grade Level: | 9-12 | Course Repeatable: | No | Maximum Credits, if Repeatable: | N/A |
| Course Type: | College Prep | Designated College Prep/CTE: | Yes | CTE Course Level: | Concentrator |
| Meets EUHSD Graduation Requirement: | Fine Arts or Designated College Prep/CTE or Elective Credit | Pathway: | Residential and Commercial Construction |
| Meets UC/CSU Requirement: | F: Visual and Performing Arts | UC Honors Designation: | No |
| Required Prerequisite(s): | None | |
| Recommended Prerequisite(s): | None | |

Course Material(s)
- This course uses Open Educational Resources (OERs) in order to access current digital libraries that are pivoting rapidly to industry needs.

Standards
**Unit Outline**

<table>
<thead>
<tr>
<th>Standards</th>
<th>Learning Objectives</th>
<th>Essential Questions</th>
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<tbody>
<tr>
<td><strong>Common Core State Standards English Language Arts &amp; Literacy:</strong></td>
<td></td>
<td></td>
</tr>
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<td>● <strong>Reading Standard:</strong> Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. (CCSS.ELA-LITERACY.RST.9-10.1)</td>
<td>Students will...</td>
<td>1. What is the function of this product?</td>
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<td>● <strong>Reading Standard:</strong> Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. (CCSS.ELA-LITERACY.RLST.11-12.3)</td>
<td>● research products available in the desired market.</td>
<td>2. How can the product be improved upon?</td>
</tr>
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<td>● <strong>Reading Standard:</strong> Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics. (CCSS.ELA-LITERACY.RLST.11-12.4)</td>
<td>● design a prototype using drawings or design software.</td>
<td>3. Will this ideation of this product be cost effective to manufacture?</td>
</tr>
<tr>
<td>● <strong>Writing Standard:</strong> Use precise language, domain-specific vocabulary, and techniques such as metaphor, simile, and analogy to manage the complexity of the topic. (CCSS.ELA-LITERACY.W.11-12.2.D)</td>
<td>● compare and contrast prototype with current available designs.</td>
<td>4. How could this new product be marketed?</td>
</tr>
<tr>
<td>● <strong>Writing Standard:</strong> Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (CCSS.ELA-LITERACY.W.11-12.4)</td>
<td>● build a prototype using available materials, tools, and machinery.</td>
<td>5. Does this ideation of the product meet market and industry needs?</td>
</tr>
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<td>● <strong>Writing Standard:</strong> Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. (CCSS.ELA-LITERACY.W.11-12.6)</td>
<td>● receive feedback for potential design.</td>
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<td>● <strong>Writing Standard:</strong> Gather relevant information from multiple authoritative print and digital sources using advanced searches</td>
<td>Sample Performance Tasks/Assessments</td>
<td></td>
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<td>● Working individually, students will research this product design and create a project proposal that will include design concept, a drawn rendering of product, and manufacturing plan. Once the design is accepted, students will use necessary materials and various machines and tools to create a prototype. Prototypes will be presented verbally and visually to class for feedback on design.</td>
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effectively; assess the strengths and limitations of each source in terms of the task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation including footnotes and endnotes. CA CCSS.ELA-LITERACY.W.11-12.8)

Building and Construction Trades - Knowledge and Performance Anchor Standards:

- **4.0 Technology:** Use existing and emerging technology to investigate, research, and produce products and services, including new information, as required in the Building and Construction Trades sector workplace environment.
- **6.0 Health and Safety:** Demonstrate health and safety procedures, regulations, and personal health practices and determine the meaning of symbols, key terms, and domain-specific words and phrases as related to the Building and Construction Trades sector workplace environment.
- **10.0 Technical Knowledge and Skills:** Apply essential technical knowledge and skills common to all pathways in the Building and Construction Trades sector, following procedures when carrying out experiments or performing technical tasks.
- **11.0 Demonstration and Application:** Demonstrate and apply the knowledge and skills contained in the Building and Construction Trades anchor standards, pathway standards, and performance indicators in classroom, laboratory, and workplace settings, and through the career technical student organizations.

Residential and Commercial Construction Pathway Standards:

- **D2.0** Apply the appropriate mathematical calculations used in the construction trades.
- **D2.1** Apply formulas to determine area, volume, lineal, board, and square feet.
- **D2.2** Apply the Pythagorean Theorem to calculate pipe offsets, roof slope, and check for square.
- **D2.3** Estimate the materials needed to complete a specific task.
- **D3.0** Interpret and apply information from technical drawings, schedules, and specifications used in the construction trades.
• D3.1 Identify the elements used in technical drawings, including types of lines, symbols, details, and views.
• D3.2 Identify and interpret the elements of technical drawings, including plan, elevation, section, and detail views.
• D3.3 Interpret technical drawings specifications.
• D3.4 Identify plumbing, electrical, and mechanical symbols and other abbreviations used in construction drawings.
• D3.5 Interpret and scale dimensions from a set of plans using an architect’s scale.
• D3.6 Interpret sectional and detail drawings to determine construction details such as corners, rough openings, stairs, and roof systems.
• D3.7 Understand the sequencing and phases of residential and commercial construction projects.
• D9.0 Understand, integrate, and employ sustainable construction practices in the building trades.
• D9.1 Identify design and energy solutions for improving building energy efficiency.
• D9.2 Identify materials used in building construction to increase energy efficiency and sustainability.
• D9.3 Calculate energy requirements and loads for buildings and structures.
• D9.4 Demonstrate the application of constructing materials intended to improve building efficiency and sustainability.
• D9.5 Analyze and evaluate buildings for energy efficiency and performance.
• D9.6 Develop solutions to improve building energy performance and efficiency.

**California Arts Standards for Visual Arts:**

• Acc.VA:Cr1.1: Individually or collaboratively formulate new creative problems based on students’ existing artwork.
• Prof.VA:Cr1.1: Use multiple approaches to begin creative endeavors.
• Acc.VA:Cr2.1: Through experimentation, practice, and persistence, demonstrate acquisition of skills and knowledge in a chosen art form.
• Prof.VA:Cr3: Apply relevant criteria from traditional and contemporary cultural contexts to examine, reflect on, and plan revisions for works of art and design in progress.
## Unit Description

Students will design and build a fidget toy. Students start by researching books, online, and retail spaces to generate multiple product ideas on what kinds of fidget toys exist, how they work, what they are made of, and how they are made. They then refine their ideas using critical thinking and come up with one unique fidget toy to produce. Using computers or by hand, the students will draw, draft, and sketch their idea using accurate measurements, math, materials, and processes. Then, they will create a timeline for completion. Students then start to build a working fidget toy, considering manufacturability, cost, finishes, and using a variety of tools (3D printer, saws, drills, CNC, laser, vacuum form, etc.). When completed, students will present their finished “working” fidget toy to the class: including idea research, sketches, drawings, and finished product, and receive feedback. The focus of this unit is on identifying how the available materials, tools, and machinery can be leveraged to create an object that moves.

### Common Core State Standards English Language Arts & Literacy:

- **Reading Standard:** Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. ([CCSS.ELA-LITERACY.RST.9-10.1](#))
- **Reading Standard:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. ([CCSS.ELA-LITERACY.RLST.11-12.3](#))
- **Reading Standard:** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics. ([CCSS.ELA-LITERACY.RLST.11-12.4](#))
- **Writing Standard:** Use precise language, domain-specific vocabulary, and techniques such as metaphor, simile, and analogy to manage the complexity of the topic. ([CCSS.ELA-LITERACYW.11-12.2.D](#))
- **Writing Standard:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. ([CCSS.ELA-LITERACYW.11-12.4](#))
- **Writing Standard:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. ([CCSS.ELA-LITERACYW.11-12.6](#))
- **Writing Standard:** Gather relevant information from multiple authoritative print and digital sources using advanced searches effectively; assess the strengths and limitations of each source in terms

### Sample Performance Tasks/Assessments

- Working individually, students will research a product design and create a project proposal that will include design concept, a drawn rendering of product, and manufacturing plan. Once the design is accepted, students will use necessary materials and various machines and tools to create a prototype. Prototypes will be presented verbally and visually to class for feedback on design.
of the task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation including footnotes and endnotes. CA CCSS.ELA-LITERACY. W.11-12.8

Building and Construction Trades - Knowledge and Performance Anchor Standards:

- **4.0 Technology:** Use existing and emerging technology to investigate, research, and produce products and services, including new information, as required in the Building and Construction Trades sector workplace environment.
- **6.0 Health and Safety:** Demonstrate health and safety procedures, regulations, and personal health practices and determine the meaning of symbols, key terms, and domain-specific words and phrases as related to the Building and Construction Trades sector workplace environment.
- **10.0 Technical Knowledge and Skills:** Apply essential technical knowledge and skills common to all pathways in the Building and Construction Trades sector, following procedures when carrying out experiments or performing technical tasks.
- **11.0 Demonstration and Application:** Demonstrate and apply the knowledge and skills contained in the Building and Construction Trades anchor standards, pathway standards, and performance indicators in classroom, laboratory, and workplace settings, and through the career technical student organizations.

Residential and Commercial Construction Pathway Standards:

- **D2.0** Apply the appropriate mathematical calculations used in the construction trades.
- **D2.1** Apply formulas to determine area, volume, lineal, board, and square feet.
- **D2.2** Apply the Pythagorean Theorem to calculate pipe offsets, roof slope, and check for square.
- **D2.3** Estimate the materials needed to complete a specific task.
- **D3.0** Interpret and apply information from technical drawings, schedules, and specifications used in the construction trades.
- D3.1 Identify the elements used in technical drawings, including types of lines, symbols, details, and views.
- D3.2 Identify and interpret the elements of technical drawings, including plan, elevation, section, and detail views.
- D3.3 Interpret technical drawings specifications.
- D3.4 Identify plumbing, electrical, and mechanical symbols and other abbreviations used in construction drawings.
- D3.5 Interpret and scale dimensions from a set of plans using an architect’s scale.
- D3.6 Interpret sectional and detail drawings to determine construction details such as corners, rough openings, stairs, and roof systems.
- D3.7 Understand the sequencing and phases of residential and commercial construction projects.

**California Arts Standards for Media Arts:**

- Acc.MA:Re7: a. Analyze and explain the qualities of and relationships between the components, form and content, aesthetics, intentions and contexts of a variety of media artworks.
- Acc.MA:Re7: b. Analyze and explain how diverse media artworks manage audience experience and create intention and persuasion through multimodal perception.
- Prof.MA:Re8: Analyze the intent, meanings, and reception of a variety of media artworks, focusing on personal and cultural contexts.
- Acc.MA:Cn10: b. Explain and demonstrate the use of media artworks to synthesize new meaning and knowledge, in addition to reflecting and forming cultural experiences, such as new connections between themes and ideas, and personal influence.
- Acc.MA:Cn11: a. Examine in depth and demonstrate the relationships of media arts ideas and works to various contexts, purposes, and values, such as markets, systems, propaganda, and truth.
- Acc.MA:Cn11: b. Critically investigate and proactively interact with legal, technological, systemic, and vocational contexts of media arts, considering civic values, media literacy, digital identity, and artist/audience interactivity.
## Unit Description

Students will design and build/replicate a working child’s toy. Students start by researching books, online, and retail spaces to generate multiple product ideas on what kinds of toys exist, how they work, what they are made of, and how they are made. They then refine their ideas using critical thinking and come up with one unique toy to produce. Using computers or by hand, the students will draw, draft, and sketch their idea using accurate measurements, math, materials, and processes. Then, they will create a timeline for completion. Students then start to build a working toy, considering components, manufacturability, cost, and finishes, and using a variety of tools (lathe, 3D printer, saws, drills, CNC, laser, etc.). When completed, students will present their finished working toy to the class including idea research, sketches, drawings, finished product, and receive feedback. The focus of this unit is on identifying the needs of the end user and creating a prototype that supports them.

## Unit Outline

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<td>Students will...</td>
<td>1. What is the function of this product?</td>
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<td>● <strong>Reading Standard:</strong> Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. (<a href="#">CCSS.ELA-LITERACY.RLST.11-12.3</a>)</td>
<td>● design a prototype with an end user in mind, considering their needs.</td>
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<td>● <strong>Reading Standard:</strong> Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics. (<a href="#">CCSS.ELA-LITERACY.RLST.11-12.4</a>)</td>
<td>● build a prototype using available materials, tools, and machinery, with due consideration for the safety and needs of the user.</td>
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## Sample Performance Tasks/Assessments

- Working individually, students will research this product design and create a project proposal that will include design concept, a drawn rendering of product, and manufacturing plan. Empathy interviews will be used to assess user needs. Once the design is accepted, students will use necessary materials and various machines and tools to create a prototype. Prototypes will be presented verbally and visually to class for feedback on design.
selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation including footnotes and endnotes. CA CCSS.ELA-LITERACY. W.11-12.8)

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Residential and Commercial Construction Pathway Standards:
- D2.0 Apply the appropriate mathematical calculations used in the construction trades.
- D2.1 Apply formulas to determine area, volume, lineal, board, and square feet.
- D2.2 Apply the Pythagorean Theorem to calculate pipe offsets, roof slope, and check for square.
- D2.3 Estimate the materials needed to complete a specific task.
- D3.0 Interpret and apply information from technical drawings, schedules, and specifications used in the construction trades.
• D3.1 Identify the elements used in technical drawings, including types of lines, symbols, details, and views.
• D3.2 Identify and interpret the elements of technical drawings, including plan, elevation, section, and detail views.
• D3.3 Interpret technical drawings specifications.
• D3.4 Identify plumbing, electrical, and mechanical symbols and other abbreviations used in construction drawings.
• D3.5 Interpret and scale dimensions from a set of plans using an architect’s scale.
• D3.6 Interpret sectional and detail drawings to determine construction details such as corners, rough openings, stairs, and roof systems.
• D3.7 Understand the sequencing and phases of residential and commercial construction projects.
• D9.0 Understand, integrate, and employ sustainable construction practices in the building trades.
• D9.1 Identify design and energy solutions for improving building energy efficiency.
• D9.2 Identify materials used in building construction to increase energy efficiency and sustainability.
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• Prof.VA:Cr3: Apply relevant criteria from traditional and contemporary cultural contexts to examine, reflect on, and plan revisions for works of art and design in progress.
### Unit 4: Design & Build a Video Game Prop

**Unit Description**

Students will design and build a video game prop. Students start by researching books, online, and retail spaces to generate multiple product ideas on what kinds of video game props exist, how they work, what they are made of, and how they are made. They then refine their ideas using critical thinking and come up with one unique video game prop to produce. Using computers or by hand, the students will draw, draft, and sketch their idea using accurate measurements, math, materials, and processes. Then, they will create a timeline for completion. Students then start to build a video game prop, considering components, manufacturability, cost, and finishes, and using a variety of tools (lathe, 3D printer, saws, drills, CNC, laser, vacuum form, etc.). When completed, students will present their finished video game prop to the class including idea research, sketches, drawings, finished product, and receive feedback. The focus of this unit is on creative thinking and ideation surrounding how to generate a 3D object from a 2D rendering. *This unit is interchangeable with unit 5 dependent on lathe instruction.*

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<td>1. What are the differences between 2D and 3D product design and development?</td>
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<td><strong>Students will...</strong></td>
<td>2. How does this ideation of the product meet market and industry needs?</td>
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**Unit Outline**

**Sample Performance Tasks/Assessments**

- Working individually, students will research this product design and create a project proposal that will include design concept, a drawn rendering of product, and manufacturing plan. Once the design is accepted, students will use necessary materials and various machines and tools to create a prototype. Prototypes will be presented verbally and visually to class for feedback on design.
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Building and Construction Trades - Knowledge and Performance Anchor Standards:

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- **10.0 Technical Knowledge and Skills**: Apply essential technical knowledge and skills common to all pathways in the Building and Construction Trades sector, following procedures when carrying out experiments or performing technical tasks.
- **11.0 Demonstration and Application**: Demonstrate and apply the knowledge and skills contained in the Building and Construction Trades anchor standards, pathway standards, and performance indicators in classroom, laboratory, and workplace settings, and through the career technical student organizations.

Residential and Commercial Construction Pathway Standards:

- **D2.0** Apply the appropriate mathematical calculations used in the construction trades.
- **D2.1** Apply formulas to determine area, volume, lineal, board, and square feet.
- **D2.2** Apply the Pythagorean Theorem to calculate pipe offsets, roof slope, and check for square.
- **D2.3** Estimate the materials needed to complete a specific task.
- **D3.0** Interpret and apply information from technical drawings, schedules, and specifications used in the construction trades.
- D3.1 Identify the elements used in technical drawings, including types of lines, symbols, details, and views.
- D3.2 Identify and interpret the elements of technical drawings, including plan, elevation, section, and detail views.
- D3.3 Interpret technical drawings specifications.
- D3.4 Identify plumbing, electrical, and mechanical symbols and other abbreviations used in construction drawings.
- D3.5 Interpret and scale dimensions from a set of plans using an architect’s scale.
- D3.6 Interpret sectional and detail drawings to determine construction details such as corners, rough openings, stairs, and roof systems.
- D3.7 Understand the sequencing and phases of residential and commercial construction projects.
- D9.0 Understand, integrate, and employ sustainable construction practices in the building trades.
- D9.1 Identify design and energy solutions for improving building energy efficiency.
- D9.2 Identify materials used in building construction to increase energy efficiency and sustainability.
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- D9.5 Analyze and evaluate buildings for energy efficiency and performance.
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- Prof.VA:Cr1.1: Use multiple approaches to begin creative endeavors.
- Acc.VA:Cr2.1: Through experimentation, practice, and persistence, demonstrate acquisition of skills and knowledge in a chosen art form.
- Prof.VA:Cr3: Apply relevant criteria from traditional and contemporary cultural contexts to examine, reflect on, and plan revisions for works of art and design in progress.
Unit 5: Design & Build a Lightsaber on the Lathe

Unit Description
Students will design and build a lightsaber on the lathe. Students start by researching books, online, and retail spaces to generate multiple product ideas on what kinds of lightsabers exist, how they work, what they are made of, and how they are made. They then refine their ideas using critical thinking and come up with one unique lightsaber to produce. Using computers or by hand, the students will draw, draft, and sketch their idea using accurate measurements, math, materials, and processes. Then, they will create a timeline for completion. Students then start to build a lightsaber, considering electronics, lights, components, manufacturability, cost, and finishes, and using a variety of tools (lathe, 3D printer, saws, drills, CNC, laser, etc.). When completed, students will present their finished working lightsaber to the class including idea research, sketches, drawings, finished product, and receive feedback. The focus of this unit is on the intersection between previously studied ideas: movement, end user/market needs, creativity, and form. *This unit is interchangeable with unit 4 dependent on lathe instruction.*

<table>
<thead>
<tr>
<th>Common Core State Standards English Language Arts &amp; Literacy:</th>
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<tbody>
<tr>
<td>● <strong>Reading Standard:</strong> Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. (CCSS.ELA-LITERACY.RST.9-10.1)</td>
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<td>● <strong>Reading Standard:</strong> Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. (CCSS.ELA-LITERACY.RLST.11-12.3)</td>
</tr>
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<td>● <strong>Reading Standard:</strong> Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics. (CCSS.ELA-LITERACY.RLST.11-12.4)</td>
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<td>● <strong>Writing Standard:</strong> Use precise language, domain-specific vocabulary, and techniques such as metaphor, simile, and analogy to manage the complexity of the topic. (CCSS.ELA-LITERACY.W.11-12.2.D)</td>
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<td>● <strong>Writing Standard:</strong> Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (CCSS.ELA-LITERACY.W.11-12.4)</td>
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<td>● <strong>Writing Standard:</strong> Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. (CCSS.ELA-LITERACY.W.11-12.6)</td>
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<tr>
<th>Learning Objectives</th>
<th>Essential Questions</th>
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</thead>
<tbody>
<tr>
<td>Students will...</td>
<td>1. What different components go into building a lightsaber model?</td>
</tr>
<tr>
<td>● identify the various considerations that go into successfully building a lightsaber model.</td>
<td>2. How might a product like this one be marketed to end users?</td>
</tr>
<tr>
<td>● design and build a prototype using drawings or design software and available machinery and tools.</td>
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</tbody>
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<th>Sample Performance Tasks/Assessments</th>
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<td>● Working individually, students will research this product design and create a project proposal that will include design concept, a drawn rendering of product, and manufacturing plan. Once the design is accepted, students will use necessary materials and various machines and tools to create a prototype. Prototypes will be presented verbally and visually to class for feedback on design.</td>
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</table>
• **Writing Standard:** Gather relevant information from multiple authoritative print and digital sources using advanced searches effectively; assess the strengths and limitations of each source in terms of the task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation including footnotes and endnotes. (CCSS.ELA-LITERACY.W.11-12.8)

**Building and Construction Trades - Knowledge and Performance Anchor Standards:**

- 4.0 Technology: Use existing and emerging technology to investigate, research, and produce products and services, including new information, as required in the Building and Construction Trades sector workplace environment.
- 6.0 Health and Safety: Demonstrate health and safety procedures, regulations, and personal health practices and determine the meaning of symbols, key terms, and domain-specific words and phrases as related to the Building and Construction Trades sector workplace environment.
- 10.0 Technical Knowledge and Skills: Apply essential technical knowledge and skills common to all pathways in the Building and Construction Trades sector, following procedures when carrying out experiments or performing technical tasks.
- 11.0 Demonstration and Application: Demonstrate and apply the knowledge and skills contained in the Building and Construction Trades anchor standards, pathway standards, and performance indicators in classroom, laboratory, and workplace settings, and through the career technical student organizations.

**Residential and Commercial Construction Pathway Standards:**

- D2.0 Apply the appropriate mathematical calculations used in the construction trades.
- D2.1 Apply formulas to determine area, volume, lineal, board, and square feet.
- D2.2 Apply the Pythagorean Theorem to calculate pipe offsets, roof slope, and check for square.
- D2.3 Estimate the materials needed to complete a specific task.
- D3.0 Interpret and apply information from technical drawings, schedules, and specifications used in the construction trades.
• D3.1 Identify the elements used in technical drawings, including types of lines, symbols, details, and views.
• D3.2 Identify and interpret the elements of technical drawings, including plan, elevation, section, and detail views.
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**Unit 6: Design, Invent & Build a Product (Student Choice)**

**Unit Description**

Based on previous units of study and utilizing Stanford’s Design Thinking Model, students will problem solve and think critically to create alternative solutions to answer a question or solve a problem. They will understand and apply research methodologies to validate a need, problem, or opportunity for a new product, product line, system design, or service. Students understand and apply various ideation techniques to develop ideas and concepts. They will synthesize information and experiment with non-traditional possibilities for innovative design solutions. Leveraging the skills developed in the previous units of study, students will develop and build a project of their choice. Students start by researching books, online, and retail spaces to generate multiple product ideas on what kinds of products exist, how they work, what they are made of, and how they are made. They then refine their ideas using critical thinking and come up with one product to produce. Using computers or by hand, the students will draw, draft, and sketch their idea using accurate measurements, math, materials, and processes. Then, they will create a timeline for completion. Students then start to build a working product, considering components, manufacturability, cost, and finishes, and using a variety of tools (lathe, 3D printer, saws, drills, CNC, laser, etc.). When completed, students will present their finished working product to the class including idea research, sketches, drawings, finished product, and receive feedback.

**Unit Outline**

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<td>Students will...</td>
<td>1. What is the function of this product?</td>
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<td>● <strong>Reading Standard:</strong> Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. (CCSS.ELA-LITERACY.RST.9-10.1)</td>
<td>● research products available in the desired market.</td>
<td>2. How can the product be improved upon?</td>
</tr>
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<td>● <strong>Reading Standard:</strong> Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. (CCSS.ELA-LITERACY.RLST.11-12.3)</td>
<td>● design a prototype using drawings or design software.</td>
<td>3. Will this ideation of this product be cost effective to manufacture?</td>
</tr>
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<td>● <strong>Reading Standard:</strong> Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics. (CCSS.ELA-LITERACY.RLST.11-12.4)</td>
<td>● compare and contrast prototype with current available designs.</td>
<td>4. How could this new product be marketed?</td>
</tr>
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<td>● build a prototype using available materials, tools, and machinery.</td>
<td>5. Does this ideation of the product meet market and industry needs?</td>
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<td>● receive feedback for potential design.</td>
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