



Lasers and 3d Printers A

Eastmont School District

Official OSPI Course Title: Pre-Engineering Technologies

Total Framework Hours: 55

CIP Code: 140102

☒ **Exploratory** ☐ **Preparatory**

Date Last Modified: February 3, 2021

Career Cluster: STEM

Cluster Pathway: Engineering and Technology

☐ **High School Framework**

☒ **Middle School Framework**

Course Summary: Lasers and 3d Printers A - (.5 credit) This is a class for 7th and 8th Grade students. This course is designed for students who are considering engineering or trade fields. The class will cover 3d Modeling, orthographic projections, and isometric drawings. We have five 3D Printers and one Laser Engraver for producing prototypes of our ideas.

Eligible for Equivalent Credit in:

Total Number of Units: 6

Course Resources:

- OnShape - Primary Modeling and Drafting Program
- Clara.io - Utilized for Mesh modeling
- Google Slides - Assignment Organization
- Google Forms - Safety Quizzes
- Quizlet - Vocabulary Acquisition and Concept Review
- Web Searches - Brainstorm/Refinements/Career Exploration
- Rulergame.net - Measurement Practice

Unit	Unit Title	Learning Hours
1	Drafting Technical Skills	14
2	Multi-View or Orthographic Projections	12
3	Math and Measurements for Drafting	8
4	Understanding and Applying the Design Process	13
5	Employability, Teamwork, and Cooperation	5
6	Career Planning	3
	Total	55

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Unit 1: Drafting Technical Skills	Total Learning Hours for Unit: 14
Unit Summary: Students will utilize Onshape to develop understanding of drafting principles and techniques.	
Performance Assessments: Performance Tasks: ● Student's learn to use OnShape - Clara.io ● Tutorials - Students utilize constraints to construct drawings using geometric shapes and vocabulary. ● Keychain - Utilize sketching tools to create an extrude of design. ● Students will design and create a keychain, and laser cut box. ● Students creating working drawings with correct annotation by following isometric views for Z- Block, laser box, Parts A1, A2, A3 & A4. ● Students learn how to use geometric construction techniques using constraints. ● Students plan for the Z- Block, laser box, Parts A1, A2, A3 & A4, and personal projects by utilizing freehand sketches to represent their ideas and plans. ● Students do research utilizing drafting documents and research images to create project solutions. Assessment: Google Slide Expectations, Quizlet Test	
Leadership Alignment: Washington CTE 21st Century Skills 2.A Reason Effectively 2.A.1 Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation 2.B Use Systems Thinking 2.B.1 Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems 2.D Solve Problems 2.D.1 Solve different kinds of non-familiar problems in both conventional and innovative ways 3.A Communicate Clearly 3.A.1 Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts 4.B Use and Manage Information 4.B.4 Use information accurately and creatively for the issue or problem at hand 6.A Apply Technology Effectively 6.A.1 Use technology as a tool to research, organize, evaluate and communicate Information 7.A Adapt to Change 7.8.2 Deal positively with praise, setbacks and criticism 8.A Manage Goals and Time 8.A.3 Utilize time and manage workload efficiently Activity: Students will utilize different types of reasoning to determine dimension placement. it will analyze how parts of a whole interact when they develop their multi-view drawings. Students will utilize time and manage workload efficiently when completing their drafting tutorial assignments.	

Industry Standards and/or Competencies: Identify and use the various drafting media and techniques. Use technical skills to develop a working set of drawings. Use appropriate standards in the design process. Apply geometric construction techniques. Add correct annotation(s) to drawing Create freehand technical sketches Read technical drawings and documents to plan a project.	
Aligned Washington State Academic Standards	
Computer Science	
Computer Science Practices	
Educational Technology	(6-8)1.d. Students are able to navigate a variety of technologies and transfer their knowledge and skills to learn how to use new technologies. (6-8)3.d. Students explore real-world issues and problems and actively pursue an understanding of them and solutions for them. (6-8)4.a. Students engage in a design process and employ it to generate ideas, create innovative products or solve authentic problems. (6-8)4.c. Students engage in a design process to develop, test and revise prototypes, embracing the cyclical process of trial and error and understanding problems or setbacks as potential opportunities for improvement (6-8)5.a. Students practice defining problems to solve by computing for data analysis, modeling or algorithmic thinking. (6-8)5.b. Students find or organize data and use technology to analyze and represent it to solve problems and make decisions (6-8)6.a. Students select appropriate platforms and tools to create, share and communicate their work effectively (6-8)6.b. Students create original works or responsibly repurpose other digital resources into new creative works (6-8)6.c. Students communicate complex ideas clearly using various digital tools to convey the concepts textually, visually, graphically, etc.
English Language Arts: Common Core	
Financial Education	
Mathematics: Common Core	7.NS.3. Solve real-world and mathematical problems involving the four operations with rational numbers. 7.EE.3. Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies 7.G.1. Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. 7.G.2. Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions.

	8.G.2. Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them. 8.G.4. Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two dimensional figures, describe a sequence that exhibits the similarity between them.
Mathematical Practices	
Media Arts	
Next Gen Science Standards	
Visual Arts	

Unit 2: Multi-View or Orthographic Projections	Total Learning Hours for Unit: 12
Unit Summary: Students will develop drawings as they learn the basics and rationale for how orthographic and isometric drawings are laid out according to standards.	
Performance Assessments: Performance Tasks: - Students will create freehand sketches for Z- Block, laser box, parts A1, A2, A3 & A4, and design projects. - Students will define the scale of their drawing for print on parts A1, A2, A3 & A4. - Students will create and annotate drawings with horizontal & vertical surfaces, circles, and arcs on parts Z- Block, laser box, A1, A2, A3 & A4, and design projects. - Students will identify, create, and place appropriate orthographic views for Parts A1, A2, A3 & A4, and design projects. - Students will identify, create, and place appropriate auxiliary views for parts A1, A2, A3 & A4, and design projects. - Students will identify, create, and place appropriate section views for part A3 & A4. Assessment: Google Slide Expectations, Orthographic Projections Worksheet	
Leadership Alignment: Washington CTE 21st Century Skills 1.A Think Creatively 1.A.3 Elaborate, refine, analyze and evaluate their own ideas in order to improve and maximize creative efforts 1.B Work Creatively with Others 1.B.1 Develop, implement and communicate new ideas to others effectively 2.B Use Systems Thinking 2.B.1 Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems 2.D Solve Problems 2.D.1 Solve different kinds of non-familiar problems in both conventional and innovative ways	

Activity: Students will elaborate, refine, analyze, and evaluate their design ideas through developing orthographic projections. Students will utilize orthographic projections to develop, implement and communicate new ideas to others effectively during group projects. Students will utilize their drawings to solve different kinds of non familiar problems.	
Industry Standards and/or Competencies: Prepare multi-view or orthographic freehand sketches. Select proper drawing scale, views and layout. Prepare drawings containing horizontal and vertical surfaces. Prepare drawings containing circles and/or arcs. Identify, create, and place appropriate orthographic views Identify, create and place appropriate auxiliary views Identify, create, and place appropriate section views	
Aligned Washington State Academic Standards	
Computer Science	
Computer Science Practices	
Educational Technology	(6-8)1.c. Students actively seek performance feedback from people, including teachers, and from functionalities embedded in digital tools to improve their learning process, and they select technology to demonstrate their learning in a variety of ways. (6-8)1.d. Students are able to navigate a variety of technologies and transfer their knowledge and skills to learn how to use new technologies (6-8)3.d. Students explore real-world issues and problems and actively pursue an understanding of them and solutions for them. (6-8)5.a. Students practice defining problems to solve by computing for data analysis, modeling or algorithmic thinking. (6-8)6.a. Students select appropriate platforms and tools to create, share and communicate their work effectively (6-8)6.b. Students create original works or responsibly repurpose other digital resources into new creative works (6-8)6.c. Students communicate complex ideas clearly using various digital tools to convey the concepts textually, visually, graphically, etc.
English Language Arts: Common Core	
Financial Education	
Mathematics: Common Core	7.G.1. Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. 7.G.2. Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. 8.G.2. Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them. 8.G.4. Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two dimensional figures, describe a sequence that exhibits the similarity between them.

Mathematical Practices	
Media Arts	
Next Gen Science Standards	
Visual Arts	(VA:Cr1.1.8) a. Document early stages of the creative process visually and/or verbally in traditional or new media. (VA:Cr3.1.8) a. Apply relevant criteria to examine, reflect on, and plan revisions for a work of art or design in progress. (VA:Cr1.1.I) a. Use multiple approaches to begin creative endeavors. (VA:Cn10.1.I) a. Document the process of developing ideas from early stages to fully elaborated ideas.

Unit 3: Math and Measurements for Drafting	Total Learning Hours for Unit: 8
Unit Summary: Students will utilize math concepts and procedures to develop their drawings. They will also calculate the cost of materials for projects that they produce based on weight and surface area to develop their understanding of unit conversion.	
Performance Assessments: Performance Tasks: - Students will use brainstorm and refinement drawings to accurately design a box they will need to laser cut and assemble. - Students will demonstrate basic math principles by determining the overall scale of their Keychain. - Students will solve problems using formulas to calculate distances and sizes automatically without the use of calculator or paper. - Students will Perform addition, subtraction, division and multiplication of whole numbers, fractions, decimals, metric and percentages when creating personal projects or finding unknown sizes on parts A3, & A4. - Students will identify different measurement tools and applications on Z- Block, laser box, Parts A1, A2, A3 & A4. - Students will measure parts using a fractional scale, and metric scale on Parts A1, A2, A3 & A4. - Students will develop drawings utilizing measurements when creating working drawings of Parts A1, A2, A3 & A4 - Students will solve problems using algebra to calculate material costs on all 3D printed objects. - Students will solve problems using geometry to create working drawings and sketches - Students will solve problems using trigonometry to create 3d models, working drawings, and sketches.	
Assessment: Google Slide Expectations, Standard Ruler Quizlet, Standard Ruler Game	
Leadership Alignment: Washington CTE 21st Century Skills 2.B Use Systems Thinking 2.B.1 Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems 2.D Solve Problems 2.D.2 Identify and ask significant questions that clarify various points of view and lead to better solutions 3.A Communicate Clearly 3.A.1 Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts	

Activity: **Students will identify and ask significant questions** when converting units to determine cost for projects. **Students will articulate thoughts and ideas through nonverbal communication skills in a variety of forms** when they are showing their design ideas to other students and the teacher

Industry Standards and/or Competencies:

- Demonstrate basic math principles
- Solve problems using formulas
- Perform addition, subtraction, division and multiplication of whole numbers, fractions, decimals, metric and percentages.
- Identify different measurement tools and applications.
- Measure parts using a fractional scale, and metric scale
- Develop drawings utilizing measurements.
- Solve problems using algebra
- Solve problems using geometry
- Solve problems using trigonometry

Aligned Washington State Academic Standards

Computer Science	
Computer Science Practices	
Educational Technology	(6-8)3.d. Students explore real-world issues and problems and actively pursue an understanding of them and solutions for them. (6-8)5.a. Students practice defining problems to solve by computing for data analysis, modeling or algorithmic thinking. (6-8)5.b. Students find or organize data and use technology to analyze and represent it to solve problems and make decisions (6-8)6.a. Students select appropriate platforms and tools to create, share and communicate their work effectively
English Language Arts: Common Core	
Financial Education	
Mathematics: Common Core	7.NS.1.D. Apply properties of operations as strategies to add and subtract rational numbers. 7.NS.2.A. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. 7.NS.2.C. Apply properties of operations as strategies to multiply and divide rational numbers. 7.NS.3. Solve real-world and mathematical problems involving the four operations with rational numbers. 7.EE.2. Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, $a + 0.05a = 1.05a$ means that “increase by 5%” is the same as “multiply by 1.05.” 7.EE.3. Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies

	7.G.1. Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. 7.G.2. Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. 8.G.2. Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them. 8.G.4. Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two dimensional figures, describe a sequence that exhibits the similarity between them.
Mathematical Practices	
Media Arts	
Next Gen Science Standards	
Visual Arts	

Unit 4: Understanding and Applying the Design Process	Total Learning Hours for Unit: 13
Unit Summary: Students will have the opportunity to develop their own designs within parameters. They will be given an objective with requirements expectations and limitations. They will utilize the design process by brainstorming ideas, further refining the idea by creating a 3D model, producing a prototype, and reviewing their final design.	
Performance Assessments: Performance Tasks: - Students will establish design principles used to evaluate existing designs, to collect data, and to guide the design process; Design principles are often rules of thumb rather than absolutes by designing their own keychain, laser box, personal projects. - Students will display that the design process is influenced by personal characteristics, such as creativity, teamwork, resourcefulness, and the ability to visualize and think abstractly by brainstorm, and reporting on their designs for the 3d puzzle, keychain, and personal projects. - Students will create a prototype as a working model used to test a design concept by making actual observations and necessary adjustments when designing their personal project. Any parts that require assembly, need to have smaller scale prototypes made to determine tolerance. - Students will display their knowledge that the design process takes into account a number of factors, including safety, reliability, economic considerations, manufacturability, maintenance and repairs, and human factors engineering; the design process can't be complete without a prototype or virtual model by creating a 3d puzzle, nameplate, and personal project. All of which require a post project report. - Students will identify the design problem to solve and decide whether or not to address it; differentiate between problems and solutions by reading a design brief for all and coming up with a solution for the 3d puzzle, nameplate, and personal project. - Students will identify criteria and constraints and determine how these will affect the design process when designing their projects. Each design brief has size constraints and varying requirements which are defined for them as part of the objective. - Students will refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of the final product. They will create prototypes as a means for redesign. They will refine their solutions and then be able to create working drawings for their projects. - Students will evaluate the design solution using conceptual, physical and mathematical models at various intervals of the design process in order to check for proper design and to note where areas of improvements are needed on their personal projects.	

- Students will develop and produce a product or system using a design process for the keychain, 3d puzzle, and personal project.
- Students will evaluate final solutions and communicate observations, processes, and results of the entire design process, using verbal, graphic, quantitative, virtual, and written means, in addition to three-dimensional models by creating presentations for their personal projects.

Assessment: Google Slide Expectations

Leadership Alignment:

Washington CTE 21st Century Skills

1.A Think Creatively

- 1. A.1 Use a wide range of idea creation techniques (such as brainstorming).
- 1.A.2 Create new and worthwhile ideas (both incremental and radical concepts)
- 1.A.3 Elaborate, refine, analyze and evaluate their own ideas in order to improve and maximize creative efforts1.8.1 Develop, implement and communicate new ideas to others effectively

1.B Work Creatively with Others

- 1.B.3 Demonstrate originality and inventiveness in work and understand the real world limits to adopting new ideas
- 1.B.4 View failure as an opportunity to learn; understand that creativity and innovation is a long-term

2.B Use Systems Thinking

- 2.B.1 Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems

2.D Solve Problems

- 2.D.1 Solve different kinds of non-familiar problems in both conventional and innovative ways
- 2.D.2 Identify and ask significant questions that clarify various points of view and lead to better solutions

3.A Communicate Clearly

- 3.A.1 Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts
- 3.A.3 Use communication for a range of purposes (e.g. to inform, instruct, motivate and persuade)

3.B Collaborate with Others

- 3.B.1 Demonstrate ability to work effectively and respectfully with diverse teams
- 3.B.2 Exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal
- 3.B.3 Assume shared responsibility for collaborative work, and value the individual contributions made by each team member

4.A Access and Evaluate Information

- 4.A.1 Access information efficiently (time) and effectively (sources)

Activity: **Students will use a wide range of idea creation techniques and create new and work while ideas** when they brainstorm for their design projects. When given a design prompt **they will work collaboratively with others and use systems thinking to solve problems.** Through their group workday will demonstrate **the ability to work effectively and respectfully.**

Industry Standards and/or Competencies:

Established design principles are used to evaluate existing designs, to collect data, and to guide the design process; Design principles are often rules of thumb rather than absolutes.

The design process is influenced by personal characteristics, such as creativity, teamwork, resourcefulness, and the ability to visualize and think abstractly.

A prototype is a working model used to test a design concept by making actual observations and necessary adjustments.

The design process takes into account a number of factors, including safety, reliability, economic considerations, manufacturability, maintenance and repairs, and human factors engineering; the design process can't be complete without a prototype or virtual model.

Identify the design problem to solve and decide whether or not to address it; differentiate between problems and solutions.

Identify criteria and constraints and determine how these will affect the design process.

Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of the final product.

Evaluate the design solution using conceptual, physical and mathematical models at various intervals of the design process in order to check for proper design and to note where areas of improvements are needed.

Develop and produce a product or system using a design process.

Evaluate final solutions and communicate observations, processes, and results of the entire design process, using verbal, graphic, quantitative, virtual, and written means, in addition to three-dimensional models.

Aligned Washington State Academic Standards	
Computer Science	2-AP-15 Seek and incorporate feedback from team members and users to refine a solution that meets user needs. (P. 2.3, P. 1.1)
Computer Science Practices	
Educational Technology	(6-8)1.b. Students identify and develop online networks within school policy, and customize their learning environments in ways that support their learning, in collaboration with an educator. (6-8)1.c. Students actively seek performance feedback from people, including teachers, and from functionalities embedded in digital tools to improve their learning process, and they select technology to demonstrate their learning in a variety of ways. (6-8)1.d. Students are able to navigate a variety of technologies and transfer their knowledge and skills to learn how to use new technologies (6-8)3.a. Students demonstrate and practice the ability to effectively utilize research strategies to locate appropriate digital resources in support of their learning. (6-8)3.c. Students locate and collect resources from a variety of sources and organize assets into collections for a wide range of projects and purposes. (6-8)3.d. Students explore real-world issues and problems and actively pursue an understanding of them and solutions for them. (6-8)4.a. Students engage in a design process and employ it to generate ideas, create innovative products or solve authentic problems. (6-8)4.c. Students engage in a design process to develop, test and revise prototypes, embracing the cyclical process of trial and error and understanding problems or setbacks as potential opportunities for improvement (6-8)4.d. Students demonstrate an ability to persevere and handle greater ambiguity as they work to solve open-ended problems. (6-8)5.a. Students practice defining problems to solve by computing for data analysis, modeling or algorithmic thinking. (6-8)5.b. Students find or organize data and use technology to analyze and represent it to solve problems and make decisions (6-8)6.a. Students select appropriate platforms and tools to create, share and communicate their work effectively

	(6-8)6.b. Students create original works or responsibly repurpose other digital resources into new creative works (6-8)6.c. Students communicate complex ideas clearly using various digital tools to convey the concepts textually, visually, graphically, etc.
English Language Arts: Common Core	
Financial Education	
Mathematics: Common Core	7.G.1. Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. 7.G.2. Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. 8.G.2. Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them. 8.G.4. Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two dimensional figures, describe a sequence that exhibits the similarity between them.
Mathematical Practices	
Media Arts	
Next Gen Science Standards	MS-PS3-5. Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object. MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. MS-ETS1-4. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.
Visual Arts	(VA:Cr1.1.8) a. Document early stages of the creative process visually and/or verbally in traditional or new media. (VA:Cr2.1.8) a. Demonstrate willingness to experiment, innovate, and take risks to pursue ideas, forms, and meanings that emerge in the process of art-making or designing. (VA:Cr3.1.8) a. Apply relevant criteria to examine, reflect on, and plan revisions for a work of art or design in progress. (VA:Cr1.1.I) a. Use multiple approaches to begin creative endeavors. (VA:Cn10.1.I) a. Document the process of developing ideas from early stages to fully elaborated ideas.

Unit 5: Employability and Teamwork	Total Learning Hours for Unit: 5
Unit Summary: Students will work together to develop projects that need to meet objectives. They will demonstrate understanding of the professional work habit expectations through daily work.	

Performance Assessments:

Performance Tasks:

- Work in groups on laser cut box.
- Assist fellow students on the design of projects and working through tutorial assignments.

Assessment: Google Slides grading rubric - professional work habits

Leadership Alignment:

Washington CTE 21st Century Skills

1.B Work Creatively with Others

1.B.2 Be open and responsive to new and diverse perspectives; incorporate group input and feedback into the work

9.A Interact Effectively with Others

9.A.1 Know when it is appropriate to listen and when to speak

9.A.2 Conduct themselves in a respectable, professional manner

9.B Work Effectively in Diverse Teams

9.B.2 Respond open-mindedly to different ideas and values

11.B Be Responsible to Others

11.B.1 Act responsibly with the interests of the larger community in mind.

Activity: Students will **interact effectively and work creatively with others, be flexible, and adapt to change** while working on the laser cut box. Students will **work effectively in diverse teams and be responsible to others** while constructing their individual projects by working in table groups.

Industry Standards and/or Competencies:

Standard: Safety

- Learn and use safety rules and practices.
- Demonstrate proper techniques for use in operation of basic equipment
- Demonstrate correct use/operation of tools and equipment

Standard WR 2: Personal Success

WR-2.1 Implement effective study skills for academic success;

WR-2.3 Use interpersonal skills to facilitate effective teamwork;

WR-2.5 Use effective time-management and goal-setting strategies;

WR-2.6 Effectively use information and communication technology tools; and

WR-2.7 Identify skills that can be transferable among a variety of careers.

Standard WR 3: Employability and Entrepreneurship

WR-3.1 Demonstrate effective verbal, nonverbal, written, and electronic communication skills;

WR-3.3 Model characteristics of effective leadership, teamwork, and conflict management;

WR-3.6 Complete activities using project- and time-management techniques.

WR-3.8 Demonstrate dependability, punctuality, and initiative;

WR-3.11 Exhibit productive work habits, ethical practices, and a positive attitude;

WR-3.12 Demonstrate the ability to work with the other employees to support the organization and complete assigned tasks;

WR-3.13 Demonstrate willingness to learn and further develop skills

WR-3.14 Describe the importance of having a positive attitude and techniques that boost morale

WR-3.17 Explain the importance of taking pride in work accomplished and extrinsic and intrinsic motivators that can be used to increase pride

Standard WR 6: Teamwork and Cooperation

WR-6.1 Employ leadership skills to accomplish organizational goals and objectives.

WR-6.2 Establish and maintain effective working relationships with others in order to accomplish objectives and tasks.

WR-6.5 Cooperates rather than compete with team members

WR-6.7 Listens to and considers the ideas of team members.

WR-6.8 Supports group decision even if not in total agreement.

WR-6.10 Treat everybody with respect and understanding

Aligned Washington State Academic Standards	
Computer Science	2-AP-15 Seek and incorporate feedback from team members and users to refine a solution that meets user needs. (P. 2.3, P. 1.1)
Computer Science Practices	
Educational Technology	(6-8)1.c. Students actively seek performance feedback from people, including teachers, and from functionalities embedded in digital tools to improve their learning process, and they select technology to demonstrate their learning in a variety of ways.
English Language Arts: Common Core	
Financial Education	
Mathematics: Common Core	
Mathematical Practices	
Media Arts	
Next Gen Science Standards	MS-ETS1-2 Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. MS-ETS1-3 Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. MS-ETS1-4 Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.
Visual Arts	

Unit 6: Career Planning	Total Learning Hours for Unit: 3
Unit Summary: Students will utilize the Washington state provided website to research and discover positions that utilize drafting skills.	
Performance Assessments:	
Performance Tasks:	

- Students will explore the career clusters as defined by the U.S. Department of Education and summarize the career opportunities in a cluster of personal interest by creating a presentation.

Assessment: Google Slide for Drafting Positions

Leadership Alignment:

Washington CTE 21st Century Skills

3.A Communicate Clearly

3.A.1 Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts

3.A.3 Use communication for a range of purposes (e.g. to inform, instruct, motivate and persuade)

4.A Access and Evaluate Information

4.A.1 Access information efficiently (time) and effectively (sources)

4.A.2 Evaluate information critically and competently

6.A Apply Technology Effectively

6.A.1 Use technology as a tool to research, organize, evaluate and communicate Information

6.A.2 Use digital technologies (computers, PDAs, media players, GPS, etc.),communication/networking tools and social networks appropriately to access, manage, integrate, evaluate and create information to successfully function in a knowledge economy

Activity: Google Slide for Drafting Positions

Industry Standards and/or Competencies:

Explore the career clusters as defined by the U.S. Department of Education and summarize the career opportunities in a cluster of personal interest

Aligned Washington State Academic Standards

Computer Science

Computer Science Practices

Educational Technology

(6-8)1.c. Students actively seek performance feedback from people, including teachers, and from functionalities embedded in digital tools to improve their learning process, and they select technology to demonstrate their learning in a variety of ways.
 (6-8)3.d. Students explore real-world issues and problems and actively pursue an understanding of them and solutions for them.
 (6-8)5.b. Students find or organize data and use technology to analyze and represent it to solve problems and make decisions
 (6-8)6.a. Students select appropriate platforms and tools to create, share and communicate their work effectively
 (6-8)6.b. Students create original works or responsibly repurpose other digital resources into new creative works
 (6-8)6.c. Students communicate complex ideas clearly using various digital tools to convey the concepts textually, visually, graphically, etc.

English Language Arts: Common Core

Financial Education

8.EI.2. Match personal skills and interests to various career options.
 8.EI.3. Compare the costs of postsecondary education with the potential increase in income from a career of choice.

Mathematics: Common Core

Mathematical Practices	
Media Arts	
Next Gen Science Standards	
Visual Arts	

21st CENTURY SKILLS

LEARNING AND INNOVATION	INFORMATION, MEDIA AND TECHNOLOGY SKILLS	LIFE AND CAREER SKILLS
Creativity and Innovation ☒ Think Creatively ☒ Work Creatively with Others ☒ Implement Innovations Critical Thinking and Problem Solving ☒ Reason Effectively ☒ Use Systems Thinking ☒ Make Judgments and Decisions ☒ Solve Problems Communication and Collaboration ☒ Communicate Clearly ☒ Collaborate with Others	Information Literacy ☒ Access and Evaluate Information ☒ Use and Manage Information Media Literacy ☐ Analyze Media ☒ Create Media Products Information, Communications and Technology (ICT Literacy) ☒ Apply Technology Effectively	Flexibility and Adaptability ☐ Adapt to Change ☐ Be Flexible Initiative and Self-Direction ☒ Manage Goals and Time ☒ Work Independently ☒ Be Self-Directed Learners Social and Cross-Cultural ☐ Interact Effectively with Others ☐ Work Effectively in Diverse Teams Productivity and Accountability ☒ Manage Projects ☒ Produce Results Leadership and Responsibility ☐ Guide and Lead Others ☒ Be Responsible to Others