

| | |
|---|---|
| <p>Grade, Subject/Course: Creative Technology (9-12)</p> | |
| <p>Unit: Creative Mindset</p> | <p><u> X </u> Essential <u> </u> Important <u> </u> Compact</p> |
| <p>Big Idea: Design thinking and creativity is something that can be developed and cultivated.</p> | |
| <p>STEELS/Tech and Engineering Strand: 3.5.9-12.P - Apply a broad range of design skills to a design thinking process. 3.5.9-12.AA Safely apply an appropriate range of making skills to a design thinking process.</p> | <p>Pacing: .5 weeks</p> |
| <p>Essential Questions: UEQ: What does it mean to be creative? LEQ: How can we cultivate a creative mindset? LEQ: What is design thinking and how does it relate to the design process? LEQ: In what ways does creativity impact various fields and industries? LEQ: How can collaboration enhance creative outcomes? LEQ: What strategies can we use to overcome creative blocks?</p> | <p>Understandings: Students will know that...</p> <ul style="list-style-type: none"> ● Creativity involves generating new ideas, thinking outside of traditional boundaries, and finding innovative solutions to problems. ● A creative mindset can be cultivated through practices such as curiosity, openness to new experiences, and willingness to take risks and learn from failure. ● Design thinking is a problem-solving approach that emphasizes empathy, ideation, and iterative testing, forming an essential part of the design process. ● Creativity has a significant impact across various fields and industries by driving innovation, solving complex challenges, and enhancing value and appeal. ● Collaboration can enhance creative outcomes by combining diverse perspectives, skills, and ideas to generate more well-rounded solutions. ● Strategies to overcome creative blocks include setting aside time for rest, exploring new sources of inspiration, and breaking down problems into manageable steps. |
| <p>Knowledge: Design Thinking Design Process Adobe Illustrator</p> | <p>Do/Skills: Students will be able to...</p> <ul style="list-style-type: none"> ● Define creativity and explain its role in generating innovative ideas and solutions. ● Identify practices that cultivate a creative mindset, such as embracing curiosity, openness, and resilience. ● Describe the principles of design thinking and explain how it integrates with the design process. ● Analyze the impact of creativity across various fields and industries in driving innovation and solving complex challenges. ● Demonstrate how collaboration can enhance creativity by incorporating diverse perspectives and skills. ● Apply strategies to overcome creative blocks, including seeking inspiration, taking breaks, and simplifying complex problems. |

| | |
|---|---|
| | <ul style="list-style-type: none"> • Create a simple vector art project utilizing design thinking skills and Adobe Illustrator software. |
| <u>Vocabulary:</u> Creativity, Innovation, Brainstorming, Divergent thinking, Convergent thinking, Ideation, Prototype, Iteration | <u>Core Resources:</u> Schoolology LMS |
| <u>Common Assessment(s):</u> 1. Adobe Illustrator Experiment Activity 2. Wall Block Design Project | <u>Supplemental Resources:</u> Teacher created activities, tutorials and assignments |

| | |
|--|---|
| <u>Grade, Subject/Course:</u> Creative Technology (9-12) | |
| <u>Unit:</u> Graphics | <input checked="" type="checkbox"/> Essential <input type="checkbox"/> Important <input type="checkbox"/> Compact |
| <u>Big Idea:</u> There are rules regarding the proper use of technology. | |
| <u>STEELS/Tech and Engineering Strand:</u> 3.5.9-12.L Interpret laws, regulations, policies, and other factors that impact the development and use of technology. 3.5.9-12.P - Apply a broad range of design skills to a design thinking process. 3.5.9-12.AA Safely apply an appropriate range of making skills to a design thinking process. | <u>Pacing:</u> .5 weeks |
| <u>Essential Questions:</u> UEQ: What are the rules regarding proper use of communication technology? LEQ: What is copyright and how does it differ from fair use? LEQ: Why are you allowed to use any media from the internet in school projects, but not for projects that you would sell for profit? LEQ: What are two ways that you can add a unique style to text in graphic design software? LEQ: How do you get a vector from a website into your design? LEQ: What is a vector graphic? LEQ: What is a raster graphic? | <u>Understandings:</u> Students will know that... <ul style="list-style-type: none"> • Copyright is a legal protection for original works, and it differs from fair use, which allows limited use of copyrighted material under certain conditions without permission. • Media from the internet can be used for educational purposes in school projects under fair use, but using it for profit requires permission due to copyright laws. • Text in graphic design software can be uniquely styled by adjusting elements like font, color, size, and effects to create a personalized look. • Vector graphics from websites can be imported into design software through downloading, saving, and inserting them into the design workspace. • Vector graphics are images created with mathematical formulas, allowing them to scale without losing quality, making them ideal for design work. • Raster graphics are images composed of pixels, which can lose quality when scaled up, affecting clarity in design projects. |

| | |
|--|--|
| <p><u>Knowledge:</u> Copyright Fair Use Creative Commons Vector vs. Raster Adobe Illustrator</p> | <p><u>Do/Skills:</u> Students will be able to...</p> <ul style="list-style-type: none"> ● Explain the concept of copyright and distinguish it from fair use, identifying when each applies. ● Describe why media from the internet may be used in educational projects under fair use, but not for commercial purposes without permission. ● Demonstrate how to add unique styling to text in graphic design software using font, color, size, and effects. ● Import and incorporate vector graphics from websites into design software effectively. ● Define vector graphics and explain why they are suitable for scalable design work. ● Identify and describe raster graphics, explaining the impact of pixelation and quality loss when scaling. ● Create a simple vector art project utilizing Adobe Illustrator software. |
| <p><u>Vocabulary:</u> Copyright, Fair Use, Creative Commons, Vector, Raster</p> | <p><u>Core Resources:</u> Schoology LMS Adobe Illustrator</p> |
| <p><u>Common Assessment(s):</u> 1. Adobe Illustrator Review</p> | <p><u>Supplemental Resources:</u> Teacher created activities, tutorials and assignments</p> |

| | |
|---|---|
| <p><u>Grade, Subject/Course:</u> Creative Technology (9-12)</p> | |
| <p><u>Unit:</u> Creative Design - Visual Communication</p> | <p><u> X </u> Essential <u> </u> Important <u> </u> Compact</p> |
| <p><u>Big Idea:</u> There are universal principles and elements of design.</p> | |
| <p><u>STEELS/Tech and Engineering Strand:</u> 3.5.9-12.M Develop a device or system for the marketplace. 3.5.9-12.N Analyze and use relevant and appropriate design thinking processes to solve technological and engineering problems. 3.5.9-12.P - Apply a broad range of design skills to a design thinking process. 3.5.9-12.Q - Implement and critique principles, elements, and factors of design. 3.5.9-12.AA Safely apply an appropriate range of making skills to a design thinking process.</p> | <p><u>Pacing:</u> 1 weeks</p> |

| | |
|---|--|
| <p>Essential Questions:</p> <p>UEQ: What are the key principles of visual communication, and how do they enhance the effectiveness of a message?</p> <p>LEQ: How do color theory and typography influence the perception and interpretation of visual content?</p> <p>LEQ: In what ways can imagery and graphics be used to convey complex ideas or emotions more effectively than text alone?</p> <p>LEQ: What are the fundamental elements of design, and how do they interact to create effective visual compositions?</p> <p>LEQ: How does the use of line, shape, and form influence the overall aesthetics and functionality of a design?</p> <p>LEQ: How do balance, contrast, and unity affect the viewer's perception and interpretation of a design?</p> | <p>Understandings: Students will know that...</p> <ul style="list-style-type: none"> • The key principles of visual communication, such as clarity, hierarchy, and coherence, enhance the effectiveness of a message by ensuring it is easily understood and engaging. • Color theory and typography significantly influence the perception and interpretation of visual content by affecting mood, readability, and emotional response. • Imagery and graphics can convey complex ideas or emotions more effectively than text alone by providing visual context and stimulating audience engagement. • The fundamental elements of design, including line, shape, form, color, texture, and space, interact to create effective visual compositions that communicate intended messages. • The use of line, shape, and form influences the overall aesthetics and functionality of a design by guiding the viewer's eye and contributing to the design's overall impact. • Balance, contrast, and unity are essential design principles that affect the viewer's perception and interpretation of a design, contributing to its overall harmony and effectiveness. |
| <p>Knowledge:</p> <p>Layout and Composition Fundamentals of Design Adobe Illustrator</p> | <p>Do/Skills: Students will be able to...</p> <ul style="list-style-type: none"> • Analyze the key principles of visual communication and evaluate how they enhance the effectiveness of a message. • Examine the impact of color theory and typography on the perception and interpretation of visual content, including mood and emotional response. • Assess the effectiveness of imagery and graphics in conveying complex ideas or emotions compared to text alone. • Identify the fundamental elements of design and explain how they interact to create effective visual compositions. • Explore how the use of line, shape, and form influences the overall aesthetics and functionality of a design. • Evaluate the roles of balance, contrast, and unity in shaping the viewer's perception and interpretation of a design. • Utilize the principles of layout, composition and the fundamentals of design to create a graphic art project using Adobe Illustrator software. |

| | |
|---|--|
| <p><u>Vocabulary:</u> Line, shape, space, value, form, texture, color, balance, rhythm, pattern, emphasis, contrast, unity, movement</p> | <p><u>Core Resources:</u> Schoolology LMS Adobe Illustrator</p> |
| <p><u>Common Assessment(s):</u></p> <ol style="list-style-type: none"> 1. Adobe Illustrator Techniques 2. Graphic Design Project | <p><u>Supplemental Resources:</u> Teacher created activities, tutorials and assignments</p> |

| | |
|--|---|
| <p><u>Grade, Subject/Course:</u> Creative Technology (9-12)</p> | |
| <p><u>Unit:</u> Creative Design - Advertising and Promoting</p> | <p><input checked="" type="checkbox"/> Essential <input type="checkbox"/> Important <input type="checkbox"/> Compact</p> |
| <p><u>Big Idea:</u> Graphic design can be used in many different ways to advertise and promote goods, products and services.</p> | |
| <p><u>STEELS/Tech and Engineering Strand:</u> 3.5.9-12.H Evaluate ways that technology and engineering can impact individuals, society, and the environment. 3.5.9-12.M Develop a device or system for the marketplace. 3.5.9-12.N Analyze and use relevant and appropriate design thinking processes to solve technological and engineering problems. 3.5.9-12.O Apply appropriate design thinking processes to diagnose, adjust, and repair systems to ensure precise, safe, and proper functionality. 3.5.9-12.P Apply a broad range of design skills to a design thinking process. 3.5.9-12.Q Implement and critique principles, elements, and factors of design. 3.5.9-12.S Conduct research to inform intentional inventions and innovations that address specific needs and wants. 3.5.9-12.U Evaluate and define the purpose of a design. 3.5.9-12.W Optimize a design by addressing desired qualities within criteria and constraints while considering trade-offs. 3.5.9-12.X Implement the best possible solution to a design using an explicit process.</p> | <p><u>Pacing:</u> 4 weeks</p> |

3.5.9-12.AA Safely apply an appropriate range of making skills to a design thinking process.

Essential Questions:

UEQ: What makes an advertisement effective in capturing attention and interest?

LEQ: How do advertisers define and target specific audiences?

LEQ: What role does branding play in advertising and promotion?

LEQ: How do various advertising media (digital, print, social, etc.) impact the reach and effectiveness of a campaign?

LEQ: How have digital marketing trends and social media changed the landscape of advertising and promotion?

LEQ: What are the ethical considerations in advertising and how do they influence campaigns?

LEQ: How does storytelling contribute to persuasive advertising?

LEQ: What strategies do advertisers use to persuade or influence consumer behavior?

LEQ: What are the components of a successful advertising campaign?

LEQ: What is the role of visuals, color, and design in creating compelling advertisements?

LEQ: How does typography influence the tone, readability, and overall effectiveness of an advertisement?

LEQ: In what ways can font choice and text layout impact audience perception and brand identity in advertising?

Understandings: Students will know that...

- Effective advertisements capture attention and interest through engaging visuals, compelling messages, and a clear call to action.
- Advertisers define and target specific audiences by analyzing demographics, preferences, and behaviors to tailor their messages.
- Branding plays a crucial role in advertising and promotion by establishing a unique identity that resonates with consumers and differentiates products in the market.
- Various advertising media, including digital, print, and social platforms, impact the reach and effectiveness of a campaign by determining how and where messages are delivered.
- Digital marketing trends and social media have transformed advertising by enabling real-time engagement, targeted advertising, and user-generated content.
- Ethical considerations in advertising influence campaigns by guiding the responsible representation of products and services and fostering trust with consumers.
- Storytelling contributes to persuasive advertising by creating emotional connections and enhancing relatability to the audience.
- Advertisers use various strategies, such as appeals to emotion, logic, and social proof, to persuade or influence consumer behavior.
- The components of a successful advertising campaign include clear objectives, a defined target audience, strategic messaging, and effective media placement.
- Visuals, color, and design play a significant role in creating compelling advertisements by influencing audience attention and emotional response.
- Typography affects the tone, readability, and overall effectiveness of an advertisement by shaping how the message is perceived.
- Font choice and text layout can impact audience perception and brand identity by conveying personality and establishing a brand's visual language.

Knowledge:

Advertising
Promoting
Typography
Color
Adobe After Effects

Do/Skills: Students will be able to...

- Analyze the elements that make an advertisement effective in capturing attention and generating interest.
- Define and identify methods advertisers use to target specific audiences based on demographics and consumer behavior.
- Explain the role of branding in advertising and promotion, including its impact on consumer perception and loyalty.
- Evaluate how different advertising media (digital, print, social, etc.) affect the reach and effectiveness of an advertising campaign.
- Assess the influence of digital marketing trends and social media on contemporary advertising strategies and practices.
- Identify ethical considerations in advertising and explain how these considerations impact advertising campaigns and brand reputation.
- Describe how storytelling techniques enhance the persuasiveness of advertisements and connect with the audience.
- Discuss various strategies advertisers employ to persuade or influence consumer behavior and decision-making.
- Outline the key components of a successful advertising campaign, including objectives, target audience, and media selection.
- Analyze the role of visuals, color, and design in creating compelling advertisements and their effects on audience engagement.
- Examine how typography influences the tone, readability, and overall effectiveness of advertisements.
- Explore the impact of font choice and text layout on audience perception and brand identity in advertising.
- Utilize the appropriate tools and resources necessary to design and fabricate their own advertisement for a product or service.
- Utilize the appropriate tools and resources necessary to design and fabricate their own promotion for a product or service.

Vocabulary:

Script, storyboard, voiceover, animation, advertising, promotion, QR code, branding, identity, PNG, JPG, SVG, EPS, typography, color, serif, sans serif, script, easing, keyframing, demographic, target audience, clipping mask

Core Resources:

Schoology LMS
Adobe Illustrator
Adobe Photoshop
Adobe After Effects

| | |
|--|--|
| <p><u>Common Assessment(s):</u></p> <ol style="list-style-type: none"> 1. Business Promotion Project 2. Adobe After Effects Techniques 3. Adobe Illustrator Techniques 4. Advertising Project | <p><u>Supplemental Resources:</u></p> <p>Teacher created activities, tutorials and assignments Google Sites</p> |
|--|--|

| | |
|--|---|
| <p><u>Grade, Subject/Course:</u> Creative Technology (9-12)</p> | |
| <p><u>Unit:</u> Creative Design - Vinyl Sticker Design and Fabrication</p> | <p><input checked="" type="checkbox"/> Essential <input type="checkbox"/> Important <input type="checkbox"/> Compact</p> |
| <p><u>Big Idea:</u> Vinyl stickers can be used as a medium for self-expression, creativity, and communication.</p> | |
| <p><u>STEELS/Tech and Engineering Strand:</u> 3.5.9-12.M Develop a device or system for the marketplace. 3.5.9-12.N Analyze and use relevant and appropriate design thinking processes to solve technological and engineering problems. 3.5.9-12.O Apply appropriate design thinking processes to diagnose, adjust, and repair systems to ensure precise, safe, and proper functionality. 3.5.9-12.P - Apply a broad range of design skills to a design thinking process. 3.5.9-12.Q Implement and critique principles, elements, and factors of design. 3.5.9-12.U Evaluate and define the purpose of a design. 3.5.9-12.W Optimize a design by addressing desired qualities within criteria and constraints while considering trade-offs. 3.5.9-12.X Implement the best possible solution to a design using an explicit process. 3.5.9-12.Y (ETS) Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. 3.5.9-12.AA Safely apply an appropriate range of making skills to a design thinking process.</p> | <p><u>Pacing:</u> 1 weeks</p> |

Essential Questions:

UEQ: How can vinyl stickers be used as a medium for self-expression, creativity, and communication?
LEQ: What makes vinyl an effective material for creating durable stickers?
LEQ: How does the design process for vinyl stickers differ from other types of design projects?
LEQ: What software tools and techniques are commonly used to create vinyl sticker designs?
LEQ: How are vector graphics used in vinyl sticker production, and why are they preferred?
LEQ: What steps are involved in preparing a design for cutting on a vinyl cutter?
LEQ: How does the vinyl cutter work, and what settings are essential for precise cuts?
LEQ: What is the purpose of transfer tape, and how is it used to apply vinyl stickers?
LEQ: What are some effective methods for troubleshooting common issues in vinyl cutting and application?
LEQ: How can color, shape, and style impact the appeal and functionality of vinyl stickers?
LEQ: In what ways can vinyl stickers be used for personal expression, branding, or practical applications?

Understandings: Students will know that...

- Vinyl is a durable material suitable for stickers due to its weather resistance, flexibility, and adhesive qualities.
- The design process for vinyl stickers has unique considerations, such as durability, cut accuracy, and transferability, that may differ from other design projects.
- Specialized software tools and techniques, such as vector design programs, are commonly used to create vinyl sticker designs.
- Vector graphics are preferred in vinyl sticker production because they allow for scalable, precise, and smooth cuts.
- Preparing a design for vinyl cutting involves steps like setting paths, adjusting size, and confirming cut lines for accuracy.
- A vinyl cutter operates through precise blade movement, with settings like pressure and speed being essential for clean cuts.
- Transfer tape is used to transfer vinyl stickers from their backing to a surface, ensuring accurate placement and adhesion.
- Troubleshooting techniques, such as adjusting blade settings and checking material alignment, are effective in resolving common issues in vinyl cutting and application.
- Color, shape, and style significantly impact the visual appeal and functionality of vinyl stickers for different purposes.
- Vinyl stickers can serve as tools for personal expression, branding, and practical applications due to their versatility and durability.

Knowledge:

Vinyl Design and Cutting
Vinyl Post Processing

Do/Skills: Students will be able to...

- Explain why vinyl is an effective material for creating durable stickers.
- Describe the unique steps and considerations in the design process for vinyl stickers compared to other design projects.
- Identify software tools and techniques commonly used in creating vinyl sticker designs.
- Explain the importance of vector graphics in vinyl sticker production and why they are preferred.
- Outline the steps needed to prepare a design for cutting on a vinyl cutter.
- Describe how a vinyl cutter works and identify essential settings for achieving precise cuts.
- Explain the purpose of transfer tape and demonstrate its use in applying vinyl stickers accurately.
- Apply troubleshooting techniques to resolve common issues in vinyl cutting and sticker application.
- Analyze how color, shape, and style impact the appeal and functionality of vinyl stickers.
- Describe various applications for vinyl stickers, including personal expression, branding, and practical uses.
- Utilize the appropriate tools and resources necessary to design and fabricate their own vinyl sticker product.

Vocabulary:

Vinyl, Cutter, Plotter, Adhesive Vinyl, Weeding, Transfer Tape, Cut Path, Vector Graphic, Raster Graphic, Contour Cut, Registration Marks, Blade Depth, Pressure Setting, Speed Setting, Overcut, Print and Cut, Masking, Alignment, Offset.

Core Resources:

Schoology LMS
Adobe Illustrator
Vinyl Cutting machine

Common Assessment(s):

1. Adobe Illustrator Techniques
2. Vinyl Sticker Project

Supplemental Resources:

Teacher created activities, tutorials and assignments

| | |
|---|---|
| <p>Grade, Subject/Course: Creative Technology (9-12)</p> | |
| <p>Unit: Creative Design - Laser Fabrication</p> | <p><input checked="" type="checkbox"/> Essential <input type="checkbox"/> Important <input type="checkbox"/> Compact</p> |
| <p>Big Idea: Laser fabrication technology is a transformative tool in design and manufacturing.</p> | |
| <p>STEELS/Tech and Engineering Strand: 3.5.9-12.A Use various approaches to communicate processes and procedures for using, maintaining, and assessing technological products and systems. 3.5.9-12.M Develop a device or system for the marketplace. 3.5.9-12.N Analyze and use relevant and appropriate design thinking processes to solve technological and engineering problems. 3.5.9-12.O Apply appropriate design thinking processes to diagnose, adjust, and repair systems to ensure precise, safe, and proper functionality. 3.5.9-12.P - Apply a broad range of design skills to a design thinking process. 3.5.9-12.Q Implement and critique principles, elements, and factors of design. 3.5.9-12.S Conduct research to inform intentional inventions and innovations that address specific needs and wants. 3.5.9-12.U Evaluate and define the purpose of a design. 3.5.9-12.W Optimize a design by addressing desired qualities within criteria and constraints while considering trade-offs. 3.5.9-12.X Implement the best possible solution to a design using an explicit process. 3.5.9-12.Y (ETS) Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. 3.5.9-12.AA Safely apply an appropriate range of making skills to a design thinking process.</p> | <p>Pacing: 4 weeks</p> |
| <p>Essential Questions: UEQ: How can laser fabrication technology be used as a transformative tool in design and manufacturing? LEQ: Why is a design process useful to follow when designing and creating projects or products? LEQ: Why are the Engineering Design Process steps arranged around a circle rather than a linear path? LEQ: In what types of situations can the Engineering Design Process be applied? LEQ: How are problems and opportunities identified when analyzing real-world situations?</p> | <p>Understandings: Students will know that...</p> <ul style="list-style-type: none"> • Following a design process is essential for organizing, improving, and successfully completing projects or products. • The Engineering Design Process steps are arranged in a circular flow to support continuous improvement, feedback, and iterative development rather than a one-time sequence. • The Engineering Design Process can be applied across various situations where structured problem-solving is required, from technical challenges to creative projects. • Analyzing real-world situations involves identifying both problems and potential opportunities that can drive the design process. |

| | |
|--|---|
| <p>LEQ: What clarification and specifications are needed to frame a design brief?</p> <p>LEQ: How are research and investigations conducted to gather information for possible future reference in solving problems?</p> <p>LEQ: How are brainstorming and other techniques used to generate alternative solutions to problems?</p> <p>LEQ: How is the best solution to a problem chosen when evaluating several solutions on a design matrix?</p> <p>LEQ: From the laser engraving experiment, what types of designed content can the laser engrave into material?</p> <p>LEQ: What settings are needed to make a path that the laser will cut?</p> <p>LEQ: In relation to the Pen Tool, what are anchors, paths, and handles?</p> <p>LEQ: What are some of the properties of acrylic plastic sheet material?</p> <p>LEQ: Why do engineers use models or prototypes to test solutions to problems?</p> <p>LEQ: Why is it important for engineers to evaluate and analyze solutions to problems?</p> | <ul style="list-style-type: none"> ● Clarifying requirements and defining specifications are crucial steps to establish a clear design brief. ● Research and investigation are necessary steps in gathering accurate information that supports the problem-solving and design process. ● Brainstorming and other creative techniques are effective methods for generating multiple alternative solutions to a problem. ● Evaluating solutions with a design matrix helps in objectively selecting the best solution based on established criteria. ● Laser engraving can create various types of content on material, including text, images, and patterns, depending on design and settings. ● Specific settings are required for laser cutting, such as defining a path, speed, and power to achieve precise cuts. ● Anchors, paths, and handles are components that allow for precision and control in digital design. ● Acrylic plastic sheet material has unique properties, such as durability, transparency, and ease of cutting, making it versatile for design projects. ● Engineers use models or prototypes to test and refine solutions to problems before finalizing the design. |
| <p><u>Knowledge:</u></p> <p>Engineering</p> <p>Engineering Design Process</p> <p>Laser Engraving Techniques</p> <p>Laser Engraver Operation</p> | <p><u>Do/Skills:</u> Students will be able to...</p> <ul style="list-style-type: none"> ● Explain the importance of following a design process in developing effective projects or products. ● Describe why the Engineering Design Process is arranged in a circular flow rather than a linear sequence. ● Identify various situations where the Engineering Design Process can be applied to solve problems. ● Analyze real-world scenarios to identify both problems and opportunities for design. ● Define necessary clarifications and specifications to develop a clear design brief. ● Conduct research and investigations to gather relevant information for problem-solving. ● Apply brainstorming and other creative techniques to generate multiple solutions for a given problem. ● Evaluate and select the best solution to a problem using a design matrix. ● Identify different types of content that can be engraved on materials using a laser engraver. ● Set up specific laser settings for creating a path that will be cut accurately. ● Use the Pen Tool effectively by manipulating anchors, paths, and handles in digital design. ● Describe the properties of acrylic plastic sheets and how they impact design and production processes. ● Explain the purpose and benefits of using models or prototypes to test and refine design solutions. |

| | |
|---|--|
| | <ul style="list-style-type: none"> Utilize the appropriate tools and resources necessary to design and fabricate their own laser cut product. |
| <p><u>Vocabulary:</u> Engraving, cutting path, acrylic, fill, stroke, focus, lens, mirror, carriage, speed, power, frequency, resolution, DPI, line weight, anchors, paths, handles</p> | <p><u>Core Resources:</u> Schoology LMS Adobe Illustrator Laser cutting machine</p> |
| <p><u>Common Assessment(s):</u> Laser Fabrication Design Portfolio Laser Fabrication Research Activity Laser Engraver Operation Activity Adobe Illustrator Techniques Laser Fabrication Project</p> | <p><u>Supplemental Resources:</u> Teacher created activities, tutorials and assignments</p> |

| | |
|---|---|
| <p>Grade, Subject/Course: Creative Technology (9-12)</p> | |
| <p>Unit: Creative Design - 3D Modeling and Printing</p> | <p><u> X </u> Essential <u> </u> Important <u> </u> Compact</p> |
| <p>Big Idea: 3D printing transforms ideas into tangible objects while utilizing creativity, innovation, and problem-solving.</p> | |
| <p>STEELS/Tech and Engineering Strand: 3.5.9-12.M Develop a device or system for the marketplace. 3.5.9-12.N Analyze and use relevant and appropriate design thinking processes to solve technological and engineering problems. 3.5.9-12.O Apply appropriate design thinking processes to diagnose, adjust, and repair systems to ensure precise, safe, and proper functionality. 3.5.9-12.P - Apply a broad range of design skills to a design thinking process. 3.5.9-12.Q Implement and critique principles, elements, and factors of design. 3.5.9-12.S Conduct research to inform intentional inventions and innovations that address specific needs and wants. 3.5.9-12.U Evaluate and define the purpose of a design. 3.5.9-12.W Optimize a design by addressing desired qualities within criteria and constraints while considering trade-offs. 3.5.9-12.X Implement the best possible solution to a design using an explicit process. 3.5.9-12.Y (ETS) Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. 3.5.9-12.AA Safely apply an appropriate range of making skills to a design thinking process. 3.5.9-12.PP Demonstrate the use of conceptual, graphical, virtual, mathematical, and physical modeling to identify conflicting considerations before the entire system is developed and to aid in design decision making.</p> | <p>Pacing: 4 weeks</p> |
| <p>Essential Questions: UEQ: How does 3D printing transform design ideas into tangible objects while utilizing creativity, innovation, and problem-solving? LEQ: What is 3D printing, and how does it differ from traditional manufacturing methods? LEQ: What are the different types of 3D printing technologies (e.g., FDM, SLA, SLS), and how do they work? LEQ: What materials are commonly used in 3D printing, and what are their properties and applications?</p> | <p>Understandings: Students will know that...</p> <ul style="list-style-type: none"> • 3D printing is an additive manufacturing process that builds objects layer by layer, differentiating it from traditional subtractive manufacturing methods. • there are various types of 3D printing technologies, such as Fused Deposition Modeling (FDM), Stereolithography (SLA), and Selective Laser Sintering (SLS), each with unique processes and applications. • a range of materials, including plastics, metals, and ceramics, are used in 3D printing, each with specific properties that influence their suitability for different applications. |

| | |
|--|---|
| <p>LEQ: How can design software be used to create 3D models, and what are the key considerations in the design process?</p> <p>LEQ: What are the benefits and limitations of using 3D printing for prototyping and production?</p> <p>LEQ: How does the 3D printing process work from the digital model to the finished product?</p> <p>LEQ: What role does post-processing play in the 3D printing workflow, and what techniques are commonly used?</p> <p>LEQ: In what ways can 3D printing be applied creatively in fields such as art, fashion, and healthcare?</p> <p>LEQ: How can troubleshooting and problem-solving skills be applied to address common challenges encountered in 3D printing?</p> | <ul style="list-style-type: none"> ● design software is essential for creating 3D models and that key considerations in the design process include scalability, complexity, and material constraints. ● 3D printing offers benefits such as rapid prototyping and customization, while also having limitations, including build size restrictions and material strength. ● the 3D printing process involves several steps, including modeling, slicing, printing, and finishing, each critical to achieving the desired final product. ● post-processing plays a crucial role in enhancing the quality of 3D printed objects and that common techniques include sanding, painting, and curing. ● 3D printing can be applied creatively in various fields, such as art, fashion, and healthcare, enabling innovative designs and solutions. ● Troubleshooting and problem-solving skills are essential for addressing common challenges in 3D printing, such as print failures, misalignment, and material issues. |
| <p>Knowledge:</p> <p>Computer Aided Drafting and Design (CADD)</p> <p>3D Modeling and Design</p> <p>3D Printing Technology</p> <p>Engineering Design Process</p> | <p>Do/Skills: Students will be able to...</p> <ul style="list-style-type: none"> ● Define 3D printing and articulate how it differs from traditional manufacturing methods, including advantages and disadvantages of each approach. ● Identify and describe the different types of 3D printing technologies (FDM, SLA, SLS), including their mechanisms and typical applications. ● Analyze various materials used in 3D printing, explaining their properties, applications, and suitability for different printing methods. ● Demonstrate proficiency in design software to create 3D models, understanding key considerations in the design process such as dimensions, tolerances, and complexity. ● Evaluate the benefits and limitations of using 3D printing for prototyping and production, making informed decisions about when to use this technology. ● Explain the complete 3D printing process, from creating a digital model to producing the finished product, detailing each step involved. ● Describe the role of post-processing in 3D printing and identify common techniques used to enhance the final product, such as sanding, painting, and assembly. ● Explore and present examples of how 3D printing is applied creatively in fields such as art, fashion, and healthcare, identifying innovative solutions it offers. ● Apply troubleshooting and problem-solving skills to common challenges encountered in 3D printing, effectively diagnosing and resolving issues. ● Discuss the ethical and environmental implications of 3D printing technology, considering sustainability and the impact of material usage. ● Utilize the appropriate tools and resources necessary to design and fabricate their own 3D printed product. |
| <p>Vocabulary:</p> <p>CADD, Orthographic Projection, Isometric Projection, Stereolithography (STL), G-code, slicing, Polylactic Acid (PLA), Acrylonitrile Butadiene Styrene (ABS), coordinate positioning, infill, support material, raft, brim, shell, overhang, filament</p> | <p>Core Resources:</p> <p>CADD Software</p> <p>Slicing Software</p> <p>3D Printers</p> |

Common Assessment(s):

1. 3D Printing Portfolio
2. Orthographic Projection Activity 1
3. Orthographic Projection Activity 2
4. Orthographic Projection Activity 3
5. 3D Printing Project

Supplemental Resources:

Teacher created activities, tutorials and assignments

| | |
|---|--|
| Grade, Subject/Course: Creative Technology (9-12) | |
| Unit: Creative Design - Transfer Printing | <input checked="" type="checkbox"/> Essential <input type="checkbox"/> Important <input type="checkbox"/> Compact |
| Big Idea: Transfer printing allows for the transformation of designs into tangible products. | |
| STEELS/Tech and Engineering Strand: 3.5.9-12.M Develop a device or system for the marketplace. 3.5.9-12.N Analyze and use relevant and appropriate design thinking processes to solve technological and engineering problems. 3.5.9-12.O Apply appropriate design thinking processes to diagnose, adjust, and repair systems to ensure precise, safe, and proper functionality. 3.5.9-12.P - Apply a broad range of design skills to a design thinking process. 3.5.9-12.Q Implement and critique principles, elements, and factors of design. 3.5.9-12.S Conduct research to inform intentional inventions and innovations that address specific needs and wants. 3.5.9-12.U Evaluate and define the purpose of a design. 3.5.9-12.W Optimize a design by addressing desired qualities within criteria and constraints while considering trade-offs. 3.5.9-12.X Implement the best possible solution to a design using an explicit process. 3.5.9-12.Y (ETS) Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. 3.5.9-12.AA Safely apply an appropriate range of making skills to a design thinking process. | Pacing: 3 weeks |

Essential Questions:

UEQ: How does transfer printing allow for the transformation of designs into tangible products?

LEQ: What is dye sublimation, and how does it differ from other printing techniques?

LEQ: In what ways can dye sublimation be used creatively in art and design, and what innovative applications are emerging in the industry?

LEQ: What materials are best suited for dye sublimation, and why do they work effectively?

LEQ: How does the chemical process of dye sublimation transform solid dye into a gas, and what role does heat play in this process?

LEQ: What are the advantages and limitations of using dye sublimation for various applications?

LEQ: How can design choices (such as color, pattern, and scale) impact the outcome of a dye sublimation project?

LEQ: What techniques can be employed to ensure color accuracy and vibrancy in dye sublimation printing?

LEQ: What are some common troubleshooting strategies for issues that may arise during the dye sublimation process?

Understandings: Students will know that...

- Dye sublimation is a printing technique that uses heat to transfer dye onto materials, and they will understand how it differs from other methods like screen printing and digital printing.
- Dye sublimation can be used creatively in various art and design contexts, allowing for unique applications in textiles, promotional items, and customized products.
- Specific materials, such as polyester and certain polymers, are best suited for dye sublimation due to their ability to bond with the dye during the heat process.
- The chemical process of dye sublimation involves the transition of solid dye to gas without passing through a liquid state and that heat is essential for this transformation.
- Dye sublimation offers advantages such as vibrant colors and durability, but it also has limitations, including material restrictions and the need for specialized equipment.
- Design choices, including color, pattern, and scale, can significantly impact the outcome of a dye sublimation project, influencing aesthetics and material compatibility.
- There are specific techniques to ensure color accuracy and vibrancy in dye sublimation printing, such as proper calibration, color profiling, and using high-quality images.
- There are common troubleshooting strategies for issues that may arise during the dye sublimation process, including adjusting temperature settings, checking material compatibility, and ensuring proper alignment.

Knowledge:

Transfer Printing Methods
Dye Sublimation Techniques
Engineering Design Process

Do/Skills: Students will be able to...

- Define dye sublimation and explain how it differs from other printing techniques, such as screen printing and direct-to-garment printing.
- Identify and discuss innovative uses of dye sublimation in art and design, providing examples of contemporary applications in various industries.
- List the materials best suited for dye sublimation and explain the reasons for their effectiveness in the process.
- Describe the chemical process of dye sublimation, including the transformation of solid dye into gas and the critical role of heat in this process.
- Analyze the advantages and limitations of dye sublimation for various applications, articulating informed decisions based on project needs.
- Evaluate how design choices (such as color, pattern, and scale) impact the final outcome of dye sublimation projects and make strategic decisions in their own designs.
- Apply techniques for ensuring color accuracy and vibrancy in dye sublimation printing, including understanding color profiles and printing settings.
- Identify common issues that may arise during the dye sublimation process and implement troubleshooting strategies to resolve them effectively.
- Utilize the appropriate tools and resources necessary to design and fabricate their own dye sublimation product.

Vocabulary:

Screen printing, Dye Sublimation, Direct to Garment printing (DTG), heat transfer, polymers, synthetic vs organic, color management, color profiles, International Color Consortium (ICC), Cyan Magenta Yellow Key (CMYK), Red Green Blue (RGB)

Core Resources:

Adobe Illustrator
Dye Sublimation Printer
Heat Press

Common Assessment(s):

1. Transfer Printing Portfolio
2. Transfer Printing Techniques
3. Transfer Printing Project

Supplemental Resources:

Teacher created activities, tutorials and assignments