West Windsor-Plainsboro Regional School District

Unit 1: Intro to Computer Graphics	
Content Area: Technology	
Course & Grade Level: Computer Graphics 8th Grade	
Summary and Rationale	
● Students will understand the 90 day progression of the 8th grade computer graphics elective by way of general introduction to the course, computer lab procedures, and curriculum related software ● Students will understand the use of technology tools to broaden and reinforce learning, increase productivity, and foster creativity not only in computer graphics but across all content areas ● Students will engage in interpersonal activities to gain a sense of comfort and familiarity with all classroom members	
Recommended Pacing	
2 days	
New Jersey Student Learning Standards for Career Readiness, Life Literacies and Key Skills	
Standard: Standards for Career Readiness, Life Literacies and Key Skills	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.8.TL.3	Select appropriate tools to organize and present information digitally
ISTE (International Society for Technology in Education) Student Standards	
ISTE Standard: 1.7 Global Collaborator	
ISTE 1.7a	Students use digital tools to connect with learners from a variety of backgrounds and cultures, engaging with them in ways that broaden mutual understanding and learning.
Instructional Focus	
Unit Enduring Understandings	
● Building intrapersonal/interpersonal and collaborative skills ● Importance of relationships in getting to know your peers, teachers, and class expectations	
Unit Essential Questions	
● How do we independently communicate our interests, skills, and goals? ● Why is it important to understand and use technology tools appropriately?	
Objectives	
Students will know: ● Expectations of the class ● Basic introductory information about their classmates **Students will be able to:** ● Use technology to gather and communicate information in an effective, efficient, and appropriate manner ● Become collaborative and effective communicators ● Understand and implement classroom and school rules, procedures, and expectations	
Evidence of Learning	
Assessments	
● Students will introduce themselves using a digital product ● Students will sign a User Agreement (Computer Lab Rules & Procedures)	
Resources	
Google Slides	

Unit 2: Graphic Design	
Content Area: Technology	
Course & Grade Level: Computer Graphics 8th Grade	
Summary and Rationale	
● Students will understand how to effectively communicate information using digital media ● Students will be able to demonstrate creativity and innovation using graphic design concepts	
Recommended Pacing	
16 days	
ISTE (International Society for Technology in Education) Student Standards	
ISTE Standard: 1.1 Empowered Learner	
CPI #	**Cumulative Progress Indicator (CPI)**
ISTE 1.1.b	Students build networks and customize their learning environments in ways that support the learning process.
ISTE Standard: 1.4 Innovative Designer	
CPI #	**Cumulative Progress Indicator (CPI)**
ISTE 1.4.a	Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
ISTE 1.4.b	Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
ISTE 1.4.d	Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.
Standard: 1.6 Creative Communicator	
CPI #	**Cumulative Progress Indicator (CPI)**
ISTE 1.6.a	Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.
Standard: 1.7 Global Collaborator	
CPI #	**Cumulative Progress Indicator (CPI)**
ISTE 1.7.c	Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.
Instructional Focus	
Unit Enduring Understandings	
● Graphics Designers make intentional design choices using the Principles/Elements of Design to evoke a specific tone/message ● Color is often utilized to evoke a specific emotion(s)	
Unit Essential Questions	
● How can you make intentional design choices to evoke a specific tone/message? ● What makes a design resonate with viewers? ● How do graphic designers convey an underlying meaning in their work?	
Objectives	
Students will know: ● The Elements and Principles of Design and how they can be used in artwork ● The different feelings/emotions associated with each color **Students will be able to:** ● creatively depict a specific emotion design using color psychology	

- create a unique representation of one of the Principles of Design
- select a theme, related words, and make creative depictions of said typography
- create a literal depiction of a musical band using images (no words)
- design logos for themselves, classmates, schools clubs, and/or local businesses

Evidence of Learning

Assessment

Students will create designs which meets both the technical (Elements/Principles of Design) and emotional aspects (Tone, message, Desired Impact) of design

Resources

Software (Adobe Illustrator, Canva, Google Drawings)
The Principles of Design (Video)
The Psychology of Color (Video)
https://www.dafont.com
https://wordart.com

Unit 3: Photo Editing	
Content Area: Technology	
Course & Grade Level: Computer Graphics 8th Grade	
Summary and Rationale	
● Students will learn advanced photo editing techniques and concepts ● Students will use their photo editing skills to create forms of advertisement, marketing, and brand communication	
Recommended Pacing	
19 days	
ISTE (International Society for Technology in Education) Student Standards	
ISTE Standard: 1.3 Knowledge Constructor	
CPI #	**Cumulative Progress Indicator (CPI)**
ISTE 1.3.a	Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.
ISTE Standard: 1.6 Creative Communicator	
CPI #	**Cumulative Progress Indicator (CPI)**
ISTE 1.6.a	Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.
ISTE 1.6.b	Students create original works or responsibly repurpose or remix digital resources into new creations.
Instructional Focus	
Unit Enduring Understandings	
● Photo Editing is one of the highest forms of digital manipulation which allows the editor to make endless versions of the same image(s) ● Photo Editing has become increasingly accessible to people worldwide through social media and other photo editing applications	
Unit Essential Questions	
● How is Photo Editing used in the workplace? ● How can Photo Editing be used to positively impact the world? ● Is Photo Editing necessary? Why or Why not? ● How can you distinguish between a high quality and low quality photo edit?	
Objectives	
Students will know: ● how to recognize and reorganize layers ● how to adjust background and image brightness ● how to adjust hue saturation ● how to resize and rotate images ● how to apply layer masks ● how to use various brush tools ● how to use selection tools **Students will be able to:** ● Draw upon various photo editing skills/concepts to make a unique design ● Expand upon existing photo editing skills by integrating online tutorials into their projects	
Evidence of Learning	
Assessment	

● Students will utilize various photo editing skills to make unique photo edits on themselves or another person (Athlete/Celebrity)
Resources
Adobe Photoshop **Adobe Lightroom** **Remove.bg** **Make it Now with Photoshop (Adobe CC YouTube Playlist)**

Unit 4: Animation	
Content Area: Technology	
Course & Grade Level: Computer Graphics 8th Grade	
Summary and Rationale	
• Students will go through the process of creating an illusion of motion and shape change by means of rapid display of various types of pictures that were made to create a single scene. • Students will learn animation concepts and eventually transfer their thoughts, ideas, and concepts in various fields like marketing, advertising, and business.	
Recommended Pacing	
15 days	
New Jersey Student Learning Standards for Computer Science and Design Thinking	
Standard: Standards for Computing Systems	
CPI #	**Cumulative Progress Indicator (CPI)**
8.1.8.CS4	Systematically apply troubleshooting strategies to identify and resolve hardware and software problems in computing systems.
New Jersey Student Learning Standards for Career Readiness, Life Literacies, and Key Skills	
Standard: Creativity and Innovation	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.8.CI.4	Explore the role of creativity and innovation in career pathways and industries.
Standard: Global and Cultural Awareness	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.8.GCA.1	Model how to navigate cultural differences with sensitivity and respect (e.g., 1.5.8.C1a).
Standard: Information and Media Literacy	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.8.IML.3	Create a digital visualization that effectively communicates a data set using formatting techniques such as form, position, size, color, movement, and spatial grouping (e.g., 6.SP.B.4, 7.SP.B.8b).
9.4.8.IML.6	Identify subtle and overt messages based on the method of communication.
9.4.8.IML.12	Use relevant tools to produce, publish, and deliver information supported with evidence for an authentic audience.
9.4.8.IML.14	Analyze the role of media in delivering cultural, political, and other societal messages.
9.4.8.IML.15	Explain ways that individuals may experience the same media message differently.
Standard: Technology Literacy	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.8.TL.3	Select appropriate tools to organize and present information digitally.
New Jersey Student Learning Standards for English Language Arts Companion Standards	
Standard: Science & Technical Subjects	
CPI #	**Cumulative Progress Indicator (CPI)**
RST.6-8.3	**Key Ideas and Details:** Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
RST.6-8.7	**Integration of Knowledge and Ideas:** Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
Instructional Focus	

Unit Enduring Understandings

- Animation is defined as a series of images rapidly changing to create an illusion of movement.
- Animations have the ability to effectively elicit various emotions.

Unit Essential Questions

- What is animation?
- How can animation properties be manipulated and customized?
- How can you create engaging animated content?

Objectives

Students will know:

- Principles of animations are used for effective and easy communication
- Computer animation is a visual digital display that processes moving images on screen
- How to use tools in various software to create digital animations

Students will be able to:

- Create a basic computer animation
- Draw rectangles, ovals and other shapes
- Modify the shape, color, and size of drawn objects
- Understand fill and stroke settings
- Create and edit curves and variable-width strokes
- Apply gradients and transparencies
- Use the various tools for expressive drawing
- Create and edit text, and use web fonts
- Distribute objects on the stage
- Create and edit symbols
- Animate the position, scale, and rotation of objects using motion tweening
- Adjust pacing and timing of the animation
- Animate transparency and filters
- Change the path of an object's motion
- Create a nested animation
- Split a motion tween
- Change the easing of an object's motion
- Understand and manage keyframes in a timeline
- Animate in 3D space
- Explore different types of animation (motion tweens, classic tweens, frame by frame)

Evidence of Learning

Assessment

Using digital equipment and software students will convey messages by creating various animations.

Resources

FlipaClip
Pivot Animator
Adobe Animate
12 Principles of Animation (Short Video)
12 Principles of Animation (Long Video)
https://www.geeksforgeeks.org/principles-of-animation/
https://study.com/academy/lesson/computer-animation-definition-history-types.html
https://helpx.adobe.com/animate/using/animation-guide.html

Unit 5: 3D Modeling and Fabrication	
Content Area: Technology	
Course & Grade Level: Computer Graphics 8th Grade	
Summary and Rationale	
• 3D modeling is a digital approach to drawing, painting and sculpting. • 3D modeling facilitates 'design thinking' in that it supports the creative processes that go along with it • There is a growing need for trained professionals in the area of 3D printing • Students can express themselves creatively, enhance their digital education, and prepare them for the many opportunities that await them. • 3D modeling expression can move beyond simply creating pieces of art; it can provide solutions to real-world problems.	
Recommended Pacing	
20 days	
New Jersey Student Learning Standards for Computer Science and Design Thinking	
Standard: Standards for Computing Systems	
CPI #	**Cumulative Progress Indicator (CPI)**
8.1.8.CS4	Systematically apply troubleshooting strategies to identify and resolve hardware and software problems in computing systems.
Standard: Standards for Data & Analysis	
CPI #	**Cumulative Progress Indicator (CPI)**
8.1.8.DA.3	Identify the appropriate tool to access data based on its file format.
New Jersey Student Learning Standards for Career Readiness, Life Literacies and Key Skills	
Standard: Standards for Creativity and Innovation	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.8.CI.4	Explore the role of creativity and innovation in career pathways and industries.
Standard: Standards for Information and Media Literacy	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.8.IML.3	Create a digital visualization that effectively communicates a data set using formatting techniques such as form, position, size, color, movement, and spatial grouping (e.g., 6.SP.B.4, 7.SP.B.8b).
9.4.8.IML.4	Ask insightful questions to organize different types of data and create meaningful visualizations.
New Jersey Student Learning Standards for English Language Arts Companion Standards	
Standard: Science & Technical Subjects	
CPI #	**Cumulative Progress Indicator (CPI)**
RST.6-8.3	**Key Ideas and Details:** Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
RST.6-8.7	**Integration of Knowledge and Ideas:** Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
ISTE (International Society for Technology in Education) Student Standards	
ISTE Standard: 1.1 Empowered Learner	
ISTE 1.1.a	Students articulate and set personal learning goals, develop strategies leveraging technology to achieve them and reflect on the learning process itself to improve learning outcomes.
ISTE 1.1.b	Students build networks and customize their learning environments in ways that support the learning process.

ISTE 1.1.c	Students use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways..
ISTE 1.1.d	Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.
ISTE Standard: 1.3 Knowledge Instructor	
ISTE 1.3.c	Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.
ISTE Standard: 1.4 Innovative Designer	
ISTE 1.4.a	Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
ISTE 1.4.b	Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
ISTE 1.4.c	Students develop, test and refine prototypes as part of a cyclical design process.
ISTE 1.4.d	Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.
ISTE Standard: 1.6 Creative Communicator	
ISTE 1.6.a	Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.
ISTE Standard: 1.7 Global Collaborator	
ISTE 1.7.a	Students use digital tools to connect with learners from a variety of backgrounds and cultures, engaging with them in ways that broaden mutual understanding and learning.
ISTE 1.7.b	Students use collaborative technologies to work with others, including peers, experts or community members, to examine issues and problems from multiple viewpoints.

Instructional Focus

Unit Enduring Understandings

- 3D modeling and fabrication requires craft skills and techniques
- 3D fabrication and modeling empowers one to express a visual tangible object

Unit Essential Questions

- What applications are used for 3D modeling and fabrication?
- How are objects manipulated in a 3D environment?
- How do you get from digital modeling to tangible 3D form?

Objectives

Students will know:

- how to zoom, orbit and pan the view
- how to create a sphere from two intersecting circles
- how to navigate model axes
- how to import existing models and images
- how to switch to various views
- how to use various tools to duplicate shapes and existing models
- how to manipulate objects size and shape by stretching and distorting
- how to use paint tool to apply textures
- how to make an object symmetric
- how to install conversion extensions
- how to export their model as an stl file
- how to import the stl file to generate g code using designated software
- how to change filament color in 3d printer
- how to print three dimensional objects

Students will be able to: ● Further develop their spatial visualization skills ● Create a three dimensional (3D) model from a screen using computer-aided design (CAD) and print out their creations
Evidence of Learning
Assessment
Using digital equipment, 3d printing supplies and software students to design and create 3D models for printing.
Resources
SketchUp for Schools **https://elearningindustry.com/creative-skills-in-classrooms-with-3d-modeling-nurturing**

Unit 6: 2D Design, Machinery, and Fabrication	
Content Area: Technology	
Course & Grade Level: Computer Graphics 8th Grade	
Summary and Rationale	
• Vinyl cutting is the act of creating a design in a software program then sending that design through to a vinyl cutter, which will cut out your design using a blade on sheets of vinyl. The software you use to design will export your creation from your computer to the vinyl cutter, controlling the movements of the blade like it would do with a printer. • Computer Numerical Control (CNC) routing machines have been around for decades. Schools started installing machines in the industrial arts workshops in the 1990s. They work as a computer controls the movement of a tool. The tool is then cutting or shaping the material very precisely.	
Recommended Pacing	
9 days	
New Jersey Student Learning Standards for Computer Science and Design Thinking	
Standard: Standards for Computing Systems	
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Standard: Standards for Data & Analysis	
CPI #	**Cumulative Progress Indicator (CPI)**
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CPI #	**Cumulative Progress Indicator (CPI)**
9.4.8.CI.4	Explore the role of creativity and innovation in career pathways and industries.
Standard: Standards for Information and Media Literacy	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.8.IML.3	Create a digital visualization that effectively communicates a data set using formatting techniques such as form, position, size, color, movement, and spatial grouping (e.g., 6.SP.B.4, 7.SP.B.8b).
9.4.8.IML.4	Ask insightful questions to organize different types of data and create meaningful visualizations.
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Standard: Science & Technical Subjects	
CPI #	**Cumulative Progress Indicator (CPI)**
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ISTE 1.1.b	Students build networks and customize their learning environments in ways that support the learning process.

ISTE 1.1.c	Students use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways..
ISTE 1.1.d	Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.
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ISTE 1.6.a	Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.
ISTE Standard: 1.7 Global Collaborator	
ISTE 1.7.a	Students use digital tools to connect with learners from a variety of backgrounds and cultures, engaging with them in ways that broaden mutual understanding and learning.
ISTE 1.7.b	Students use collaborative technologies to work with others, including peers, experts or community members, to examine issues and problems from multiple viewpoints.

Instructional Focus

Unit Enduring Understandings

- 2D design and fabrication allows students to become creators of their own ideas
- The use of CNC routing machinery, vinyl cutting machinery and other resources help students see their innovative art come to fruition.
- 2D fabrication and modeling empowers one to express a visual tangible object
- Original hand drawn designs can be transferred into scalable vector graphics that can be replicated and mass-produced by machinery

Unit Essential Questions

- How can CNC machines be used?
- How can CNC routing and vinyl cutting be used in the workplace?
- What can you create with a CNC machine?
- Which tool is most essential for vinyl cutting?

Objectives

Students will know:

- What a CNC machine is and how it operates
- What a vinyl cutter is and how it operates
- How the use of machinery can be utilized to automate reproduction of original works

Students will be able to:

- Recognize various elements that need to be considered before mass producing an object
- Students will create and understand scalable vector graphics
- Express their interests and ideas in the form of digital design that can be made into tangible objects (stickers, tiles, stencils, etc)

Evidence of Learning

Assessment
Using design software students will create unique and original tangible objects that can be mass produced using machinery.
Resources
Machinery (Cricut Maker 3, Carvey, Vinyl Master, USCutter) **Software (EASEL Inventables)** **https://www.puzzleshiftcreate.com/innovative-arts/using-easel-xcarve-by-inventables/** **https://vinylcuttingmachines.net/choosing-a-vinyl-cutter/**

Unit 7: Portfolio Design	
Content Area: Technology	
Course & Grade Level: Computer Graphics 8th Grade	
Summary and Rationale	
● Students will showcase their personal content creation from the 90 day Computer Graphics elective in the form of a Final Portfolio (Website or online alternative)	
Recommended Pacing	
9 days	
ISTE (International Society for Technology in Education) Student Standards	
ISTE Standard: 1.6 Creative Communicator	
CPI #	**Cumulative Progress Indicator (CPI)**
ISTE 1.6.a	Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.
ISTE 1.6.d	Students publish or present content that customizes the message and medium for their intended audiences.
Instructional Focus	
Unit Enduring Understandings	
● Designers use easily accessible, well organized, and user friendly digital portfolios to showcase their creations ● Digital Portfolios and websites help attract new clientele and project recommendations	
Unit Essential Questions	
● How are digital portfolios beneficial to designers? ● What is the best way to showcase graphic design projects? ● What makes a website or digital portfolio effective? ● How important is layout and organization in digital portfolios?	
Objectives	
Students will know: ● How to create a website (or video portfolio) which includes pages, subpages, page links, buttons, image carousels, project images and descriptions **Students will be able to:** ● Organize computer graphics projects into specific pages ● Share and/or Publish their digital portfolio for students, teachers, and/or family members to view ● Reference, update, and make new contributions to their digital portfolio	
Evidence of Learning	
Assessment	
Students will create a digital portfolio which showcases all of their work from the 90 Day Computer Graphics Elective.	
Resources	
Website Design - Google Sites **Video Portfolio - WeVideo**	