

Intro Industrial Design (Syllabus)		
Unit One: Introduction		
Essential Questions	What is industrial design? What is bad design? What is good design? What are affordances? How does tunnel vision affect a user? What are forcing features (lock in/lock out/interlock)? What are dark patterns? What is the design process?	
Standards	Digital Literacy and Computer Science 9-12.CT.d.10 Use an iterative design process, including learning from making mistakes, to gain a better understanding of the problem domain.	
Concepts and Skills	- Discussion: What is Industrial Design? - Good vs. Bad Design - Visual Clues/Affordances - Tunnel Vision/Focus - Forcing Features - Dark Patterns - The Design Process - Overview - Brainstorming Activity - Research Activity - Design History	Science and Technology/Engineering Practices Practice 1. Asking Questions and Defining Problems
Content Objectives "I can"	I can explain the steps of the design process. I can identify an example of bad design. I can explain what an affordance is and how it impacts the design of an object or system.	

Statements"	I can explain what tunnel vision is and how it impacts the design of an object or system. I can explain what forcing features are and how they impact the design of an object or system. I can explain what dark patterns are and how they impact the design of an object or system.
Assessments, vocabulary, products, practice	Activity: Scattergories (Brainstorming Game) Activity: Paper Tower Assignment: Example of Bad Design Assignment: Famous Designers Collaborative SlideShow Assignment: Example of Good Design
Text, Materials, and Resources	• Video: What is Industrial Design? • Presentation: Good vs. Bad Design Presentation • Presentation: The Design Process
Unit Two: Rapid Prototyping - Laser-cutting	
Essential Questions	What is rapid prototyping? What does a laser-cutter do? Why do we make models? What is an iterative design process? How does a laser-cutter speed up the design process? What is the difference between bitmap and vector art? How do I optimize my artwork for laser-cutting?
Standards	Science and Technology/Engineering • HS-ETS2-1(MA). Determine the best application of manufacturing processes to create parts of desired shape, size, and finish based on available resources and safety. Digital Literacy and Computer Science • 9-12.CT.d.10 Use an iterative design process, including learning from making mistakes, to gain a better understanding of the problem domain. • 9-12.CS.a.4 Explain and demonstrate how specialized computing devices can be used for problem

	solving, decision-making and creativity in all subject areas. 9-12.CT.e.1 Create models and simulations to help formulate, test, and refine hypotheses 9-12.DTC.a.1 Use digital tools to design and develop a significant digital artifact Mathematics - G-GMD B.4. Identify the shapes of two-dimensional cross sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects. - G-MG A.1. Use geometric shapes, their measures, and their properties to describe objects.	
Concepts and Skills	- Creating paper prototypes - Laser-cutter demonstration - Bitmap vs. Raster Graphics - Overview of Adobe Illustrator - Creating and editing artwork in Adobe Illustrator - Optimizing art for the laser - Proofing the artwork - Redesign	Science and Technology/Engineering Practices - Practice 1. Asking Questions and Defining Problems - Practice 2. Developing and Using Models - Practice 6. Constructing Explanations and Designing Solutions
Content Objectives "I can Statements"	I can create a paper model of my idea. I can explain the difference between a bitmap and a vector. I can open Adobe Illustrator. I can demonstrate how to use the shape and pencil tools to create artwork in Adobe Illustrator. I can demonstrate the use of the scissor and combine tools to create cut outlines. I can optimize my design for the laser-cutter by setting line width and color. I can identify problems with and make changes to my artwork to solve them.	
Assessments, vocabulary, products, practice	Activity: Paper Prototype Assignment: Wooden Animal	

Text, Materials, and Resources	● Tutorials: Creating Artwork for Laser-Cutting with Adobe Illustrator	
Unit Three: Rapid Prototyping - Hand Tools		
Essential Questions	What is rapid prototyping? Why do we make models? What is an iterative design process? Why is rapid prototyping important in an iterative design process? What is subtractive manufacturing? How do I use basic hand tools to create a model of my idea?	
Standards	Science and Technology/Engineering ● HS-ETS2-1(MA). Determine the best application of manufacturing processes to create parts of desired shape, size, and finish based on available resources and safety. Digital Literacy and Computer Science ● 9-12.CT.d.10 Use an iterative design process, including learning from making mistakes, to gain a better understanding of the problem domain. Mathematics ● G-GMD B.4. Identify the shapes of two-dimensional cross sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects. ● G-MG A.1. Use geometric shapes, their measures, and their properties to describe objects.	
Concepts and Skills	● Tools and Material Introduction ● Demonstration of the process used to create an object out of foam	Science and Technology/Engineering Practices ● Practice 2. Developing and Using Models ● Practice 6. Constructing Explanations and Designing Solutions
Content Objectives "I	I can demonstrate the use of basic carving tools (files, hot wire cutters, xacto knives). I can demonstrate how to use subtractive manufacturing techniques to create a recognizable object.	

can Statements"	I can make changes to my model based on feedback and suggestions from my peers and teacher.
Assessments, vocabulary, products, practice	Assignment: Foam Object
Text, Materials, and Resources	Video: Creating a 8ft Tiger Shark
Unit Four: Nintendo Controllers	
Essential Questions	What is a circuit? How do I use symbols to represent the elements in my circuit? What is the difference between something wired in series or in parallel? How does a button work? What is a capacitor? How is the controller telling the Nintendo what to do? How do I choose the best rapid prototyping method for my design?
Standards	Science and Technology/Engineering • HS-ETS1-6(MA). Document and present solutions that include specifications, performance results, successes and remaining issues, and limitations. • HS-ETS2-1(MA). Determine the best application of manufacturing processes to create parts of desired shape, size, and finish based on available resources and safety. • HS-PS2-9(MA). Evaluate simple series and parallel circuits to predict changes to voltage, current, or resistance when simple changes are made to a circuit. Digital Literacy and Computer Science • 9-12.CAS.c.3 Describe the role that assistive technology can play in people's lives.

	• 9-12.CAS.c.4 Create a digital artifact that is designed to be accessible • 9-12.DTC.a.2 Select digital tools or resources based on their efficiency and effectiveness to use for a project or assignment and justify the selection. • 9-12.CS.a.4 Explain and demonstrate how specialized computing devices can be used for problem solving, decision-making and creativity in all subject areas. • 9-12.CT.d.10 Use an iterative design process, including learning from making mistakes, to gain a better understanding of the problem domain. • 9-12.CT.e.1 Create models and simulations to help formulate, test, and refine hypotheses	
Concepts and Skills	• Discussion: What is a circuit? • Circuit diagrams • Creating basic circuits • Series vs. Parallel • Capacitors • Switches/buttons	Science and Technology/Engineering Practices • Practice 1. Asking Questions and Defining Problems • Practice 2. Developing and Using Models • Practice 6. Constructing Explanations and Designing Solutions
Content Objectives "I can Statements"	I can create basic circuits. I can explain how switches and buttons work. I can explain the difference between series and parallel circuits. I can solder things together. I can select a rapid prototyping method based on the needs of my design. I can make changes to my design based on feedback from my peers and teacher. I can demonstrate the steps of the design process to create a controller of my choosing.	
Assessments, vocabulary, products, practice	• Activity: Build Simple Circuits • Activity: Build a 1-bit computer • Practice: Soldering • Assignment: Nintendo Controller	
Text, Materials,	• Activity: Circuit Game	

and Resources	
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