

Master List of All Maker Modules: Updated 12/6/23

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Audio Recording / Production Maker Modules

Module #	Point Value	Module Title	Module Description
A.1	1	Orientation	Watch this video tutorial to get oriented with the Anoka Studios, hardware and software options, and expectations/policies that help everyone find success. To submit evidence, take a picture of yourself having successfully started using the software and hardware described.
A.2	1	Podcasting	This video takes you step by step through the process of making a podcast with Garage Band. You should watch the short 8.1 Module above first though! To complete this Module, create a 45 second podcast answering this prompt: "What are you most excited about doing in the Recording Studio and why?"
A.3	1	Garage Band: Making a Basic Track	With the video tutorial as your guide, explore all the features of Garage Band to create your own complex track using software (MIDI) instruments (should be a minimum of 2 min long and include at least 4 different MIDI instrument tracks).
A.4	1	Garage Band: Record Vocals and Harmonies	With the video tutorial as your guide, create a track that includes vocals and harmonies. To submit evidence, create a screencast documenting the project you created, AND the exported MP3 file of your creation.
A.5	2	Garage Band: Importing Samples	With the video tutorial as your guide, create a track that incorporates samples into a track. Use https://ytmp3cc.cc/ to download music off of Youtube. Your track should include a minimum of 1 imported sample, 2 different loops, and be a at least 1 minute long. To submit evidence, create a screencast documenting the project you created, AND the exported MP3 file of your creation. If you get stuck in the video at 7:58 seconds check out this video to make sure Garageband is set up correctly.
A.6	2	Garage Band: Creating a film soundtrack	With the video tutorial as your guide, import a video that is at least 2 minutes long and create a multi-tracked soundtrack to accompany the video. To submit evidence, create a screencast documenting the project you created, and upload the final video with soundtrack to Drive and provide the share link.
A.7	2	Create a project as you complete the Logic Pro X Tutorial 1	To complete this module, create and submit a screencast that shows how you built a (1)basic instrumental arrangement, (2) used looping, (3) drummer, (4) and created an audio file of the project.
A.8	2	Create a project as you complete the Logic Pro X Tutorial 2	To complete this module, create and submit a screencast that shows how you (1) set your project up to record, (2) established the I/O buffer sizing, (3) selected the appropriate recording file type, (4) chose a suitable bit depth and sample rate, and (5) recording an instrument AND vocals
A.9	2	Create a project that incorporates a minimum of 2 sampled tracks.	To complete this module, create and submit a screencast that shows how you utilized a minimum of 2 samples in your project.
A.10	2	Creating a Soundtrack for a video in Logic Pro X.	To complete this module, create and submit a screencast that shows how you (1) imported a video into your project, (2) used markers for syncing, (3) incorporated different layers of sound, and (4) edited the volumes for each sound.
A.11	2	Create a project as you complete the Logic Pro X 101 Tutorial 3.	To complete this module, create and submit a screencast that shows how you (1) record a digital guitar input, (2) used the Amp Designer & Pedalboard, (3) can use the built-in Logic Tuner, and (4) how to use take folders.
A.12	2	Create a project as you complete the Logic Pro X 101 Tutorial 4.	To complete this module, create and submit a screencast that shows how you (1) used Edit tools in the Workspace Area, (2) used Snap Modes, and (3) know how to use the Fade and Marquee Click Zones.

Fabrication: Textiles Maker Modules

Module #	Point Value	Module Title	Module Description
FT.1	1	Prep the Sewing Machine	Thread your sewing machine so it is ready to use. Submit a photo providing evidence of completion to earn points for this Module.
FT.2	1	Practice Stitching; Explore Settings	Practice stitching on a piece of fabric. Use different stitches and settings, experimenting with how they work and look. Submit a photo providing evidence of completion to earn points for this Module.
FT.3	2	Napkin Thing	Make the Napkin (or whatever you want to call this thing) as detailed in the tutorial video above. Submit a photo providing evidence of completion to earn points for this Module.
FT.4	1	Hand-Sewing Basic Stitches	Use the tutorial video to practice different stitches and techniques on a piece of scrap material. Submit a photo providing evidence of completion to earn points for this Module.
FT.5	3	Wearable Tech: LED Sequins	With a scrap or some other piece of fabric (hat, glove, shirt, jacket, etc...) use conductive thread to incorporate a battery and at least 3 LED SEQUINS.
FT.6	3	Wearable Tech: Programmable LEDs	With a scrap or some other piece of fabric (hat, glove, shirt, jacket, etc...) use conductive thread to incorporate a battery and at least 3 programmable LEDs. (This will need to include a microcontroller that is programmed, too.)
FT.7	2	Choice	Make something useful that displays your interests and textile skills. Use one of the project provided above, or find your own!

Fabrication: Cricut Vinyl/Sheet Cutting Maker Modules

Module #	Point Value	Module Title	Module Description
FVC.1	1	Getting Started with Cricut Explore	Click the Start Course button to complete a few quick lessons that will get you started with the Cricut Machine and create a sticker. You will need to create a Cricut account to do this. Use your school email address. To earn credit for this module submit a picture of your final soccer sticker.
FVC.2	1	Introduction to Design Space	Click the Start Course button to begin. Use the "Introduction to Design Space" Lesson to create a vinyl decal that includes an image and text. To earn credit for this module, create your own custom decal including text and an image. Once applied, take and submit a photo of your final product.
FVC.3	2	Make a Cricut Card	Use the tutorial video to create a card with the Cricut machine. You should use this tutorial to help you create your own custom design. To earn credit for this module, submit a photo of your completed card.
FVC.4	1	Paper Flowers for Beginners	Click the Start Course button to begin. Use the lesson to create flowers cut out of cardstock. To earn credit for this module, design a creative 2D bouquet of flowers that utilizes at least 3 different colors, 3 different shapes, and 3 different flowers. Submit a photo of your final work when completed.
FVC.5	1	Faux Leather Earrings	Use this tutorial video to create a set of Faux Leather Earrings. See Hunter for hardware. To earn credit for this tutorial, submit a photo of your completed earrings.
FVC.6	1	Make a Negative Punch Art Card	Use the tutorial video to create a card with the Cricut machine. You should use this tutorial to help you create your own custom design. To earn credit for this module, submit a photo of your completed card.
FVC.7	1	Adidas Melting Logo Tutorial	Use this tutorial to see how an external image can be brought into Cricut Design Space and turned into a workable image for the Cricut machine. To earn credit for this module, make a t-shirt or vinyl decal using the melting Adidas image utilized in the tutorial video. Submit a photo of your final product to earn credit.
FVC.8	2	Spray Painting Stencils	Use this video as a guide, and this website, to make a set of 3 or more poster board stencils that can be then used to spray paint an image. To earn credit for this module, create the stencils, then work with Hunter to spray paint an image with them. Submit a photo of the final spray painted product.

Fabrication: Roland Vinyl Cutter Maker Modules

Module #	Point Value	Module Title	Module Description
FVR.1	2	Make A Sticker!	Use the tutorial above to make a sticker. To earn credit for this module, submit a photo of your sticker once it has been stuck somewhere appropriate.
FVR.2	1	Make a Sticker using Cut Studio	Use the tutorial above to make a sticker of the Anoka Tornado in 3 different sizes. To earn credit for this module, submit a photo of your stickers once they have been weeded and prepped with transfer paper.
FVR.3	2	Make a Multi-color Sticker, designed in Illustrator.	Use the tutorial above to make a 4"-6" sticker of the Anoka STEAM Logo. To earn credit for this module, submit a photo of your sticker once it has been placed appropriately.
FVR.4	2	Design and create a multi-color Sticker for a favorite brand.	Use the tutorial above to make a multi-color 4"-6" sticker of a brand. To earn credit for this module, submit a photo of your sticker once it has been placed appropriately.
FVR.5	2	Design and create a multi-color Sticker for a teacher here at school.	Use the tutorial above to make a multi-color 4"-6" sticker for a teacher here at Anoka. To earn credit for this module, submit a photo of your sticker once it has been placed appropriately.

Fabrication: 3D Printing with Tinkercad

Module #	Point Value	Module Title	Module Description
F3D.1	0.5	Introduction to Tinkercad	Use the video to see how to log in to tinkercad.com using the code your teacher provided or your school Google Account credentials. To earn credit for this Maker Module, complete the 10 Starter Lessons. Submit a screenshot showing you have completed the 10th Starter Lesson.
F3D.2	0.5	Cylinder Earrings	Complete the Cylinder Earrings Tinkercad Lesson. To earn credit for this module, submit screenshot of the completed Cylinder Earring
F3D.3	0.5	Skull Button	Complete the Skull Button Tinkercad Lesson. To earn credit for this module, submit screenshot of the completed Skull Button
F3D.4	0.5	Die from Scratch	Complete the Die from Scratch Tinkercad Lesson. To earn credit for this module, submit screenshot of the completed Die from Scratch
F3D.5	0.5	Key Ring Letters	Complete the Tinkercad Key Ring, Letters Lesson to build your own customized keychain. To earn credit for this module, submit a photo of your finished, printed keychain.
F3D.6	0.5	Print the Key Ring Letters Design	Use the video to the left to see how to prepare your custom keychain for 3D printing using Makerbot.com To earn credit for this Module, submit a photo of your 3D printed custom keychain.
F3D.7	2	Minion Tutorial	Use the video tutorial to guide your building of a Minion. <i>HINT: Remember... you can't print floating items = like the arms in this video's Minion model.</i> To earn credit for this module, you must creatively customize the Minion, and 3D print it. Take a photo of the printed Minion and submit it.
F3D.8	2	Fidget Star Tutorial	Use the video tutorial to guide your building of the Fidget Star.. To earn credit for this module, you must create and print a Fidget Star with 4 parts that uses less than 30 grams of material. Take a photo of the print and submit it. <i>HINT = Use the Print Preview button in Makerbot to see how much filament will be used.</i>
F3D.9	2	Model: Real-Life Customized Model	Choose one of the items listed below from the Makerspace: ■ Battery Powered Drill ■ Stanley Power Stapler

			■ Replicator + 3D Printer ■ Hot Glue Gun Using Tinkercad, create a digital model of your chosen item that meets these requirements: 1. Is full or half scale. (Full = your model's dimensions are exactly the same as the real objects; half means half the real size) 2. Is detailed in color, shape, text, and features. 3. Is customized with the STEAM Logo AND your Last Name. To earn credit for this module, you must submit a screenshot of your final design.
F3D.10	2	Model: Super-Lite Cell Phone Stand	Watch the video to see how you can use uniquely featured "holes" to cut beautiful patterns into an object, reducing the overall mass of the model and saving money spent on printing. Design a tabletop cell phone stand that: 1. securely holds YOUR cell phone 2. allows you to view AND use your phone while it is in the stand 3. utilizes a unique, repeating pattern of holes to reduce mass and material usage 4. Uses LESS than 20 grams of material to print. To earn credit for this module, export the model into Makerbot and run a print preview. Submit a screenshot showing the model AND the amount of material that would be used to print this. DON'T PRINT THIS UNLESS TEACHER GIVES PERMISSION.
F3D.11	1	Code + Model: Tinkercad Codeblocks Intro	To Earn Credit For This Module: Modify the tutorial's code to create a 3D repeating patterned structure. Submit a screenshot showing the final version of your 3D model ALONG with the code that created it.
F3D.12	1	Code + Model: Variables	To Earn Credit For This Module: Modify the tutorials' code to create a new, 3D repeating patterned structure. Submit a screenshot showing the final version of your 3D model ALONG with the code that created it.
F3D.13	1	Print: Incorporating Threads	Design a simple 2-part print that includes these features: 1. a threaded extrusion (bolt) which can securely screw into a threaded intrusion with the use of a screw driver or a hex wrench. 2. A threaded intrusion purposefully designed to securely accept a metal bolt Print and submit a photo of the two items threaded together.
F3D.14	2	Model: Electronics Case	Design Requirements: 1. The circuit board must bolt into the case's base through the board's connection points using <u>standoffs</u>. 2. The case must protect the bottom of the board from accidental damage and short circuiting (prevent accidental conductive connection of soldered pins) 3. The case must NOT BLOCK pins, connection ports, buttons, LEDS, or other important board features.

			4. The case base must maximize airflow along the underside of the board to prevent overheating. 5. The case base must have 4 built in mounting points so that it can be mounted to a surface using screws or bolts. 6. You must make this case base customized by incorporating these two easy to read text items on the design: ■ Your initials ■ The month and year (ex: 12/2027) To Earn Credit For This Module: Submit a screenshot showing the final version of your case with the board's 3D model shown.
F3D.15	3	Model + Print: Code Complex 3D Pattern Lantern with Tinkercad	To earn credit for this module, you must submit a GIF (or screenshot) of the Tinkercad design and a picture of the glowing lantern.

Fabrication: Advanced 3D Modeling & Printing Maker Modules

Module #	Point Value	Module Title	Module Description
F3DA.1	2	Model: Lego: Intro Fusion 360	To Earn Credit For This Module: Once you complete the tutorial, modify the Lego piece design by adding two "Lego Pegs" centered on the small face of the rectangular Lego piece. Submit a screenshot of the modified design to earn credit.
F3DA.2	1	Print: Lego: Print It!	To Earn Credit For This Module: Submit a photo showing the 3 Lego pieces you have printed.
F3DA.3	2	Get Started With Modeling: Autodesk Lesson	To Earn Credit For This Module: Submit screenshot showing the final, fileted design that you created by following all 6 sections of the lesson.
F3DA.4	1	Model: Glass Soda Bottle	To Earn Credit For This Module: Submit screenshot showing the final bottle design in a unique "appearance" material.
F3DA.5	1	Model: Exact Paperclip	To Earn Credit For This Module: Once you complete the tutorial, modify the shape of the paperclip tp look like someone bent it oddly. Submit screenshot showing the final bent paperclip design.
F3DA.6	1	Model: Ice Cube Tray	To Earn Credit For This Module: Once you complete the tutorial, submit screenshot showing the final ice cube tray model.
F3DA.7	2	Model + Print: Hex Nut	To Earn Credit For This Module: Once you complete the tutorial, PRINT 3 hex nuts, each in a different orientation on the print bed. Make sure the total amount of filament material used is less than 15 grams (check in the print preview). Submit a photo showing the finished 3D printed hex nuts.
F3DA.8	2	Model + Print: LED Bulb	To Earn Credit For This Module: Once you complete the tutorial, PRINT 1 model. Make sure the total amount of filament material used is less than 10 grams (check in the print preview). Submit a photo showing the finished 3D printed light bulb.
F3DA.9	1	Model: Dog Bowl	To Earn Credit For This Module: Once you complete the tutorial, submit a screenshot showing a SECTION VIEW of the dog bowl.
F3DA.10	1	Model: Auger	To Earn Credit For This Module: Once you have completed the tutorial, submit a screenshot of the completed auger design.

F3DA.11	2	Model + Print: Choice Character	To Earn Credit For This Module: Now that you have some skills developed, its time to apply them in a creative challenge. Design and print one of the characters listed to the left. Use a reference image to guide your work. Then print the model, making sure the total amount of filament material used is less than 15 grams (check in the print preview). Submit a photo showing the 3D printed character.
F3DA.12	2	Model + Print: Advanced Patterned Container	To Earn Credit For This Module: Once you complete the tutorial MODIFY the hexagonal design into a different shape that is patterned. Submit a screenshot showing a screenshot of your customized container.
F3DA.13	1	Model: Electronics Case	To Earn Credit For This Module: Submit a screenshot showing the final version of your case with the board's 3D model shown.

Fabrication: Tinkercad Laser Cutting Maker Modules

Module #	Point Value	Module Title	Module Description
FTL.1	1	Keychain	Use Tinkercad to create a 1.5" wide by 3" long keychain that can be cut on the laser. The keychain must utilize different shapes, edges, symbols, and text. Remember- Tinkercad can ONLY cut... and anything not connected physically will just fall away when the design is cut. Submit the .SVG file for cutting and grading.
FTL.2	1	2D -> 3D Car	Use the tutorial video to see how custom shapes can be created in Tinkercad, then how to create a file of multiple 2D parts that can be combined once cut to form a 3D project. To earn credit for this module, create a Tinkercad design containing a minimum of 6 2D parts that can be laser cut and assembled into a 3D project. Submit the .SVG file for cutting and grading.
FLT.3	1	Assembly: Laser Cut Flyer	Use the video tutorial to guide you in creating the following: A 3D glider with Wings made of thin cardboard Body made of corrugated cardboard. Submit the .SVG file for cutting and grading.
FTL.4	1	Assembly: Longboard	Use this video tutorial to build a model Longboard that can then be sent to the laser. Submit the .SVG file for cutting and grading.
FTL.5	1	Assembly: Glowbox	Use Makercase.com and the tutorial video to build the following: A 4" tall by 3" wide "Glowbox" using finger joints and cut designs in all sides that allow light to shine through when a light is placed inside. Submit the .SVG file for cutting and grading.
FTL.6	1	Phone Stand	Do a google image search for "laser cut phone stand" and look at all the designs people have come up with. For this module, design a laser cut phone stand that meets the following requirements: Is completely of your design (you can't use someone else's file) Holds the phone up in multiple orientations Is constructed of at least 2 lasered parts that assemble together Includes customized features that are unique to and identify you as the creator Submit the .SVG file for cutting and grading.

Fabrication: Adobe Illustrated Laser Cutting Maker Modules

Module #	Point Value	Module Title	Module Description
FALC. 1	1	Introduction to Epilog Lasers and Adobe Illustrator	Use the tutorial above to introduce yourself to the Makerspace Lasers. Using the sample file provided in the tutorial, create your own cardboard cut and etched print. Submit a photo providing evidence of completion to earn points for this Module.
FALC. 2	1	Practice Basic Laser Cutting	Use the tutorial video provided to cut a design on the laser that meets these requirements: 1. Is 4"x4" square 2. Made of cardboard 3. Includes these features: ■ 4 Cut Shapes ■ 4 Cut text examples Submit a photo providing evidence of completion to earn points for this Module.
FALC. 3	2	2-Layer Painted Jigsaw	Your goal for this module is to create a spray painted, 2-layered 3D cardboard jigsaw puzzle. To Earn Credit For This Module: Submit a photo of the painted jigsaw puzzle.
FALC. 4	2	Makercase Box	Your goal for this module is to create 3D, 6-sided laser cut box. To Earn Credit For This Module: Submit a photo your glued together cardboard box.
FALC. 5	2	Topographic Build	Use the tutorial video to the left to learn how to take a 2D Topographical map of a mountain and turn it into a 3D laser cut model of the mountain. To Earn Credit For This Module: Submit a photo of your glued together cardboard mountain model.
FALC. 6	3	DIY Phone Stand	Use the examples shown to the left to guide your thinking as you design a multi-piece phone stand that meets the following requirements... To Earn Credit For This Module: Submit a photo of your constructed phone stand made of cardboard.

FALC. 7	3	Phone Amplifier	For this module, your goal is to design an accurately sized and shaped smartphone amplifier. Do a Google Image Search for "Laser cut Phone Amplifier" to see many examples. To Earn Credit For This Module: Submit a photo showing your final, SPRAY PAINTED phone amplifier with your phone in it.
FALC. 8	3	Electronics Case	For this module, your goal is to design an accurately sized and shaped protective circuit board case for the microcontroller or computer that you will be using to code with while in this class. To Earn Credit For This Module: Submit a photo showing your final case with the circuit board attached using standoffs.
FALC. 9	2	Holiday Ornament	The ornament should meet these requirements: 1. Is smaller than 4"x4" 2. Made of cardboard (<i>ask permission to use wood</i>) 3. Includes these features: ■ A round shape with built in string loop ■ A minimum of 2 different cut graphics ■ A minimum of 1 word of cut text To Earn Credit For This Module: Submit a photo of the laser cut cardboard ornament you created.

Visual Design: Photography Maker Modules

Module #	Point Value	Module Title	Module Description
VP.1	1	Introduction to Camera System	Take a portrait of three people in the Makerspace Studio using the greenscreen backdrop, available lighting fixtures, and the Mspace DSLR camera. Submit these photo to earn credit for this module.
VP.2	1	Build a Photography Portfolio Website	Using all the photos you have taken and the tutorial to the right, create your own Photography Website. All the photos you have used for Modules VP.3 and on should be included in this website collection. Submit the link to your completed, published website to earn points for this module.
VP.3	1	Preparing Photos for the Web	Take a photo from Module VP.1 and follow the video's instructions to EXPORT it. Submit as evidence a screenshot of the EXPORT screen, showing that you are exporting it as a JPG file that is less than 500 kb.
VP.4	2	Exploring Shutter Speed	Read the article at this link and try taking different pictures of stationary and moving objects using different shutter speeds. To earn points for this module, make a section on your WIX Photography Portfolio titled "Module 2: Shutter Speed" and compose the following collections of photos: - Stationary Object: Take 3 photos of the same, stationary object using 3 different shutter speeds: short, long, and slow. Label each photo to match it's actual, numerical shutter speed (ex: 1/100) - Moving Object: Take 3 photos of the same, stationary object using 3 different shutter speeds: short, long, and slow. Label each photo to match it's actual, numerical shutter speed (ex: 1/100)
VP.5	2	Exploring Aperture	Read the article (and watch it's videos) at this link and try taking different pictures to test and experiment what is taught. To earn points for this module, make a section on your WIX Photography Portfolio titled "Module 3: Exploring Aperture" and compose the following collections of photos: - Stationary Object: Take 6 photos of the same, stationary object using 6 different aperture settings. For each photo, label its f-stop. - Low Light Setting: Take 6 photos of the same, stationary object using 6 different aperture settings. For each photo, label its f-stop. - Sunburst: Take a photo that uses the aperture setting to purposefully create a sunburst from a point light source (sun, flashlight, etc.) Label the photo with the f-stop used.
VP.6	1	Exploring ISO	Read the article (and watch it's videos) at this link and try taking different pictures to test and experiment what is taught. To earn points for this module, make a section on your WIX Photography Portfolio titled "Module 4: Exploring Aperture" and compose the following collections of photos: - Long-depth STATIONARY scene: Take 5 photos of the same scene using 5 different ISO settings. For each photo, label its ISO value. - MOTION-FILLED scene: Take 5 photos of the same scene using 5 different ISO settings. For each photo, label its ISO value.
VP.7	1	Exploring Focus	Read the article (and watch it's videos) at this link and try taking different pictures to test and experiment what is taught. To earn points for this module, make a section on your WIX Photography Portfolio titled "Module 5: Exploring Focus" and compose the following collections of photos:

			• Hand Portrait Manual Focus: Take 4 photos of 4 different people's hands using the Manual Focus to highlight their hand's detail and blur the background. For each photo, label the F-stop, ISO, and shutter speed. • Microscopic Details: Take 4 photos of 4 different tiny objects using the Manual Focus to highlight the object's detail and blur the background. For each photo, label the F-stop, ISO, and shutter speed.
VP.8	1	Editing Photos in Photoshop	Do this THREE TIMES for THREE DIFFERENT Photo subjects. Using a photo you have taken and the tutorial to the right, edit the photo as described in the tutorial. Submit a screenshot showing your ORIGINAL Photo AND your EDITED photo to earn points for this module. Be sure to post your 3 edited photos into your portfolio.
VP.9	1	Photographers Watermark	Using a photo you have taken and the tutorial to the right, create your own Photographers Watermark. Submit a screenshot of your completed product to earn points for this module.
VP.10	1	Change Color	Do this THREE TIMES for THREE DIFFERENT Photo subjects. Using a photo you have taken and the tutorial to the right, edit the photo as described in the tutorial. Submit a screenshot showing your ORIGINAL Photo AND your EDITED photo to earn points for this module. Be sure to post your 3 edited photos into your Portfolio.
VP.11	3	Exploring Black and White Photography	Read the article (and watch it's videos) at this link and try taking different pictures to test and experiment with black and white photography. To earn points for this module, make a section on your WIX Photography Portfolio titled "Module 14: Black and White Photography" and compose the following collections of photos: • Color vs black & white: Take 6 COLOR photos of different objects/scenes in different settings. Edit a copy of the photo to be black & white, optimizing the photo's settings to maximize it's appearance. Post the original and the edited black & white together for comparison. • Shadow: Take 3 photos that maximize shadows and edit them to be black & white. • Contrast: Take 3 photos that explore different contrasts and edit them to be black & white. • Tones: Take 3 photos that maximize dark and light tones and edit them to be black & white. • Shapes: Take 3 photos that explore shapes and edit them to be black & white. • Texture: Take 3 photos that explore different textures and edit them to be black & white. • Emotion: Take 4 photos that explore these two categories of emotion: ○ Two of: crowded, high-contrast photos with harsh textures and deep shadows ○ Two of: sparse composition and lack of distractions, isolated and lonely
VP.12	1	Crop and Straighten	Do this THREE TIMES for THREE DIFFERENT Photo subjects. Using a photo you have taken and the tutorial to the right, edit the photo as described in the tutorial. Submit a screenshot showing your ORIGINAL Photo AND your EDITED photo to earn points for this module. Be sure to post your 3 edited photos into your Portfolio.
VP.13	1	How to Use a Polarizing Filter	Read the article (and watch it's videos) at this link and try taking different pictures to test and experiment with the polarizing filter. To earn points for this module, make a section on your WIX Photography Portfolio titled "Module 13: Polarization" and compose the following collections of photos: Polarized vs. non-polarized: Take 6 photo pairs of different objects/scenes in different settings: 1 polarized and 1 non-polarized. Label each as polarized or non-polarized.

VP.14	1	Removing Color Cast	Do this THREE TIMES for THREE DIFFERENT Photo subjects. Using a photo you have taken and the tutorial to the right, edit the photo as described in the tutorial. Post in your portfolio the ORIGINAL Photo AND your EDITED photo to earn points for this module.
VP.15	1	Use Levels	Do this THREE TIMES for THREE DIFFERENT Photo subjects. Using a photo you have taken and the tutorial to the right, edit the photo as described in the tutorial. Post in your portfolio the ORIGINAL Photo AND your EDITED photo to earn points for this module.
VP.16	1	Sharpen	Do this THREE TIMES for THREE DIFFERENT Photo subjects. Using a photo you have taken and the tutorial to the right, edit the photo as described in the tutorial. Post in your portfolio the ORIGINAL Photo AND your EDITED photo to earn points for this module.

Visual Design: Video Production Maker Modules

Module #	Point Value	Module Title	Module Description
VVP.1	1	Introduction to Camera System	After watching the two videos above (Intro and learning how to transfer vid/photos), take 3 portraits of 3 different people in the Makerspace Studio using one of the backdrops, available lighting, and the Mspace DSLR camera. Submit these photos to earn credit for this module.
VVP.2	1	DSLR Video System Introduction	Take a 15 second video using the Mspace DSLR and Studio. Nothing fancy- this is just to practice using the camera, transferring the file, and uploading it to Drive. Submit the Share Link to earn credit for this Module.
VVP.3	1	VVP.3: DSLR & iMovie Interview Video	Film, then use iMovie to edit and export. Your final movie should be 30 - 35 seconds long and include titles, transitions, sound, music, and credits. You MUST use the Mspace DSLR for this. Export the video from iMovie, upload it into your Drive, and submit the Share link to earn credit for this module. For filming, choose one of these challenges: Interview 3 different people about the same topic Shoot 3 different happenings of a similar/related event
VVP.4	2	Experimenting in iMovie	Use the "10 Cinematic Hacks" Video to the right to create a set of experimental scenes. Set up your video with a title screen for each "Hack", followed by an example of that hack that you shot with the camera. Export the video from iMovie, upload it into your Drive, and submit the Share link to earn credit for this module.
VVP.5	2	Green Screen iMovie Editing	Film with the green screen, then use iMovie to edit and export. You do not need to use the Mspace DSLR for this, but it is preferable. Export the video from iMovie, upload it into your Drive, and submit the Share link to earn credit for this module.
VVP.6	2	Editing a Pro B Roll	First, shoot footage showing a student walking from the building's entrance, through the halls, and finally to the Makerspace. Then, follow the tutorial's steps to create a B Roll sequence. The final video should have no natural audio track, and should include the following features: (as guided in the video) • Importing a song • Speed Ramping • Editing to the beat • Adding Ambient Sound • Speed Ramp Sound Effects • Colour Correction • Cinematic Black Bars • Adding Titles Export the video from iMovie, upload it into your Drive, and submit the Share link to earn credit for this module.

VVP.7	2	Intro to OSMO Mobile 6 Phone Gimbal	Use this tutorial to learn how to use the mobile phone gimbal. You will need to download the DJI Mimo app onto the phone used. Follow the tutorial and DO what is shown so you learn how the device works. To earn points for this module, use the gimbal and Mimo app to create a 30 second video that utilizes the hyperlapse function to record a person walking from the main entrance of the school, around the school (past the gyms, to the cafeteria, through the L wing) and into the Makerspace. Export the video from the Mimo app into your Google Drive and submit the video as evidence for the module. DIRECT LINK TO DJI Mimo App: <i>(enter link in browser ON YOUR PHONE)</i> s.dji.com/guide38
VVP.8	2	Cinematic Footage with the Phone Gimbal	Use this video to learn 5 ways to get high quality footage with your phone and gimbal. To earn points for this module, use the gimbal and Mimo app to create a 30-60 second video that utilizes these 5 methods. First, set your phone to these settings: Frame Rate: 60 fps White Balance: Locked 5 Methods: • Use extension pole to capture a low ground view, reflection shot, OR a crane shot. • Use the focus wheel to change the scenes focus and alter the viewer's attention. • Use Active Track to perform an orbital shot. • Use the Dynamic Zoom function in the Mimo app. • Shoot a Spin Shot. Export the video from the Mimo app into your Google Drive and submit the video as evidence for the module.
VVP.9	2	Creative Gimbal Moves	Use this video to learn 7 ways to creatively use the gimbal. To earn points for this module, use the gimbal and Mimo app to create a 30-60 second video that utilizes these 7 moves. 7 Methods: • Reveal Turnaround • Character Switch • Tracker Reveal • Pan Tilt Follow • Point of View Swing • The Riding • Tilt Up Forward Export the video from the Mimo app into your Google Drive and submit the video as evidence for the module.
VVP10.	2	B-roll Gimbal Moves	Use this video to learn 7 ways to creatively use the gimbal. To earn points for this module, use the gimbal and Mimo app to create a 30-60 second video that utilizes these 7 moves. 7 Moves: • Match Cut Transition • Tracking Shots • Wipe Transition • Mask Transition • Orbit • Vortez

			Black Frame Transition Export the video from the Mimo app into your Google Drive and submit the video as evidence for the module.
VVP.11	2	Stop Motion Video	Create a Stop Motion Movie using Legos (or some other readily available material) that is no more than 20 seconds long. Your video MUST use the green screen. Export the video from iMovie, upload it into your Drive, and submit the Share link to earn credit for this module.
VVP.12	2	Intro to Adobe Premiere Pro	Use Adobe Premiere Pro to edit a 40 second video to include the following features: (Use any unedited, raw footage you want- new or old) Required Features: - Text - Speed Up and Down - Transitions - Adjust color Export your video, upload it to Drive, and submit the share link to earn points for this module.
VVP.13	2	Cinematic Edits	First, shoot 15 seconds of raw video with a hand-held DSLR at 60 FPS of a person looking directly into the camera as movement occurs in the background scene. Make sure the focus is on the person, with the background being out of focus. Bring this raw video into Premiere. Then, watch this tutorial video tutorial and add in the following cinematic edits: Required Edits: - Video Stabilization - Slow Down - Zoom In/Out - Color Grading - Cinematic Black Bar Export your video, upload it to Drive, and submit the share link to earn points for this module.
VVP.14	2	Masking	First, shoot 30 seconds of raw video with a hand-held DSLR at 60 FPS of a person walking across a distant background. Make sure the focus is on the person, with the background being slightly out of focus. Bring this raw video into Premiere. Then, watch this tutorial video tutorial to learn how to perform and use masking. As you watch the video, experiment with these masking techniques using your own footage: Required Masking Experiments: - Isolating/Targeting - Remove Unwanted Object - Combine Clips (bring in a different clip/photo/background) - Transitions

			Export your video, upload it to Drive, and submit the share link to earn points for this module.
VVP.15	1	Giant of Anoka!	First, take a high quality photo of the front of the AHS school building. Then, watch this tutorial video tutorial to learn how to use masking to create a video showing a giant person stepping over the school. Export your video, upload it to Drive, and submit the share link to earn points for this module.
VVP.16	1	Text Behind Movement	First watch this tutorial video tutorial to learn how to bring text behind moving objects into a video. Then, shoot a 10 second video of motion using the DSLR or phone with Gimbal. Bring this video into Premiere and use one of the techniques shown to incorporate 1-3 words artfully into the shot. Export your video, upload it to Drive, and submit the share link to earn points for this module.

Visual Design: Adobe Illustrator Maker Modules

Module #	Point Value	Module Title	Module Description
VAI.1	1	Quick Start Tutorial	Use Illustrator to create a document that includes 3 different shapes and 3 different text examples.
VAI.2	1	Basic Shapes	Use the Basic Shapes Tutorial (above) from Adobe to learn how to create lines, combine shapes with the Shape Builder, and trace objects. Submit a screenshot of your final file showing that you have completed the Shapes Basics Tutorial.
VAI.3	1	Editing Artwork Basics	Use the Editing Artwork Basics Tutorial (above) from Adobe to learn how to transform, combine and group, align, and cut/erase. Submit a screenshot of your final file showing that you have completed the Shapes Basics Tutorial.
VAI.4	1	Color Basics	Use the Color Basics Tutorial (above) from Adobe to learn how to change color, create swatches, add dashed lines & arrows, and create gradients. Submit a screenshot of your final file showing that you have completed the Color Basics Tutorial.
VAI.5	1	Text Basics	Use the Text Basics Tutorial (above) from Adobe to learn how to add text and paragraphs, place text on shapes, and reshape text. Submit a screenshot of your final file showing that you have completed the Color Basics Tutorial.
VAI.6	1	Drawing Tool Basics	Use the Drawing Tools Basics Tutorial (above) from Adobe to learn how to use the Pencil and Curvature tools, how to edit paths, and more. Submit a screenshot of your final file showing that you have completed the Color Basics Tutorial.
VAI.7	1	Layers Basics	Use the Layers Basics Tutorial (above) from Adobe to learn how create, edit, and organize artwork with layers. Submit a screenshot of your final file showing that you have completed the Layers Basics Tutorial.
VAI.8	1	Image Effects Basics	Use the Image Effects Basics Tutorial (above) from Adobe to learn how add images, use effects, and add creative brush strokes . Submit a screenshot of your final file showing that you have completed the Image Effects Basics Tutorial.
VAI.9	2	Project Tutorial: Kendall Plant Portrait	Use the Kendall Plant Tutorial Project (above) from Adobe. Submit a screenshot of your final file showing that you have completed the Tutorial Project.
VAI.10	2	Project Tutorial: Geometric Pattern	Use the Geometric Pattern Tutorial Project (above) from Adobe. Submit a screenshot of your final file showing that you have completed the Tutorial Project.
VAI.11	2	Project Tutorial: Mandala	Use the Mandala Tutorial Project (above) to create your own Mandala. Submit a screenshot of your final file showing that you have completed the Tutorial Project.
VAI.12	2	Project Tutorial: Vector Character Art	Use the Vector Character Art Tutorial Project (above) to create your own characters. Submit a screenshot of your final file showing that you have completed the Tutorial Project.
VAI.13	2	Project Tutorial: X-Ray Vector Art	Use the X-Ray Vector Art Tutorial Project (above) to create your own. Submit a screenshot of your final file showing that you have completed the Tutorial Project.
VAI.14	2	Project Tutorial: Symmetrical Vector Character Art	Use the Symmetrical Vector Character Art Tutorial Project (above) to create your own. Submit a screenshot of your final file showing that you have completed the Tutorial Project.
VAI.15	1	Experiment with the drawing tablet	Draw something using Illustrator and the drawing tablet. Incorporate different ways to use the pen into your drawing.

VAI.16	2	Design a Logo	Use this tutorial (click here) to create a vector art pizza slice logo. To earn points for this module submit a screenshot of your completed pizza slice logo.
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Visual Design: Photoshop Maker Modules

Module #	Point Value	Module Title	Module Description
VAP.1	1	Photoshop Basics	Use Photoshop Basics Tutorial (above) to familiarize yourself with Photoshop. Submit a screenshot and created file to earn points for this module.
VAP.2	1	Crop and Resize	Use Crop and Resize Images Tutorial (above) to familiarize yourself with Photoshop. Submit a screenshot and created file to earn points for this module.
VAP.3	1	Layers Basics	Use Layers Basics Tutorial (above) to familiarize yourself with Photoshop. Submit a screenshot and created file to earn points for this module.
VAP.4	1	Enhance Images	Use the Enhance Images Tutorial (above) to familiarize yourself with Photoshop. Submit a screenshot and created file to earn points for this module.
VAP.5	1	Selection Tool Basics	Use the Selection Tool Basics Tutorial (above) to familiarize yourself with Photoshop. Submit a screenshot and created file to earn points for this module.
VAP.6	1	Retouch/Remove from Images	Use the Retouch/Remove Tutorial (above) to familiarize yourself with Photoshop. Submit a screenshot and created file to earn points for this module.
VAP.7	1	Select and Change Colors	Use the Select and Change Colors Tutorial (above) to familiarize yourself with Photoshop. Submit a screenshot and created file to earn points for this module.
VAP.8	1	Add Text and Shapes	Use the Add Text and Shapes Tutorial (above) to familiarize yourself with Photoshop. Submit a screenshot and created file to earn points for this module.
VAP.9	1	Merge and Combine Images	Use the Merge and Combine Images Tutorial (above) to familiarize yourself with Photoshop. Submit a screenshot and created file to earn points for this module.
VAP.10	1	Using Filters	Use the Using Filters Tutorial (above) to familiarize yourself with Photoshop. Submit a screenshot and created file to earn points for this module.
VAP.11	2	Movie Poster: Enhancing Images Experimentation	Use Photoshop and/or Illustrator to create a Movie Poster that meets the following criteria: Puts at least one teacher's head onto a different body or thing. Combines multiple objects not originally placed together in the picture. Incorporates text.
VAP.12	2	Meme: Enhancing Images Experimentation	Use the tutorial to the right to create your own meme in Photoshop.
VAP.13	2	Anaglyph: Enhancing Images Experimentation	Use the tutorial to the right to create an Anaglyph in Photoshop.

Fabrication: Introductory Circuit Building Maker Modules

Module #	Point Value	Module Title	Module Description
ECB.1	1	Coin Cell + Resistor	Build a circuit with a CR 2032 Battery + holder, alligator clips, Red LED, and a 330 Ω resistor. To earn credit for this module, submit a photo of the whole circuit and the LED shining brightly.
ECB.2	1	Tinkercad: Coin Cell + Resistor	IN TINKERCAD: Build a circuit with a CR 2032 Battery + holder, alligator clips, Red LED, and a 330 Ω resistor. To earn credit for this module, submit a photo of the whole circuit and the LED shining brightly.
ECB.3	1	Tinkercad 4AAA + DC Motor + Potentiometer	IN TINKERCAD: Build a circuit with a 4xAAA battery pack, alligator clips, a potentiometer set at 10k Ω , and a DC motor. Notice: What happens if you rotate the potentiometer's knob while running the simulation. To earn credit for this module, submit a screenshot of the circuit zoomed in to show the motors RPMs.
ECB.4	1	4AAA + DC Motor + Potentiometer	Build a circuit with a variable power supply set to 5V (turn with key/flathead screwdriver), alligator clips, a 10k Ω potentiometer, and a DC motor. Notice: What happens if you rotate the potentiometer's knob while the circuit is running. To earn credit for this module, submit a video showing the DC motor spinning (put a flag of tape on rotating gear to make it easy to see the spin)
ECB.5	1	Parallel Coin Cell + Resistor	Build a PARALLEL circuit with a CR 2032 Battery + holder, alligator clips, 2 Red LEDs, and a 330 Ω resistor. To earn credit for this module, submit a photo showing the circuit working, with both LEDs shining brightly.
ECB.6	1	Tinkercad: Parallel Coin Cell + Resistor	IN TINKERCAD: Build a PARALLEL circuit with a CR 2032 Battery + holder, alligator clips, 2 Red LEDs, and a 330 Ω resistor. To earn credit for this module, submit a SCREENSHOT of the whole circuit running in simulation and the LEDs

			shining brightly (with no explosion warning signs).
ECB.7	1	Tinkercad: Parallel LED + DC Motor	In Tinkercad: Build a PARALLEL circuit with a 4xAAA battery pack and two seperate circuit loops as described: Loop 1: 1 LED + 330 Ω Resistor Loop 2: 10kΩ potentiometer + DC motor To earn credit for this module, submit a SCREENSHOT of the whole circuit running in simulation, the LED shining brightly (with no explosion warning signs). and the DC motor spinning.
ECB.8	1	Parallel LED + DC Motor	Build a PARALLEL circuit with a variable power supply set to 5V (turn with key/flathead screwdriver) and two seperate circuit loops as described: Loop 1: 1 LED + 330 Ω Resistor Loop 2: 10kΩ potentiometer + DC motor To earn credit for this module, submit a video of the whole circuit running, the LED shining brightly, and the DC motor spinning.
ECB.9	1	Parallel Red and Blue Coin Cell + Resistor	A CR 2032 battery is used to light up one red LED and one blue LED wired in parallel. The red LED operates optimally at 2.2V while drawing a current of 30 mA, and the blue operates optimally at 3.2V while drawing 20mA. To earn credit for this module, submit BOTH: ■ Design sketch showing calculations needed for resistor values ■ Photo of built circuit with both red and blue LED shining brightly
ECB.10	1	Tinkercad: Parallel Red and Blue Coin Cell + Resistor	IN TINKERCAD: A CR 2032 battery is used to light up one red LED and one blue LED wired in parallel. The red LED operates optimally at 2.2V while drawing a current of 30 mA, and the blue operates optimally at 3.2V while drawing 20mA. To earn credit for this module, submit a SCREENSHOT of the whole circuit running in simulation and both LEDs shining brightly (with no explosion warning signs).
ECB.11	1	Tinkercad: Parallel 3 LEDs + Switch +Coin Cell + Resistor	IN TINKERCAD: A CR 2032 battery is used in parallel to light up 3 or more LEDs of ALL DIFFERENT COLORS. The LED electrical characteristics can be found on the diagram taped next to the LED storage organizer. Each LED must have it's current/voltage regulated by an appropriately calculated resistor. Your circuit must use a single switch that can turn off all the LEDs. To earn credit for this module, submit BOTH: ■ Design sketch showing calculations needed for resistor values

			■ SCREENSHOT of the whole circuit running in simulation and all LEDs shining brightly (with no explosion warning signs).
ECB.12	2	Breadboard Prototyping	Use a breadboard to create a PARALLEL circuit that uses a 3xAA battery pack to light up a minimum of 3 LEDs. Your circuit must include the appropriately calculated resistors and maximize the brightness of the LEDs by lighting in parallel. Design on paper first, then build it. To earn credit for this module, submit BOTH: ■ Design sketch showing calculations needed for resistor values ■ Photo of built circuit with both red and blue LED shining brightly
ECB.13	2	555 Timer	Use this website as a guide to build a simple flashing LED circuit on a breadboard. Once you have the circuit working, experiment with your components in the following ways: What happens to the rate of flashing when you change the capacitance of the capacitor on Pin 2? How can you increase the number of LEDs flashing? (Max current for 555 is 200 mA)

Fabrication: Soldering

Module #	Point Value	Module Title	Module Description
FS.1	1	Soldering Tutorial	Watch this video. In a Google Doc, take notes as you watch. Your notes should include these following: • 5 Steps to Solder • What NOT to do To earn credit for this module, submit the Share Link to your Google Doc of notes.
FS.2	1	Connecting & Soldering for Makers Tutorial Video	Follow along with this video, doing what it demonstrates for each of the 7 Stages. This will walk you through how to strip, connect, and solder wires and other simple components. To earn credit for this module, submit the photo showing completion of the 7th Stage as shown in the video.
FS.3	2	Protoboard Soldering	Watch the video. Using a scrap protoboard (ask to get one), solder the following: ■ 1 LED ■ 1 terminal block ■ 2 jumper wires ■ 1 resistor To earn credit for this module, submit a photo showing the back side (soldered side) of your protoboard once you have finished building.

Fabrication: Micro.Bit Maker Modules

Module #	Point Value	Module Title	Module Description
EM.1	1	Flashing Heart Tutorial	To submit evidence of completion, upload your code file and a short video of your Micro.bit executing your code.
EM.2	1	Name Tag Tutorial	To submit evidence of completion, upload your code file and a short video of your Micro.bit executing your code.
EM.3	1	Smiley Buttons Tutorial	To submit evidence of completion, upload your code file and a short video of your Micro.bit executing your code.
EM.4	1	Dice Tutorial	To submit evidence of completion, upload your code file and a short video of your Micro.bit executing your code.
EM.5	1	Love Meter Tutorial	To submit evidence of completion, upload your code file and a short video of your Micro.bit executing your code.
EM.6	1	Micro Chat Tutorial	Establish a group of 4 Micro.bits that can receive a customized message. To submit evidence of completion, upload your code file and a short video of your Micro.bit executing your code.
EM.7	1	Accelerometer: Create and play the Rock Paper Scissors Game	To submit evidence of completion, upload your code file and a short video of your Micro.bit executing your code.
EM.8	1	Button & If/Else: Coin Flipper Game	To submit evidence of completion, upload your code file and a short video of your Micro.bit executing your code.
EM.9	1	Human Conductivity: Reaction Time Game	To submit evidence of completion, upload your code file and a short video of your Micro.bit executing your code.
EM.10	1	Compass & If/Then Else: Magic Button Trick	To submit evidence of completion, upload your code file and a short video of your Micro.bit executing your code.
EM.11	1	Two-Person Dice	To submit evidence of completion, upload your code file and a short video of your Micro.bit executing your code.
EM.12	1	Mood Radio	Create and operate the Mood Radio. Then, customize the code to include a "shake" and "meh" face. To submit evidence of completion, upload your code file and a short video of your Micro.bit executing your code.
EM.13	1	Fireflies	Create and operate a herd of Fireflies with a minimum of 6 others. To submit evidence of completion, upload your code file and a short video of your Micro.bit executing your code.
EM.14	1	Multiplayer Tele-Potato	Create and operate the Tele-Potato game with a minimum of 3 players. To submit evidence of completion, upload your code file and a short video of your Micro.bit executing your code.

EM.15	1	Gigglebot Line Follower	Connect, Program, and Run the GiggleBot as a line following robot. Use this resource. To submit evidence of completion, upload your code file and a short video of your Micro.bit executing your code.
EM.16	1	Gigglebot Drive Straight!	Use this video to write code that makes your Bot drive in a figure 8 pattern. To submit evidence of completion, upload your code file and a short video of your Micro.bit executing your code.
EM.17	1	Follow the Light: Gigglebot	Modify the Line Follower Code to get the GiggleBot to chase a bright light (use the follow light block). To submit evidence of completion, upload your code file and a short video of your Micro.bit executing your code.
EM.18	1	Control a Servo: Gigglebot	Use this video to see how to mount and code a servo motor that can be used on the Gigglebot. To submit evidence of completion, upload your code file and a short video of your Micro.bit executing your code.
EM.19	1	Light Sensing Beat-Box	Create and operate the Hack Your Headphones project. Modify the code to play different beats that originally coded. To submit evidence of completion, upload your code file and a short video of your Micro.bit executing your code.
EM.20	1	Servo: Milk Carton Robot	Create and operate the Milk Carton Robot project. To submit evidence of completion, upload your code file and a short video of your Micro.bit executing your code.
EM.21	1	Conductivity: Banana Piano	Create and operate the Banana Piano project using at least 3 different fruits. To submit evidence of completion, upload your code file and a short video of your Micro.bit executing your code.

Fabrication: Circuit Express: Physical Computing Maker Modules

Module #	Point Value	Module Title	Module Description		
EPC.1	1	Intro to MakeCode and Circuit Express	TO EARN CREDIT FOR THIS MODULE: Create a customized code that uses all of the built-in Neopixels in a unique, captivating way. Submit a video showing your code AND the Circuit Express actively running the code.		
EPC.2	1	Build a Siren	To earn credit for this module, customize the code in a unique and creative way using both sound and light to catch people's attention. Submit a video showing both the code and the Circuit Express actively running the code.		
EPC.3	1	Build a Night Light	To earn credit for this module, customize the code to do the following: Make the night light increase in brightness, then decrease in brightness; repeating this pulsating behavior forever. Submit a video showing both the code and the Circuit Express actively running the code.		
EPC.4	1	Build a Clap Light	To earn credit for this module, customize the code to do the following: When there is a loud clap the CE (Circuit Express) flashes multiple colors quickly while playing a loud sound; both lasting 1 second before turning off. Submit a video showing both the code and the Circuit Express actively running the code.		
EPC.5	1	Build the Hot Potato Game	To earn credit for this module, customize the code to do the following: Make the hot potato game activated by pushing button B, then showing a unique pattern of light and sound when the game ends. Submit a video showing both the code and the Circuit Express actively running the code.		
EPC.6	2	Build a Cardboard Electric Guitar	To earn credit for this module, customize the code to do the following: The air guitar should play a tone based on the light level, and when the guitar is placed flat on a surface (table) its Neopixels turn on, but when it is picked up and held like a guitar they turn off. Submit a video showing both the code and the Circuit Express actively running the code.		
EPC.7	2	Build an Inchworm Robot	To earn credit for this module, customize the code to do the following: Make the Inchworm robot move forward for 12 cycles when its light sensor detects someone's hand covering it. While it is moving it should play a sound that makes people laugh. When it stops moving, a different sound should play. Submit a video showing the Circuit Express Inchworm actively running the code.		
EPC.8	2	Create an Infrared Treasure Hunt Game	To earn credit for this module, customize the code to do the following: The "Hunter" should play an Neopixel animation while it is "hunting". When the "Hunter" finds a "Treasure", the "Hunter" should play a loud sound and change its Neopixel animation. Once the Hunter has found ALL 3 treasures, it should freak out with visuals and sounds. Code 3 different "Treasures". Each "Treasure" should broadcast its unique number every 5 seconds. Every time it broadcasts its number it should flash a color unique to visually communicate that it has completed its broadcast.		

			Submit a video showing the Hunter locating and responding to each of the 3 Treasures.		
EPC.9	2	Glowing Disembodied Hand	To earn credit for this module, build the hand and modify the code so that if a loud sound is heard the hand begins to glow and flash in a creative, unique way. Submit a video showing the hand doing the above, and include a shot of the code.		
EPC.10	2	Robotic Tappy Hand	To earn credit for this module , build the hand and modify the code so that if a loud sound is heard the hand begins to glow and flash in a creative, unique way. Submit a video showing the hand doing the above, and include a shot of the code.		
EPC.11	2	DIY Light Bot	To earn credit for this module, build the robot and modify the code so that it screams, flashes, and spins in circles if there is too much light. Submit a video showing the robot doing the above, and include a shot of the code.		
EPC.12	1	Remote Controlled Bot	To earn credit for this module , build the robot and modify the code so that the robot can be controlled by a 2nd Circuit Express board working as a handheld remote control. Submit a video showing the robot being controlled by the second Circuit Express board.	2	DIY Light Bot

Fabrication: Micro.Bit: Physical Computing Maker Modules

Module #	Point Value	Module Title	Module Description
EPM.1	0.5	Connect, Program, and Flash	To earn credit for this module: Once you have completed all the steps your challenge for this assignment is to change the code so that your Micro:Bit scrolls YOUR name across the LED Matrix. SUBMIT (for this assignment) a video showing the Micro:Bit scrolling your name across the LED Matrix.
EPM.2	0.5	Compass Bearing	To earn credit for this module, submit a video showing the micro.bit displaying the directions as you move it around.
EPM.3	0.5	Door Alarm	To earn credit for this assignment, modify the tutorial code so that the Micro:Bit flashes a warning signal for 5 seconds after the door is opened. Use the "pause" and multiple "show leds" blocks to achieve the flashing.
EPM.4	1	Thermometer	To earn credit for this module, submit a video showing BOTH the code used and the micro.bit displaying the temperature of the room in F.
EPM.5	1	Step Counter	To earn credit for this assignment, submit a video showing your Micro.Bit counting the "steps" you take, showing its symbol at 20, and restarting its count again.
EPM.6	1	Midi Board, Buzzers, & Pins	Part 1: Design code that uses BOTH Pin 1 and Pin 2 to play some sort of musical creation. Be creative... feel free to incorporate other coding blocks outside of the music category. Part 2: Submit a video of you demonstrating this code in action; show us you touching the Midi Controller; let us hear what it sounds like.
EPM.7	2	Breadboard Spotlight	To earn credit for this assignment, use what you learned in the tutorial to build and program a working Stop Light on the breadboard. Use 3 Leds with appropriate timing. Submit a video of the stoplight working.
EPM.8	1	Alternating LED w/Potentiometer	To earn credit for this assignment, submit a video of the alternating LEDs changing their flash rate in response to you turning the potentiometer dial.
EPM.9	2	Neopixel	Record a video that shows your CODE and the Micro.Bit executing that code as the Micro:Bit does this: The color of the Neopixel responds to the changing value of different inputs. A minimum of 2 different TYPES of inputs must be used. This means if you use Button A for one of your inputs, you can't use Button B for the other one.
EPM.10	2	DC Motor	Your challenge is to write a program that uses one of these inputs to control the speed of the DC motor.

			Inputs you can use: Light Level, Acceleration (x, y, z) (NO you can't use Shake or one of the predefined inputs), Temperature, buttons, etc. To earn credit for this you must submit a video showing the code AND the DC motor changing its speed relative to the variable's value.
EPM.11	1	Servo Motor	Write a program that allows you to do the following: - When Acceleration is positive in the X dimension, the Servo moves to +180 degrees. - When Acceleration is negative in the X dimension, the Servo moves to 0 degrees. - When buttons A+B are pushed, the Servo resets to 90 degrees. To earn credit for this assignment, submit a video showing your code and demonstrating the Micro.Bit operating the program as described in Step 8.
EPM.12	1	HC-SR04 Ultrasonic Detector	To earn credit for this assignment, take a video showing the plotted graph changing in response to you moving an object towards and away from the detector.
EPM.13	1	Radio Communication: Fireflies	To earn credit for this assignment, take a video showing the atleast 5 Micro.bits in the dark flashing synchronously using the firefly code.
EPM.14	2	Remote Control Servo Challenge	Using the tutorials above and your newly gained knowledge, use 2 Micro.bits to achieve the following: When a person clicks the A button on the "remote" Micro.bit, a 2nd Micro.bit receives a radio signal that makes it move the servo 90 degrees. When the B button is pushed on the remote, the servo moves 90 degrees the other direction. To earn credit for this assignment, take a video showing the remote controlling the servo using radio signals.

Fabrication: Raspberry Pi: Physical Computing Maker Modules

Module #	Point Value	Module Title	Module Description
ERi.1	1	Setting Up a Raspberry Pi	To Earn Credit For This Module: Submit a picture showing the complete setup alive and working.
ERi.2	1	Build and Control your first Circuit: LED & Resistor	To Earn Credit For This Module: Modify the code to make the LED flash twice as fast. Submit a video showing the LED flashing fast.
ERi.3	1	Using an Input to Control and Output	To Earn Credit For This Module: Submit a video showing the button controlling the LED.
ERi.4	2	Controlling Multiple LEDS	To Earn Credit For This Module: Submit a video showing Stoplight operating correctly.
ERi.5	2	Controlling RGB LEDS	To Earn Credit For This Module: COMBINE + Modify this code and the button code so that when the button is pushed the RGB LED performs a 5 second, quickly changing light pattern. Submit a video showing the RGB LED performing the pattern when the button is pushed.
ERi.6	1	The Pi Camera	To Earn Credit For This Module: Submit a video showing your ability to take video/pictures with the RPi Camera.
ERi.7	1	Make A Light Sensor	To Earn Credit For This Module: Submit a video showing your Rpi printing light levels in the serial monitor.
ERi.8	1	Dial Controlled Buzzer	To Earn Credit For This Module: Submit a video showing the dial changing the buzzer's output sound.
ERi.9	1	Using an Ultrasonic Distance Sensor	This module will show you how to use an Ultrasonic Distance Sensor to measure distance.

ERi.10	1	Setting up VNC	To Earn Credit For This Module: Submit a screenshot from your laptop showing that you have successfully established remote VNC control of the Rpi.
ERi.11	1	Controlling a Servo Motor	To Earn Credit For This Module: After completing the tutorial, modify the code so the servo moves from 0, to 90, to 180, and then back to 0. Submit a video showing the servo being controlled through the Rpi.
ERi.12	1	Controlling a Relay	To Earn Credit For This Module: After completing the tutorial, modify the code so the Rpi repeats this action 3 times: turns on the gearbox motor for 1 second, off for a second. Submit a video showing the DC motor executing this 4x repeating code through the relay.
ERi.13	1	DC Motor with Motor Controller	To Earn Credit For This Module: After completing the tutorial, use the code provided in the website instructions so you can control the motor using keyboard input. Submit a video showing the DC motor changing its behavior as you input key presses.
ERi.14	3	Robot Buggy	To Earn Credit For This Module: After completing the tutorial, modify the code so the robot drives in a repeating figure 8 six times. Submit a video showing the robot doing the figure 8 six times.

Visual Design: 3D Modeling & Animation with Blender Maker Modules

Module #	Point Value	Module Title	Module Description
V3MA.1	2	Blender: Absolute Beginner Part 1	In this absolute beginner tutorial series I will show you everything you need to get started. How to download and set up Blender. How the User Interface works and how to work with panels. How to create objects and assign materials to them. How to add lights and cameras into your scenes. And finally, how to use EEVEE or Cycles to render and save your final images! To earn credit for this module, submit a screenshot of your final rendered creation.
V3MA.2	2	Blender: Modeling Part 2	Arrr matey! Let's learn 3D modelling in Blender 2.9! In this absolute beginner tutorial I will show you how to turn a basic cube into a cool looking PIRATE TREASURE CHEST! To earn credit for this module, submit a screenshot of your partially completed Pirate Treasure Chest.
V3MA.3	2	Blender: Materials Part 3	Learn how to CREATE & ASSIGN MATERIALS in Blender 2.9! In this tutorial I will show you how to work with Materials in Blender and assign them to all - or parts of - your models to dress them up nicely. To earn credit for this module, submit a screenshot of your partially completed Pirate Treasure Chest with materials incorporated.
V3MA.4	2	Blender: Texture Part 4	Learn how to use TEXTURE MAPPING in Blender 2.9! In this tutorial you will learn how to assign textures to your materials and use UV MAPPING to control where and how they are applied to your 3D models. To earn credit for this module, submit a screenshot of your completed Pirate Treasure Chest.
V3MA.5	1	Cube Owl Tutorial Part 1: Blocking	Follow the video tutorial to begin building the cube owl. To earn points for this module submit a screenshot of the owl sculpture once you've finished this first video.
V3MA.6	1	Cube Owl Tutorial Part 2: Modeling	Follow the video tutorial to begin building the cube owl. To earn points for this module submit a screenshot of the owl sculpture once you've finished this first video.
V3MA.7	1	Cube Owl Tutorial Part 3: Shading	Follow the video tutorial to begin building the cube owl. To earn points for this module submit a screenshot of the owl sculpture once you've finished this first video.
V3MA.8	1	Cube Owl Tutorial Part 4: Rendering	Follow the video tutorial to begin building the cube owl. To earn points for this module submit a screenshot of the owl sculpture once you've finished this first video.
V3MA.9	2	Animation Tutorial	Learn how to create ANIMATION in BLENDER! In this tutorial I will show you how to create KEYFRAMES & work with the DOPE SHEET to breath some life into your 3D scenes! To earn credit for this module you must create your OWN animation using the character provided in the tutorial, then submit a video (take with your phone) showing the animation that you created.

V3MA.10	1	Walking Character Tutorial	Learn how to model, rig and animate a walking character in 15 minutes! We'll create a quadruped that can walk in any direction, using a combination of curves, constraints and armature. Then we'll tie it all together with random movement, giving it life and personality! To earn credit for this module, submit a video (use your phone) of your created walking character.
V3MA.11	1	How to Blender to 3D Print	A detailed guide of the basics of bringing a file into and out of blender for 3d printing. We will be doing a minor change and then export it as an .stl and .obj for 3d printing. ■ This tutorial is appropriate for working with an already created 3D print-friendly model. To earn credit for this module, you must 3D print the modified part.
V3MA.12	2	How to Export STL from BLender	Once you've made your 3D model in Blender, how to you turn it into a file for 3D printing? I'll show you 2 ways to get your hard work into an STL and how to correct for common modeling problems using free software. ■ This tutorial is appropriate for taking a 3D model created in Blender and preparing it for printing. To earn credit for this module, you must use the instructions from the tutorial to prep the Cube Owl model (from V3MA.8) for 3D printing, and then actually print it!

Visual Design: 3D Design with Tinkercad

Module #	Point Value	Module Title	Module Description
V3D.1	1	Introduction to Tinkercad	Use the video to see how to log in to tinkercad.com using the code your teacher provided or your school Google Account credentials. To earn credit for this Maker Module, complete the 10 Starter Lessons. Submit a screenshot showing you have completed the 10th Starter Lesson.
V3D.2	1	Cylinder Earrings	Complete the Cylinder Earrings Tinkercad Lesson. To earn credit for this module, submit screenshot of the completed Cylinder Earring
V3D.3	1	Skull Button	Complete the Skull Button Tinkercad Lesson. To earn credit for this module, submit screenshot of the completed Skull Button
V3D.4	1	Die from Scratch	Complete the Die from Scratch Tinkercad Lesson. To earn credit for this module, submit screenshot of the completed Die from Scratch
V3D.5	1	Key Ring Letters	Complete the Key Ring Letters Tinkercad Lesson. To earn credit for this Module, submit a screenshot of the completed Key Ring with YOUR own custom message written.
V3D.6	1	Saw Shaped Wrench	Complete the Saw Shaped Wrench Tinkercad Lesson. To earn credit for this Module, submit a screenshot of the completed Saw Shaped Wrench <i>with a customized addition added to it</i> .
V3D.7	1	Make a Gear	Complete the Make A Gear Tinkercad Lesson. To earn credit for this Module, submit a screenshot of the completed Gear <i>with your INITIALS added to it in negative space</i> .
V3D.8	1	Build a House/Log Cabin	Complete the Build A House OR Log Cabin Tinkercad Lesson. To earn credit for this Module, submit a screenshot of the completed House <i>OR</i> Log Cabin.
V3D.9	1	Roman Dome with Columns	Complete the Roman Dome with Columns Tinkercad Lesson. To earn credit for this Module, submit a screenshot of the completed dome <i>AFTER</i> you have customized it to match your personality.
V3D.10	1	Build a Spaceship	Complete the Create a Spaceship Tinkercad Lesson. To earn credit for this Module, submit a screenshot of the completed Spaceship <i>AFTER</i> you have customized it to match

			your personality.
V3D.11	1	Design A Stadium	Make a Copy of the Design a Stadium Tinkercad Design and use the pre-designed parts to make your own World Cup or World Series Stadium. To earn credit for this Module, submit a screenshot of the completed your completed Stadium <i>AFTER</i> you have customized it to match your favorite sports team.
V3D.12	1	Coding Complex 3D Patterns	This module has two steps: 1. Complete the "Learn to Design with Code Quick-Start Guide" at this link. This will teach you how to interact with Tinkercad's coding platform (easy!) 2. Write a piece of code which creates a thing composed of a minimum of 4 individual components. To earn credit for this module, you must submit a GIF of the Tinkercad design and a screenshot of the code that built it.

Visual Design: Sketchup Maker Modules

Module #	Point Value	Module Title	Module Description
VSKUP.1	1	Getting Started with Sketchup: Dog House	Complete the tutorial linked on the left to create the dog house. Follow the video instructions. When complete, be sure to SAVE your work into your Google Drive. To earn credit for this module you must submit BOTH: ■ Share Link to your Sketchup Design of the dog house. ■ Submit a screenshot showing your completed design.
VSKUP.2	1	Table Design	Complete the tutorial linked on the left to create the table. Follow the video instructions. When complete, be sure to SAVE your work into your Google Drive. To earn credit for this module you must submit BOTH: ■ Share Link to your Sketchup Design of the table. ■ Submit a screenshot showing your completed design.
VSKUP.3	2	Complete Chess Game	Complete the tutorial linked on the left to create the chess board and pieces. Follow the video instructions. When complete, be sure to SAVE your work into your Google Drive. To earn credit for this module you must submit BOTH: ■ Share Link to your Sketchup Design of the chess board and pieces. ■ Submit a screenshot showing your completed design.
VSKUP.4	1	Spiral Staircase	Complete the tutorial linked on the left to create the Spiral Staircase. Follow the video instructions. When complete, be sure to SAVE your work into your Google Drive. To earn credit for this module you must submit BOTH: ■ Share Link to your Sketchup Design of the Spiral Staircase. ■ Submit a screenshot showing your completed design.
VSKUP.5	1	Lighthouse and Island	Complete the tutorial linked on the left to create the Lighthouse and Island. Follow the video instructions. When complete, be sure to SAVE your work into your Google Drive. To earn credit for this module you must submit BOTH: ■ Share Link to your Sketchup Design of the Lighthouse and Island. ■ Submit a screenshot showing your completed design.
VSKUP.6	1	Thor's Hammer	Complete the tutorial linked on the left to create Thor's Hammer. Follow the video instructions. When complete, be sure to SAVE your work into your Google Drive. To earn credit for this module you must submit BOTH: ■ Share Link to your Sketchup Design of Thor's Hammer. ■ Submit a screenshot showing your completed design.

VSKUP.7	2	Basic House for Beginners	Complete the tutorial linked on the left to create a simple house. Follow the video instructions. When complete, be sure to SAVE your work into your Google Drive. To earn credit for this module you must submit BOTH: ■ Share Link to your Sketchup Design of the house. ■ Submit a screenshot showing your completed design.
VSKUP.8	1	Water Tower	Complete the tutorial linked on the left to create water tower. Follow the video instructions. When complete, be sure to SAVE your work into your Google Drive. To earn credit for this module you must submit BOTH: ■ Share Link to your Sketchup Design of the water tower. ■ Submit a screenshot showing your completed design.
VSKUP.9	2	Pirate Ship Playhouse	Complete the tutorial linked on the left to create a Pirate Ship Playhouse. Follow the video instructions. When complete, be sure to SAVE your work into your Google Drive. To earn credit for this module you must submit BOTH: ■ Share Link to your Sketchup Design of the Pirate Ship Playhouse. ■ Submit a screenshot showing your completed design.
VSKUP.10	1	Structural Part Tutorial	Complete the tutorial linked on the left to create a Structural Part Tutorial. Follow the video instructions. When complete, be sure to SAVE your work into your Google Drive. To earn credit for this module you must submit BOTH: ■ Share Link to your Sketchup Design of the part. ■ Submit a screenshot showing your completed design.
VSKUP.11	1	3D Model from 2D Picture	Complete the tutorial linked on the left to learn how to create 3D models from 2D graphics. Follow the video instructions. When complete, be sure to SAVE your work into your Google Drive. To earn credit for this module you must submit BOTH: ■ Share Link to your Sketchup Design of the completed 3 models. ■ Submit a screenshot showing your completed design.
VSKUP.12	1	Match Photo Tutorial	Use one or both of the videos to the left to learn how to use the Photo Match feature of Sketchup. Follow along with the tutorial to build the example structure. The sizing, materials, structure, and detail should be as close as possible to the actual items. To earn credit for this module you must submit BOTH: ■ Share Link to your Sketchup Design of the structure you modeled from the example photo. ■ Submit a screenshot showing your completed design.
VSKUP.13	2	Classroom Model	Complete the tutorial linked on the left to create a model of a classroom. Follow the video instructions. When complete, be sure to SAVE your work into your Google Drive.

			To earn credit for this module you must submit BOTH: ■ Share Link to your Sketchup Design of the Model Classroom. ■ Submit a screenshot showing your completed design.
VSKUP.14	3	Scene Design: Lord of the Rings	Complete the tutorial linked on the left to create scenes from the Lord of the Rings. Follow the video instructions. When complete, be sure to SAVE your work into your Google Drive. To earn credit for this module you must submit BOTH: ■ Share Link to your Sketchup Design of the Lord of the Rings Scenes. ■ Submit a screenshot showing your completed design.
VSKUP.15	3	Custom Castle	Complete the tutorial linked on the left to a Custom Giant Castle. Follow the slideshow instructions. When complete, be sure to SAVE your work into your Google Drive. Your final custom giant castle must have: ■ +16 Round Turrets ■ +6 Structures ■ A Moat ■ +2 Imported models that fit the theme (people, animals, objects, etc) To earn credit for this module you must submit BOTH: ■ Share Link to your Sketchup Design of the Giant Custom Castle. ■ Submit a screenshot showing your completed design.
VSKUP.16	2	3x Custom Creation	Pick 3 items that interact with each other (EX: table, chair, stool). Create an accurate Sketchup model that has each of these items as separate components. The sizing, materials, structure, and detail should be as close as possible to the actual items. To earn credit for this module you must submit BOTH: ■ Share Link to your Sketchup Design of the 3 items ■ Submit a screenshot showing your completed design.

Visual Design: Adobe XD Modules

Module #	Point Value	Module Title	Module Description
VAXD.1	2	Getting Started in XD	01: Create and style an artboard. 02: Import content with Repeat Grid. 03: Define interactivity. 04: Reuse colors and character styles. 05: Final touches. - Complete the linked tutorial to get started with Adobe XD: <i>make sure you download the tutorial files before starting</i>. To earn credit for this module submit a screenshot showing your final design AND your final XD final (uploaded into Google Drive)
VAXD.2	2	Prototyping in XD	01: Wire artboards. 02: Add Auto-Animate transitions. 03: Use Drag gestures for transitions. 04: Add overlays to simulate UI elements. 05: Voice triggers and speech playback. - Complete the linked tutorial to get started with Adobe XD: <i>make sure you download the tutorial files before starting</i>. To earn credit for this module submit a screenshot showing your final design.
VAXD.3	2	Using Components and Libraries	01: Create design components. 02: Vary component instances. 03: Nest and swap components. 04: Publish a library. 05: Browse a library. - Complete the linked tutorial to get started with Adobe XD: <i>make sure you download the tutorial files before starting</i>. To earn credit for this module submit a screenshot showing your final design AND your final XD final (uploaded into Google Drive)
VAXD.4	2	Collaboration	01: Publish a prototype. 02: Gather stakeholder feedback. 03: Export your design. 04: Review Design Specs. - Complete the linked tutorial to get started with Adobe XD: <i>make sure you download the tutorial files before starting</i>. To earn credit for this module submit a screenshot showing your final design AND your final XD final (uploaded into Google Drive)
VAXD.5	2	Business Website Tutorial	Design and prototype a website for a fictional business. 0:00 - Intro

			■ 1:17 - You want to learn UI/UX? ■ 2:09 - XD Interface Overview ■ 10:42 - Background Photograph ■ 13:17 - Navbar Design ■ 33:50 - Hero Section Design ■ 49:20 - Finalizing the Design ■ 53:30 - Lottie Animation ■ 57:20 - Other Prototyping ■ 1:00:14 - Final thoughts ■ Complete the linked tutorial to get started with Adobe XD: <i>make sure you download the tutorial files before starting</i>. To earn credit for this module submit a screenshot showing your final design AND your final XD final (uploaded into Google Drive)
VAXD.6	1	How to Wireframe	■ Learn how to wireframe in this Adobe XD tutorial. I share my wireframing process for a website as redesign the homepage of my portfolio site. I start with sketching simple wireframes in Procreate on an iPad Pro. Then I create low fidelity wireframes in Adobe XD. ■ Complete the linked tutorial to get started with Adobe XD. To earn credit for this module submit a screenshot showing your final design AND your final XD final (uploaded into Google Drive)
VAXD.7	2	Animation Tutorial	■ In this Adobe XD animation tutorial, you will learn how to create animations but not only – you will see how you can co-operate between Photoshop and XD to make a perfect web or app design that is animated. ■ Complete the linked tutorial to get started with Adobe XD. To earn credit for this module submit a screenshot showing your final design AND your final XD final (uploaded into Google Drive)
VAXD.8	2	App Login/Sign Up Page	■ In this Adobe XD tutorial, you'll learn how to create a Signup Page that is compatible with mobile devices. You will also have two app prototypes available. ■ The most important key takes are the way you use spacing appropriately, aligning, and creating gradients. It's a very simple tutorial but it will do a good job to introduce you to app design. ■ Complete the linked tutorial to get started with Adobe XD. To earn credit for this module submit a screenshot showing your final design AND your final XD final (uploaded into Google Drive)
VAXD.9	2	Design and Prototype a Game Menu	■ This tutorial will demonstrate how to design a game user interface in Adobe XD. We will also take a look at how to create and animate everything for the final prototype. This video is sponsored by MSI. Be sure to download the project files in the youtube video description. ■ Complete the linked tutorial to get started with Adobe XD. To earn credit for this module submit a screenshot showing your final design AND your final XD final (uploaded into Google Drive)
VAXD.10	2	Smart Home App	■ This video is all about Smart Home App UI Design in Adobe XD with vibrant gradient color combinations. The circular control UI, Slider Button UI, Tab design UI and Card design UI all in one tutorial. Be sure to download the project files in the youtube video description. ■ Complete the linked tutorial to get started with Adobe XD. To earn credit for this module submit a screenshot showing your final design AND your final XD final (uploaded into Google Drive)

Maqueen Plus Micro.Bit Robot Modules

Module #	Point Value	Module Title	Module Description
EMaq.1	1	Simple: Connect and Move Maqueen	Screenshot of your final code AND a video showing the Maqueen robot moving forward for 1 second, then backward for another second, and finally coming to a complete stop.
EMaq.2	1	Simple: Running Emoji Bot	When powered on, Maqueen drives forward in a square shape with a sad face on its LED matrix. When it finishes the square it stops driving and shows a happy face for 2 seconds before going blank.
EMaq.3	1	Simple: Rescue Bot	When powered on, Maqueen drives forward in a square shape, stops, and then drives the same shape in reverse. While driving, Maqueen's buzzer is activated to play an ambulance sound, while it's two front red LEDs flash back and forth in an alternating pattern.
EMaq.4	2	Int: Light Chaser	When powered on, Maqueen displays the current light level on its LED matrix. Maqueen drives forward when a light is shined on it's LED matrix and stops when it is dark. <i>BONUS CHALLENGE: Make Maqueen's forward speed directly controlled by the brightness of the light. (Hint: use your cell phone flashlight to test)</i>
EMaq.5	2	Int: Rave Mobile	Building on the Light Chaser module above, add the following behavior to the code you already made Maqueen does the following: When powered on, Maqueen displays the current light level on its LED matrix. Maqueen drives forward when a light is shined on it's LED matrix and stops when it is dark. Every time it drives forward, it plays a face paced melody and its 4 underbody RGB LED light turn on in a rapidly changing animated pattern. When it stops moving, the music and underbody LEDs turn off.
EMaq.6	2	Int: Ultrasonic Distance Sensing	When powered on, Maqueen displays the current distance reading from the ultrasonic sensor (in cm) on its LED matrix. Maqueen will drive forward when the distance is greater than 30 cm. If the distance is less than 30 cm, it stops, turns on BOTH front red LEDs, turns left, and starts to drive forward again if the distance is greater than 30 cm. Whenever the distance is greater than 30 cm, the front LED lights are off.
EMaq.7	1	Int: The Clapper	MODIFY THE CODE BELOW TO DO THE FOLLOWING: When powered on, Maqueen displays the current sound level reading on its LED matrix. Maqueen will drive forward when the sound level increases due to you clapping. When Maqueen drives forward the underbody LEDs are BLUE. When you are NOT clapping, the underbody LEDs are red and Maqueen stops moving.
EMaq.8	2	Int: Explora-Bot	When powered on, Maqueen begins to explore its surroundings and displays the following behaviors: 1. It does not hit objects as it moves. 2. It uses its LEDs (all) to let people know where it is and what it is doing. The LEDs change according to its motion. 3. Its plays sounds that help people know where it is and what it is doing. The sound changes according to its motion. 4. It starts and stops when a human supplies an input. 5. It shows emotion through its LED matrix.

			6. It moves forward, backward, and turns both left and right.
EMaq.9	2	Int: Servo Activated STOP Flag	When powered on, Maqueen displays the current distance reading from the ultrasonic sensor (in cm) on its LED matrix. Maqueen will ■ drive forward when the distance is greater than 20 cm. ■ If the distance is less than 40 cm, it raises a STOP flag using the servo. ■ If the distance is more than 40, it lowers the STOP flag using the servo. ■ If the distance is less than 20 cm, turns on BOTH front red LEDs, turns left, and starts to drive forward If the distance is greater than 20 cm, the front LED lights are off.
EMaq.10	2	Adv: Wii Controller Tutorial	When powered on, Maqueen will... ■ move according to the movement of the remote control Micro.bit (using the accelerometer) ■ Make a sound when Button A is pushed on the remote control ■ Flash its underbody LEDs when Button B is pushed The remote will show arrows on its LED array to match its accelerometer readings and the message sent to Maqueen.
EMaq.11	2	Adv: Game Controller Remote Bot	When powered on, Maqueen will... ■ move according to the movement of the remote control Micro.bit (using the accelerometer) ■ Make a sound when Button A is pushed on the remote control ■ Flash its underbody LEDs when Button B is pushed The remote will show arrows on its LED array to match its accelerometer readings and the message sent to Maqueen.
EMaq.12	1	Adv: Customized Light Remote Control	This module will build off of the module before it. You should use the code from Module #11 to start. Modify the code for both the Maqueen robot and the controller so the following can happen: ■ Use the controller to drive Maqueen around in a controlled manner. ■ Add to the programs so you can control the underbody LEDs.
EMaq.13	1	Adv: Customized Sound Remote Control	Modify the code for both the Maqueen robot and the controller so the following can happen: ■ Use the controller to drive Maqueen around in a controlled manner. ■ Add to the programs so you can control the underbody LEDs. ■ Add to the programs so you can control sound production with the robot.
EMaq.14	1	Adv: Customized Servo Remote Control	This module will build off of the module before it. You should use the code from Module #13 to start. Modify the code for both the Maqueen robot and the controller so the following can happen: ■ Use the controller to drive Maqueen around in a controlled manner. ■ Add to the programs so you can control the underbody LEDs. ■ Add to the programs so you can control sound production with the robot. ■ Add to the programs so you can control the servo mounted on the robot.
EMaq.15	3	Adv: Smart Remote Control Bot	Modify the code for both the Maqueen robot and the controller so the following can happen: ■ Use the controller to drive Maqueen around in a controlled manner. ■ Add to the programs so you can control the underbody LEDs. ■ Add to the programs so you can control sound production with the robot. ■ Add to the programs so you can control the servo mounted on the robot. ■ Add to the Maqueen program so that the robot can use the ultrasonic detector to avoid hitting things AND will announce it's avoidance tactics using sound and light.

Arduino Uno Modules

Module #	Point Value	Module Title	Module Description
EArđ.1	1	Getting Started with Arduino Uno	To earn credit for this assignment, submit a video showing you and your Arduino with the built-in LED flashing twice per second.
EArđ.2	1	Digital Read Serial	To earn credit for this assignment, alter the tutorial's code to check the state of the button 10 times per second. Submit a short video showing the serial value changing as you press the button. *** HINT: You have a different board than the one pictured in the tutorial. MAKE SURE YOU PAY ATTENTION to the label of the pins and use the correct pin to make the connections.
EArđ.3	1	Fade LED	To earn credit for this assignment, MODIFY the code to make the LED fades on and off 3 times as slow. Submit a video showing the LED on the breadboard fading in and out AND explain verbally what you changed in the code to achieve this.
EArđ.4	1	Read Voltage w/Potentiometer	To earn credit for this assignment, submit a video showing the serial monitor change as you turn the potentiometer.
EArđ.5	1	Button LED	Submit a To earn credit for this assignment, MODIFY this code AND circuit by adding in an external LED (like in EArđ.3) and having the button turn the LED on when it is pressed. Submit a video showing the LED on the breadboard turning on and off with a button push AND explain verbally what you changed in the code to achieve this.
EArđ.6	1	Debounce	Submit a To earn credit for this assignment, MODIFY this code AND circuit by adding in an external LED (just like you did in EArđ.5) and having the debounced button turn the LED on when it is pressed. Submit a video showing the LED on the breadboard turning on and off with a button push AND the code that is making this happen.
EArđ.7	1	Input Pullup Serial	Submit a To earn credit for this assignment, MODIFY this code AND circuit by adding in an external LED (just like you did in EArđ.5 & 6) and having the debounced button turn the LED on when it is pressed. Submit a video showing the LED on the breadboard turning on and off with a button push AND the serial monitor showing the corresponding switch in read digits.
EArđ.8	1	State Change Detection	Submit a To earn credit for this assignment, MODIFY this code AND circuit by adding in an external LED (just like you did in EArđ.5 & 6) and having the debounced button turn the LED on when it is pressed. Submit a video showing the LED on the breadboard turning on and off with a button push AND the serial monitor showing the increasing count of button pushes.
EArđ.9	2	Force Sensor Keyboard	To Earn Credit For This Module: Submit a video showing your keyboard operating and making sound. A small speaker or buzzer will work.
EArđ.10	2	Light Theremin	To Earn Credit For This Module: Submit a video of this circuit operating, changing pitch as the light value of the photoresistor changes. A small speaker or buzzer will work. <u>ALTERNATE: YOU CAN USE THIS VIDEO TUTORIAL TO HACK A PAIR OF CHEAP HEADPHONES</u> (ask the teacher for some)
EArđ.11	2	Night Rider	To Earn Credit For This Module: Modify the code to go 3 times as fast as shown in the tutorial. Submit a video showing the 6 LEDs mimicking the car from the TV show "Knight Rider".
EArđ.12	1	Witty Switch	To Earn Credit For This Module: Modify the code so that the Arduino appears to be "intelligent" as it responds to light levels with witty sayings. Submit a video showing how you can make the Arduino print witty statements using a shadow to mess with it.

EArd.13	1	Knock Detector	To Earn Credit For This Module: Modify the code so that the Arduino is sensitive to loud sounds, and prints "It's Too Loud" when a loud sound is detected. Submit a video showing how you can make the Arduino print "It's Too Loud".
EArd.14	1	Dial-Controlled Servo	To Earn Credit For This Module: Submit a video showing how you can make the Arduino move a servo.
EArd.15	1	Ultrasonic Distance Detector	To Earn Credit For This Module: Submit a video showing the LEDs on the breadboard responding to a changing distance reading from the Ultrasonic Detector.
EArd.16	1	DC Motor Control	To Earn Credit For This Module: Submit a video showing the Arduino controlling a DC Motor. Put a piece of tape on the motor's axle so it is easy to see when spinning.
EArd.17	2	Pulse Sensor	Submit a video of the pulse sensor in operation, with the measured pulse displayed in the serial monitor.

Visual: Adobe Illustrated Laser Etching Maker Modules

Module #	Point Value	Module Title	Module Description
FALE.1	1	AHS Makerspace Laser Tutorial	Use the tutorial above to introduce yourself to the Makerspace Lasers. Using the sample file provided in the tutorial, create your own cardboard cut and etched print. Submit a photo providing evidence of completion to earn points for this Module.
FALE.2	1	Practicing Basic Laser Cutting	Use the tutorial video provided to cut a design on the laser that meets these requirements: - Is 4"x4" square - Made of cardboard - Includes these features: 4 Cut Shapes 4 Cut text examples Submit a photo providing evidence of completion to earn points for this Module.
FALE.3	2	Engraving a Photo	Use the tutorial video provided to learn how to take a color portrait of yourself and prepare it for engraving in Adobe Illustrator. Module Requirements: - Take a photo of yourself in front of a simple, solid color background and use this photo for the module. - Is 1.5"x1.5" square: CUT OUT USING LASER - Made of cardboard - Has your name and date engraved in text near one corner. To Earn Credit For This Module: Submit a photo of the laser cut cardboard design you created.

FALE.4	2	3D Text Emblem	Use the tutorial video provided to create a 3D appearing Text Emblem in Illustrator. Using what you have learned in the video, create your own that meets these requirements: Module Requirements: 1. Create a 3D Text Emblem that has two words: STEAM and Your Name. 2. Is 1.5"x1.5" square: CUT OUT USING LASER 3. Made of cardboard 4. Has your name and date engraved in text near one corner. 5. NOTICE: <i>Purposefully use different colors in your design and watch how the laser changes its power output based on that color when it engraves.</i> To Earn Credit For This Module: Submit a photo of the laser cut cardboard design you created.
FALE.5	1	Offset Path Name Tag	Use the tutorial video provided to create a keychain name tag using the Offset Path tool in Adobe Illustrator. Use what you learn in the video to complete the module's requirements: Module Requirements: 1. Create a small wooden name tag with your first name. 2. Is no bigger than 2" x 2" 3. Made of WOOD: Cut out using the outer offset path 4. Must have a hole added for a key ring (ask teacher for a metal key ring once you are done!) To Earn Credit For This Module: Submit a photo of the laser cut wood keychain you created.
FALE.6	2	Live Tracing to Prep Graphics	Use the tutorial video provided to learn how to take a black and white "dirty" graphic and clean it up so it can be crisply engraved. Module Requirements: 1. Google Image Search "black and white carton character sketch" and copy an image into Illustrator to use for this module. 2. Is 1.5"x1.5" square: CUT OUT USING LASER 3. Made of cardboard 4. Has your name and date engraved in text near one corner. To Earn Credit For This Module: Submit a photo of the laser cut cardboard design you created.
FALE.7	2	QR Code + STEAM Logo Combo	Use the short bare-bones tutorial video provided to see the workflow from Canva to Adobe Illustrator that will allow you to create an engravable QR code. Use what you have learned about Illustrator to edit the STEAM logo so that the QR Code is in the center of the spiral gear arms, replacing the STEAM text. Link to use for QR Code: https://www.ahschools.us/Page/36416 STEAM Logo to download: Click here Module Requirements: 1. Is no bigger than 1.5" x 1.5" & is cut out of the cardboard by the laser.

			- Made of cardboard. - Must have an engraved QR code that when scanned takes the viewer to the STEAM Website. - Must utilize the STEAM Logo as part of the design. - The text of the STEAM logo has been edited OUT of the design and the QR code is centered in the STEAM logo. To Earn Credit For This Module: Submit a photo of the laser cut cardboard design you created.
FALE.8	2	Engraved Canva Logo	Watch this tutorial showing how to create a logo in Canva. Follow along with the video and then create your own engravable logo that can be downloaded and brought into Adobe Illustrator. It must meet these requirements: Module Requirements: - Is no bigger than 1.5" x 1.5" & is cut out of the cardboard by the laser. - Includes your first and/or last name - Includes a graphic - Is professional and visually captivating - The design is optimized to be easy to see when engraved. To Earn Credit For This Module: Submit a photo of the laser cut cardboard design you created.
FALE.9	2	Pre-Painted Engraving	Watch the 2 videos to the left to see how you can engrave pre-painted surfaces. Using the videos to guide your design efforts, creatively spray or brush paint a 2" x 2" cardboard mat board square, allow it to dry overnight, and then engrave a unique design into it. Module Requirements: - Is engraved onto a 2" x 2" pre-painted and dried mat board square. - Includes the STEAM Logo, Your Name, AND 1 additional graphic. - Is professional and visually captivating - The design is optimized to be easy to see when engraved. To Earn Credit For This Module: Submit a photo of the laser cut finished, painted, mat board design you created..
FALE.10	2	Engraving on a Mini-Canvas	Watch the 2 videos to the left to see how you can engrave an photograph onto a pre-painted canvas. Using the videos to guide your design efforts, creatively spray or brush paint a mini canvas frame (ask teacher for one), allow it to dry overnight, and then engrave a unique design into it. Module Requirements: - Is engraved onto a mini pre-painted and dried canvas frame. - Engraves a photographic image that has been optimized for engraving. (<i>Watch the lower video to see how to edit the image to best appear when engraved - the video isn't in Adobe Ill but it shows you what you need to do with the image</i>) - Is professional and visually captivating. To Earn Credit For This Module: Submit a photo of the laser cut finished, painted, mini canvas design you created.
FALE.11	2	Experimental Engraving on Fabric Scraps	Watch this tutorial to see how laser engraving can be used on fabric. Your goal for this module is to experiment with a minimum of 3 different fabrics. Follow this procedure to complete the module:

			Procedure: 1. Create a NEW design that is 1.5" x 1.5" and has space for text to be shown (<i>See Example #1</i>) 2. Using the scrap fabric bins in the Makerspace, find 3+ different fabric types and cut out a 2"x2" square from the edge of each (<i>Cut smart to limit waste and allow others to use the scrap again later</i>) 3. Repeat Steps 3-6 on each of the different fabric types. 4. Identify the print settings you will use to engrave the fabric (<i>see Suggested Settings below = especially the small print at the bottom!</i>) 5. In the text space of your design, write out the settings you will use in this experimental engraving: Include DPI, Speed, and Power. 6. Engrave your design onto the fabric scrap using the chosen settings. HINT: You might need to tape down the edges of the fabric to prevent the airflow from blowing it around during engraving. To Earn Credit For This Module: Submit a photo of ALL of the laser cut fabric experiments you engraved laid out next to each other for comparison.
FALE.12	2	Laser Engraving with AI Design Tool	Watch this tutorial showing how to tap into the design abilities of Illustrator's newly introduced AI design tool. Follow along with the video and then create your own engravable design with the AI tool that meets these requirements: Module Requirements: 1. Is no bigger than 1.5" x 1.5" & is cut out of the cardboard by the laser. 2. Made of cardboard. 3. Fills the whole 1.5" square piece. 4. The image must be edited so that when it is engraved there is contrast between the image's parts and it is easy to see the image even on cardboard. To Earn Credit For This Module: Submit a photo of the laser cut cardboard design you created.