Project 1: Ideating 3 Topics to Explore, 1 Path to Follow

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DESN34665
Interaction Design: Special Topics

Design Statement

This 3D modeled guitar is the result of 5 weeks of exploration into 3D topics (3D printing, 3D projecting, and 3D modeling) leading to a decision to further my understanding and skills in the topic of 3D modeling. Within exploration of these topics I had the opportunity to learn about the industries, technological progress, and creative opportunities related to each field, and asses how my own interests aligned to them. In my decision to focus on 3D modeling, I was then able to choose a 3D modeling platform to take up (Blender) and begin learning; working towards the result of making a complex item without the aid of a tutorial.

Skills Assessment

Week 1

Week 1 I completed a skills assessment in which I rated and described my current skill level, interest in developing, and goal skill level for 3D modeling, printing, and projecting. This helped me figure out which path I wanted to focus most on as well as what a feasible goal is in terms of learning and improving my skills.

I ended up deciding that I wanted to focus on learning to 3D model.

	3D Modeling	3D Printing	3D Projecting
Interest in Developing	10	4	2
Current Skill Level	3	2	1
Goal Skill Level	7	6	3

Link to Web Template with full Skills Assessment

Action Research

Week 2

Week 2 I did research into the concept of Action Research and how it is important to the iterative and learning process.

I learned that at its core, Action Research is a commitment to learning from mistakes, and therefore relies on repeating the Action Research process more than once.

You cannot learn from your mistakes if you do not try another solution; you cannot try another solution if you don't conclude what went wrong; you cannot make that conclusion if you don't analyze the idea as a whole; you cannot analyze without actually testing the idea; and you cannot test an idea without planning it. Thus repeating the cycle.

Each step in the cycle is reliant on all those that come before it; you cannot learn if you don't try and try again.

This process of learning from my mistakes is what guided me through my learning and creation in this project.

Choosing a Platform

Week 3

After deciding that I wanted to learn to 3D model, next I had to decide what platform I was going to use. In a conversation with my instructor, I was asked what sort of work I wanted to be doing with my 3D modeling, as that would effect which platform I would choose. Once I said I wanted to create 3D models and assets that would show my skill on a portfolio, they suggested Blender, as it is free and commonly used in the industry.

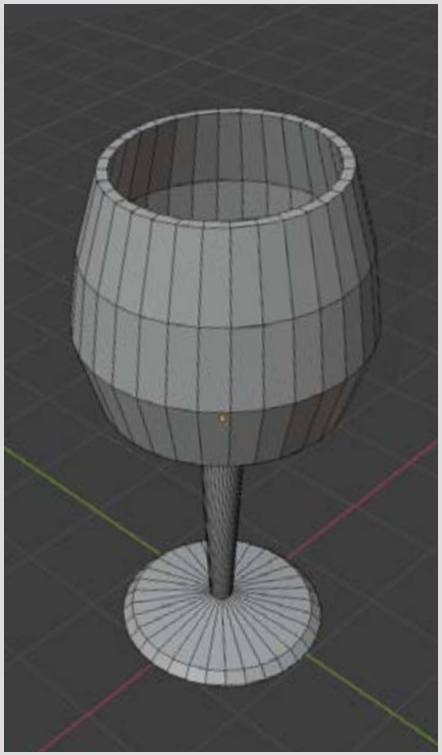
However, I was warned that Blender has a steep learning curve compared to other 3D modeling software, such as Cinema 4D and Spline, so I would need to rely a lot on existing tutorials for the beginning of my learning before I got the hang of it.

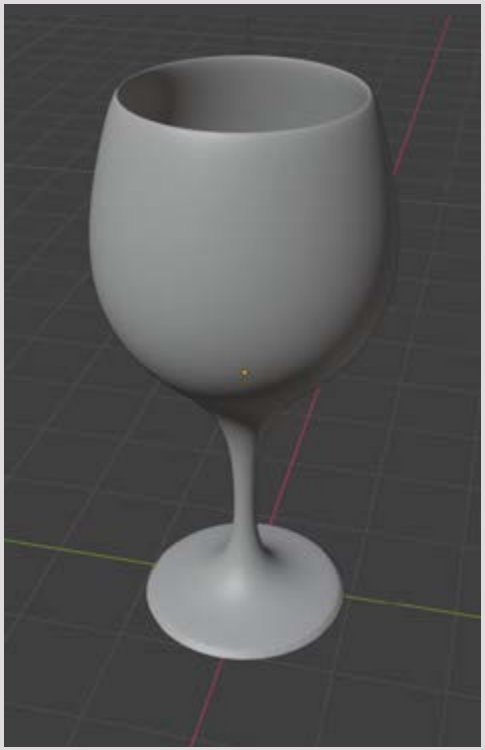
Wine Glass

Online Tutorials

In learning how to use Blender I started in the **Planning** stage of the Action Research cycle by finding a YouTube channel, The CG Essentials, that has a series of Blender tutorial videos for beginners. I planned that I would go through as many as I could until I felt confident in my ability to model an object of my choosing.

I began watching and following along to first video, a tutorial on how to model a simple wine glass, thus beginning the **Action** stage of Action Research.





Screenshots from my process in following the tutorial

After completing this video I moved into a brief **Analysis** stage, in which I noted that Blender uses a lot of keyboard shortcuts that are hard to remember while learning.

From there I moved to a brief **Conclusion** stage in which I decided that until I was familiar with all the keyboard shortcuts, having some sort of list to reference would be helpful.

Key Blender skills learned

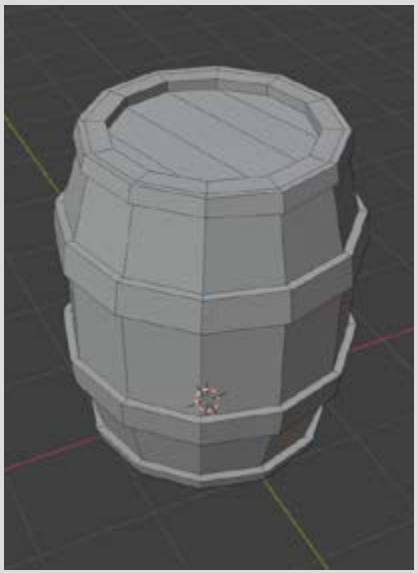
- Edge Loops
- Subdivision Modifier
- Inset tool
- Extrude Tool
- Reference Image tool

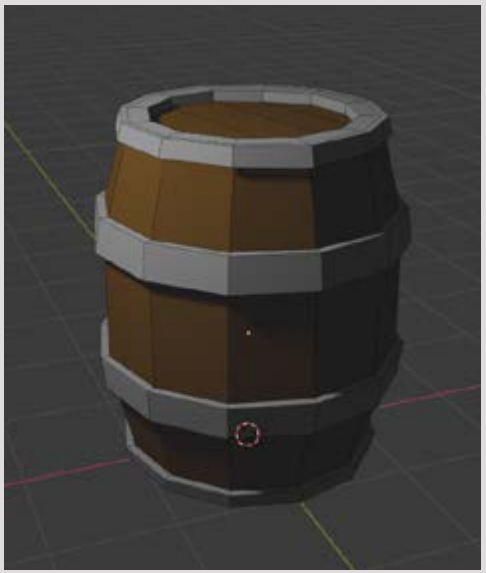
Wooden Barrel

Online Tutorials

Working off my previous conclusion, I began a list of the keyboard shortcuts that were commonly used in the Wine Glass video tutorial.

- Shift + A = Add object
- Z = Select a different view mode
- ctrl+ R = Adds edge loops
- S = Scale
- E = Extrude
- Tab = Goes into edit mode
- Ctrl + B = Bevel
- I = Inset





Screenshots from my process in following the tutorial

Next I followed along and watched the video on how to make a simple wooden barrel, beginning my second **Action** stage. This video expanded on the skills learned in the wine glass video as well as introduced materials.

In my **Analysis** of this action, I realized that despite making the list of keyboard shortcuts, by the end of the video I did not need to reference the list anymore because they were working their way into my mind and muscle memory.

My **Conclusion** from this was that despite being told the UI of Blender had a steep learning curve, that the keyboard shortcuts, due to their names, were intuitive, and that I may be learning faster than I anticipated.

Key Blender skills learned

- Creating and assigning materials
- Viewport shading modes to show shadow and colour

Metal Barrel

Online Tutorials

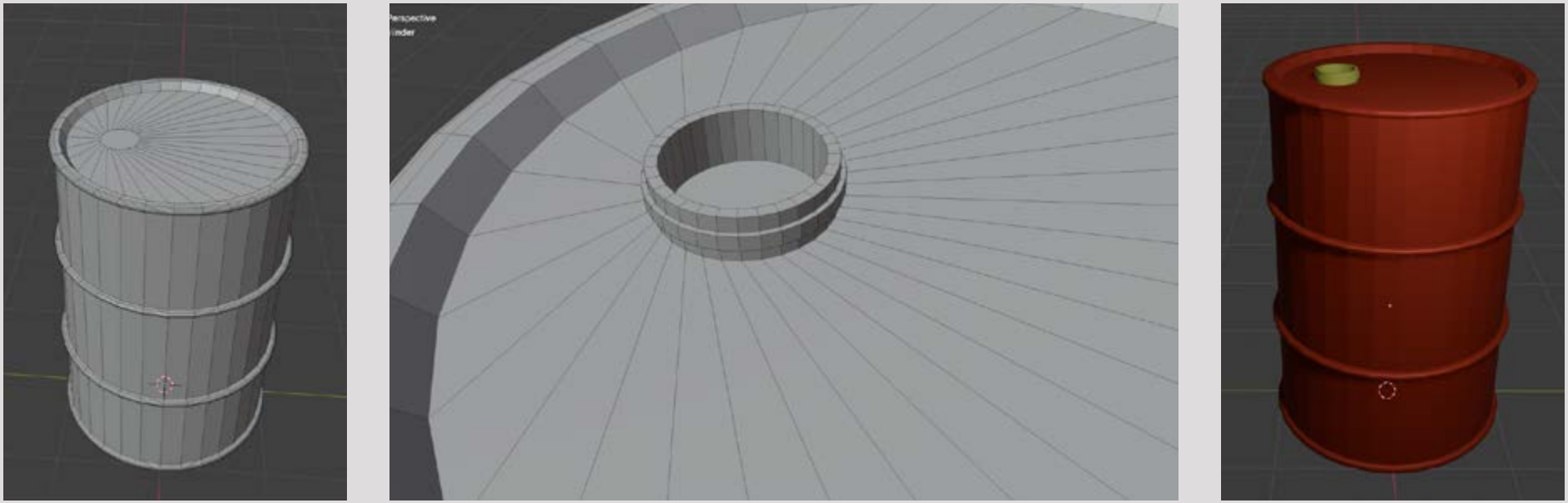
Despite my conclusion that I was learning faster than anticipated, I **planned** to continued through to the next video tutorial instead of skipping ahead to a more difficult one as I figured that more practive couldn't hurt.

The next video was a tutorial for a simple metal barrel, beginning my **Action** stage once again.

Just as I suspection from my planning, my Analysis and Conclusion revealed that I was able to accurately anticipate the tools and techniques used in the video to make the barrel, meaning that I had a solid grasp on the very basics of Blender.

Key Blender skills learned

- Bevel tool



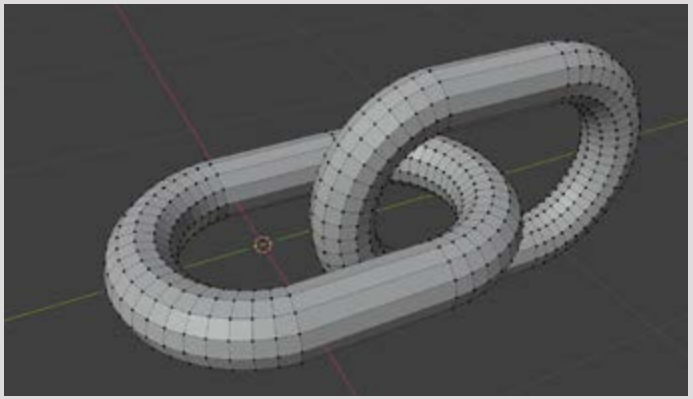
Screenshots from my process in following the tutorial

Metal Chain

Online Tutorials

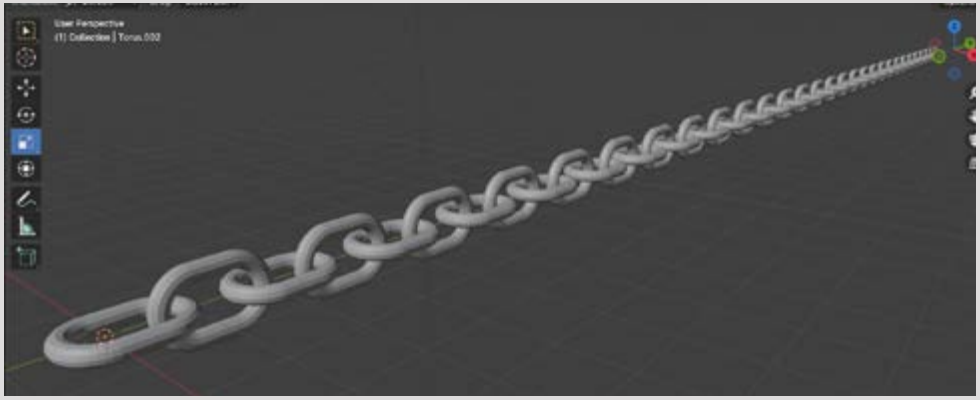
Working off my **Conclusion**, I **planned** to slightly skip ahead in the video series to a more advanced tutorial until I saw that the next video in the series looked more advanced anyway, so I stuck to the videos in order, and followed a video on how to a metal chain in my **Action** stage.

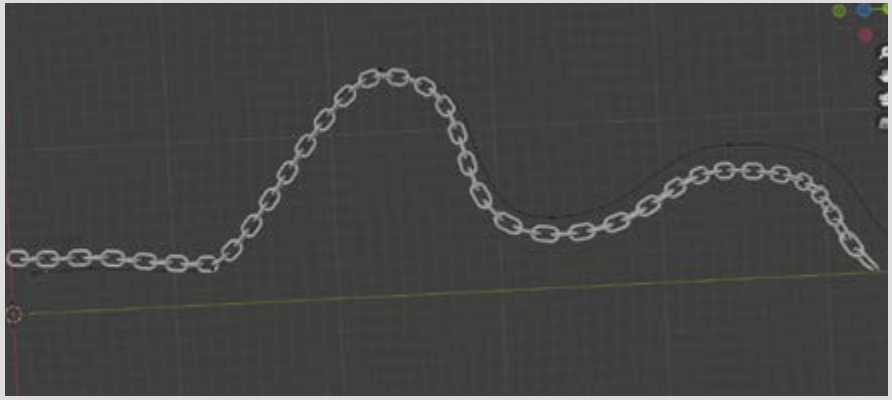
My **Analysis** of my process in this video told me that I only felt like I was advancing so fast in the previous tutorials because they were not introducing a ton of new concepts in each video, unlike this one. From this, I **concluded** that more practice was needed in the skills this video introduced, and I **planned** to find more videos with similar concepts to follow.



Key Blender skills learned

- Duplicate tool
- Array Modifier
- Besier Curve tool
- Follow Curve array length setting
- Curve Modifier





Screenshots from my process in following the tutorial

Pop Can

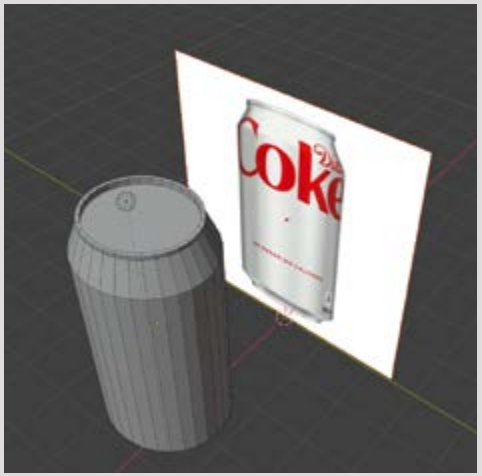
Online Tutorials

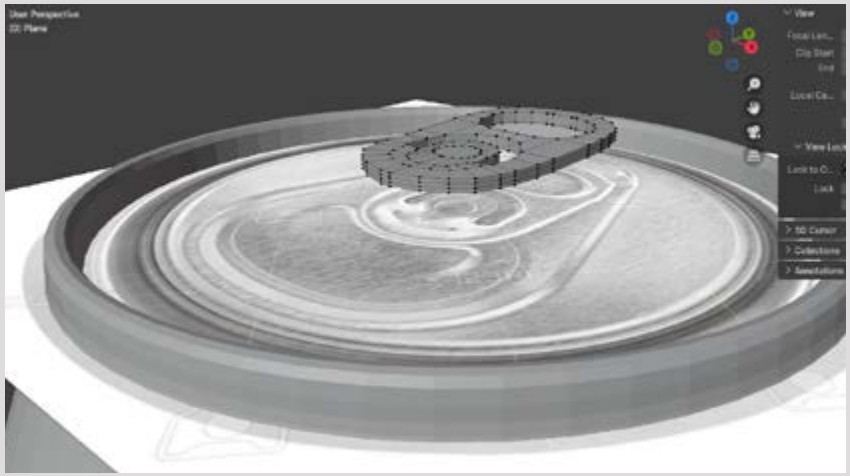
Following through to the next video in the series, I went into my **action** stage and followed a video on how to model a pop can. This video did not use the Array tool or the other tools I was hoping to practice more from the Metal Chain tutorial, but my **analysis** showed me that it did give me a deeper understanding of how powerful the tools I was already familiar with are, such as the Inset and Extrude tools, which were used to make the tab indentation on the top of the can; they are capable of much more delicate work than I realized.

From this, I **concluded** that I needed to find a video that both expanded further on these tools that I already knew, and allowed me to practice the less familiar tools, such as the Array modifier.

Key Blender skills learned

- Delicate use of the Extrude tool
- F key for create face shortcut
- Manipulating vertices





Pop Can

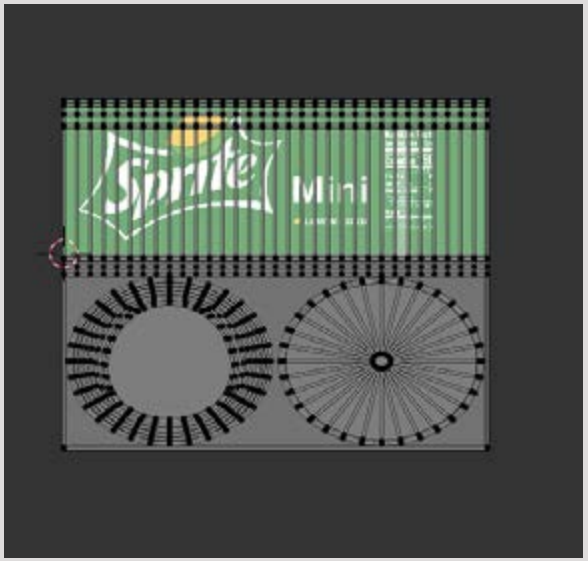
Online Tutorials and Exploration

One aspect of the Pop Can tutorial I was having trouble with was applying an image as a material. The video briefly explained that in order to get the image looking correct on the model some UV Editing was required, but I had never heard of UV Editing before, and was having trouble getting it to do what I wanted. Doing some research I found an article further explaining how to use UV Editing in Blender using the Unwrap Object tool and I was able to place the image correctly.

The a link in the article I also learned about textures in Blender. This prompted me to find a website for downloading free Blender textures, BlenderKit, and add a shiny tin metallic texture to the top and bottom of my can in order to make it look more realistic.

Key Blender skills learned

- UV mapping
- Unwrap Object tool
- Textures

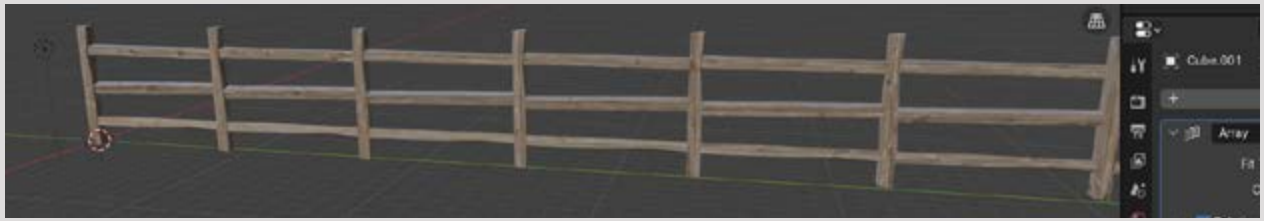


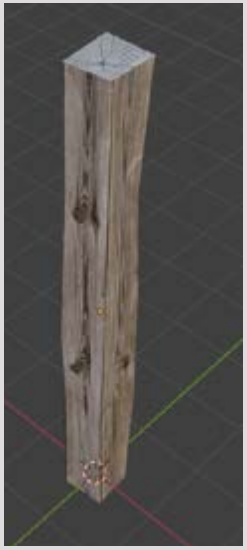
Wooden Fence

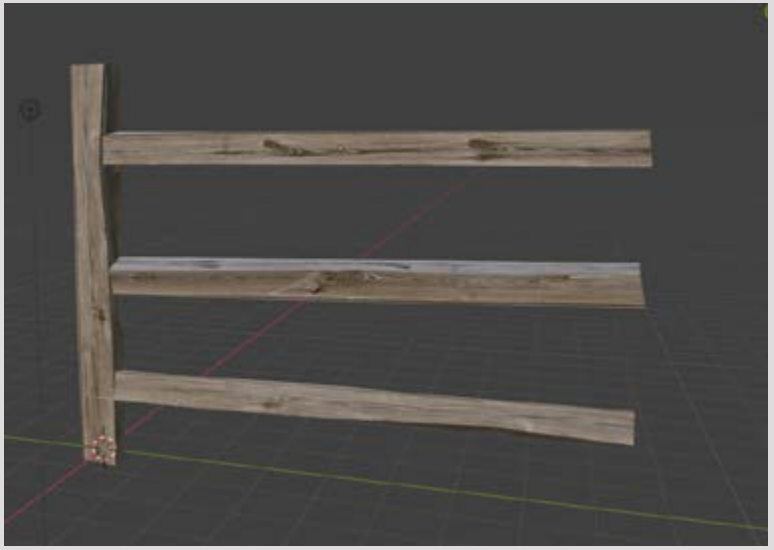
Online Tutorials and Exploration

Working off my previous conclusion, I **planned** so that next video I followed, a tutorial on how to make a wooden fence, allowed me to practice my use of the Array tool and Duplicate tool, as well as expand my understanding of other tools and skills. This video also allowed me to practice my newfound skill in UV mapping.

In my **Analysis** I found that practicing these skills even just this one more time greatly improved my understanding of how the tools and steps involved worked. From this I **concluded** that my understanding was good enough that I did not need to go out of my way to find videos with these skills, but should continue to follow along the video tutorials to learn new skills. I also concluded that I may be getting close to a skill level in which I can attempt to model something without following a tutorial.





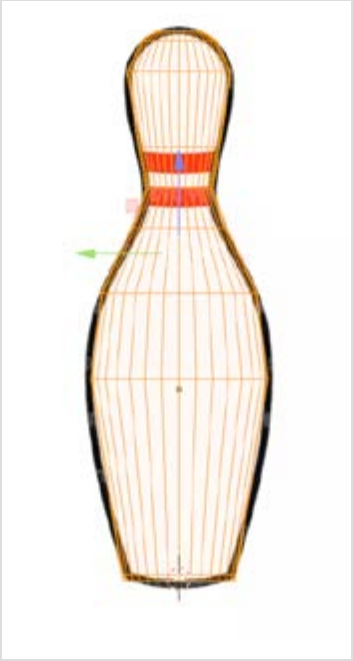


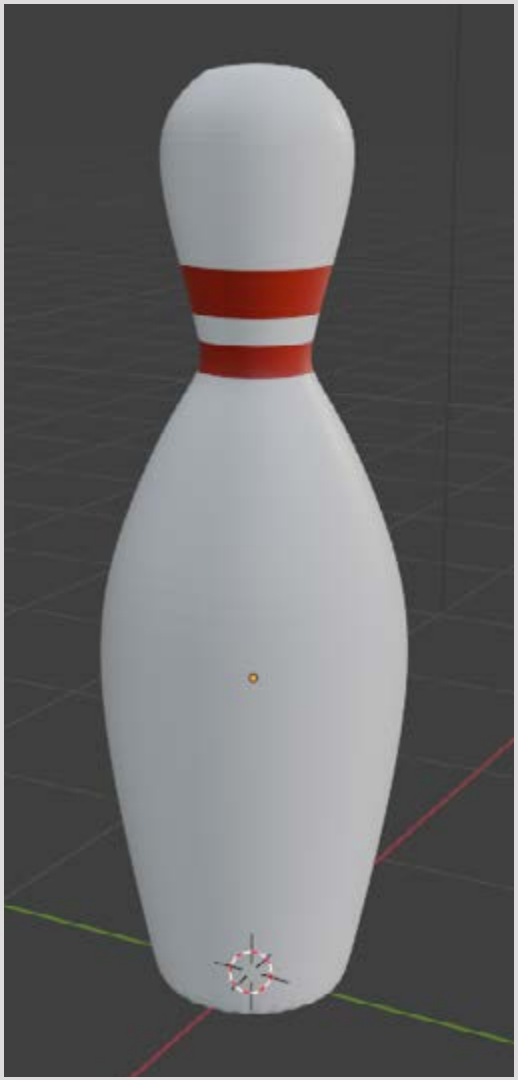
Bowling Pin

Modeling on my own

Working off my conclusion, I decided to try modeling an object on my own. I chose a simple object, a bowling pin.

I went through a few iterations of Action Research in making the pin. The first iteration I **planned** to just go for it, and in my **action** modeled a bowling pin freehand. In **analysis** I saw that the bowling pin shape was not correct no matter how much I tried to edit it. My **conclusion** from this was that I needed a reference image like in the previous video tutorials. So in the next iteration I **planned** and found a reference image to use and insert to the Blender viewport so I could trace the shape of my model over it. My **analysis** found that this made the bowling pin the correct shape, and I **concluded** that I should always use reference images.





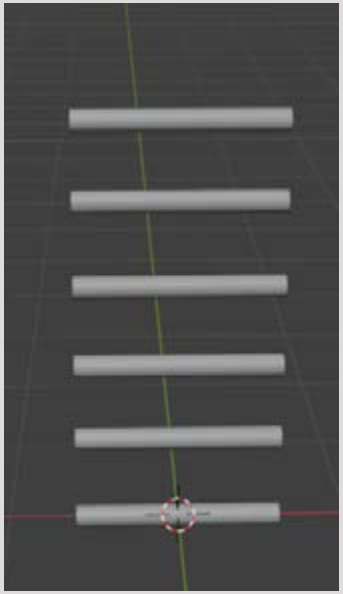
(Left to right) Bowling pin shape while modeling without a reference; Tracing the wireframe of the bowling pin to match the reference image; the final finished bowling pin.

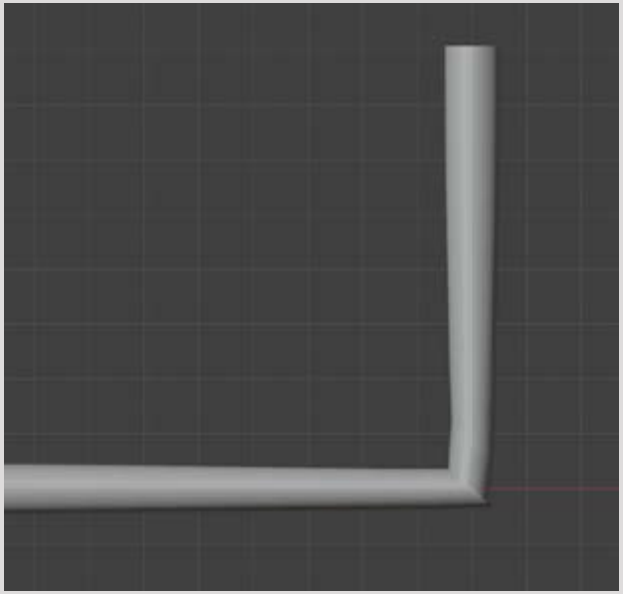
Metal Railing

Modeling on my own

The next model I tried making without a tutorial was a metal railing. I chose to do this without a tutorial because after watching the first few minutes of a tutorial for a similar model, I thought the way the tutorial showed, while functional, could be done a different way, and I wanted to test my hypothesis.

In the video tutorial a railing is made by extruding and rotating a thin cylinder in order to create a railing bar along a balcony, then is multiplied upward to give the railing height by using the array modifier. I wanted to try it the opposite way, in which a series of short metal bars stacked on top of each other are made to follow a path with the array modifier and curve modifier, therefore getting rid of having to manually extrude and rotate the cylinder bar so many times.





(Left to right) Stack of railings bars; Top-down view of railing stack following a curve with a sharp corner. Corner changes widths

So in my **Action** stage I tested my **Plan**, and in my **Analysis** found that while my way does technically work, it does not look as clean and professional as the way in the tutorial. I **analyzed** that this was because of the way the Array and Curve modifier work together, stopping objects in an array from cleanly following a path with sharp corners as I wanted it to. I **concluded** that the way the video tutorial showed worked best, but that testing my hypothesis was a good learning experience.

Choosing an Object

Final Project

I had a few criteria I was looking to fill when deciding on an object to model for my final project:

1. I had to physically have the object so I could take references pictures that worked for me
2. The object had to be visually interesting with a fun shape
3. The object had to have lots of pieces to give me the opportunity to model in detail
4. The object had to have multiple textures/colours

I found I had a few options: an electric guitar, a radio, a pair of over-the-ear headphones, and a sword. I ultimately decided on the electric guitar because it felt the most ambitious of all the items, given it has lots of small parts. I knew that there was a good possibility I was not going to be able to model the whole thing with all the small details included, given both my ability and the limited time frame, but in my personal experience I have found that aiming high is a good way to learn, and I was confident in my ability to produce something that showed what I had learned and I was proud of.

Modeling the Guitar

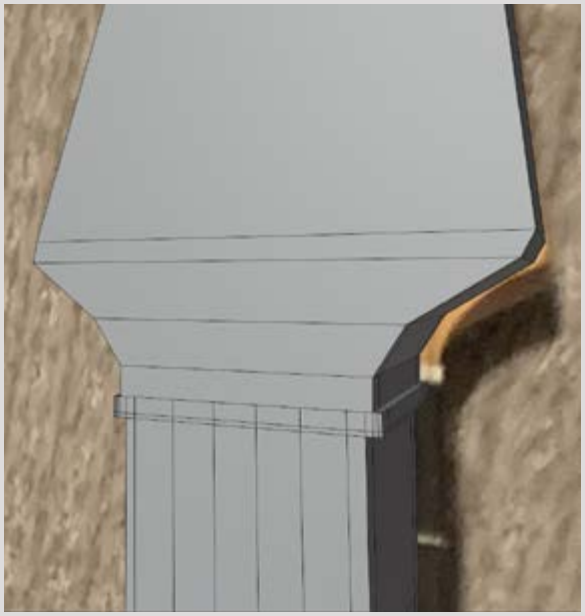
Final Project

I began by taking good quality reference images from the front, back, and side so I could manipulate my object to fit the shape correctly.

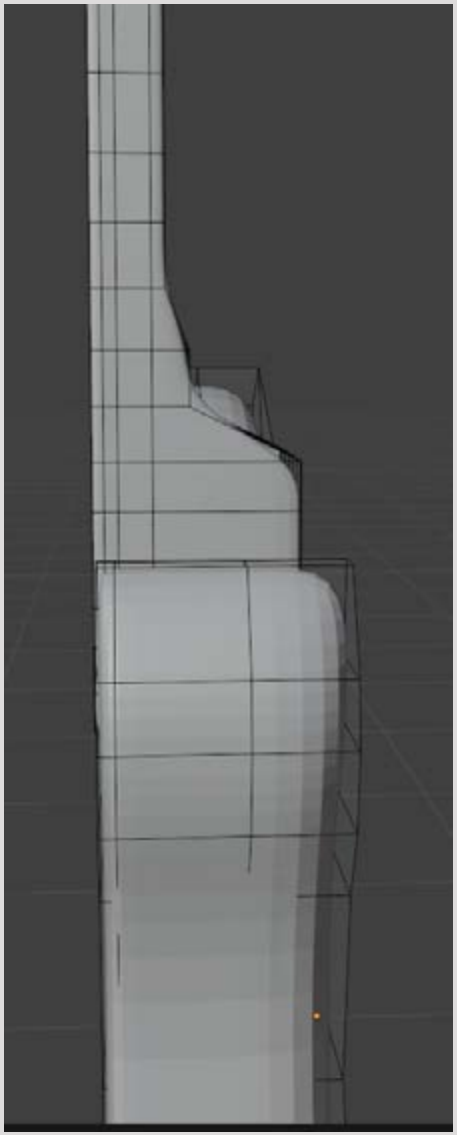
I began by loading in my reference image of the front of the guitar, then creating a plane on top of which I would then manipulate to fit the shape of the guitar. Working in wireframe view, I added lots of edge loops and learned about using the Knife tool in order to split the plane in to faces that worked with the shape of the guitar.

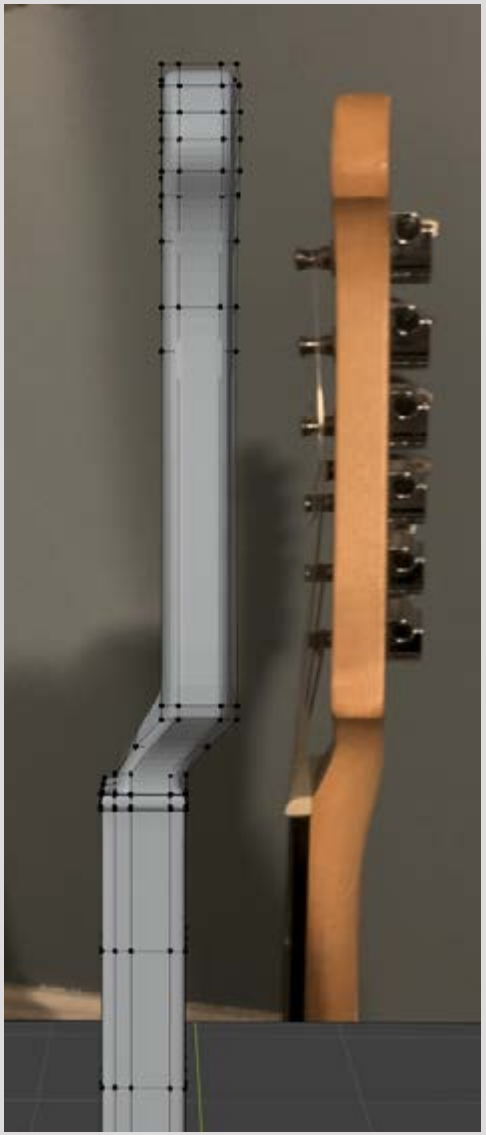
Something I paid extra attention to at this stage was ensuring that each face had 4 sides, something the video tutorial said was good practice in 3D modeling.

Then I extruded the plane to give it height, added a few edge loops along the side in order to control the rounded corners the Surface Subdivision modifier would give it, and added the modifier. Once I added the modifier I had to go back in a few times and add extra edge loops just to get the exact shape I wanted from the modifier.



Next I worked on shaping the guitar from the side view in order to fit the other reference pictures. This stage was a lot simple than I thought, as it actually only ended up requiring selecting certain faces and moving them a bit along the Z axis.





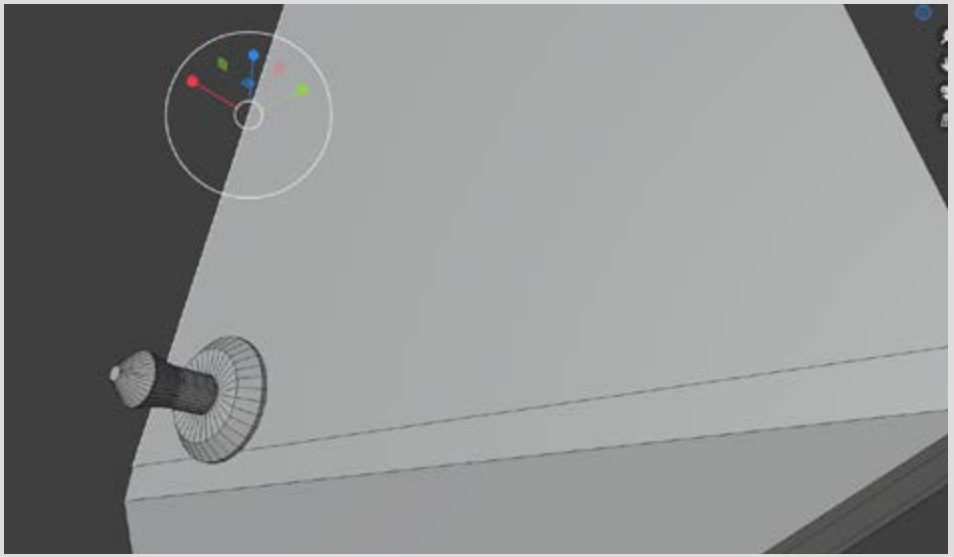
At this point I decided to add my materials and textures so I would have an easier time visually differentiating between the pieces of the guitar. Using the website I found during my exploration, I found a free wooden texture that matched the guitar in real life very well, and then UV Editing mapped the texture to fit the guitar correctly. I also found a metallic silvery texture for the frets.

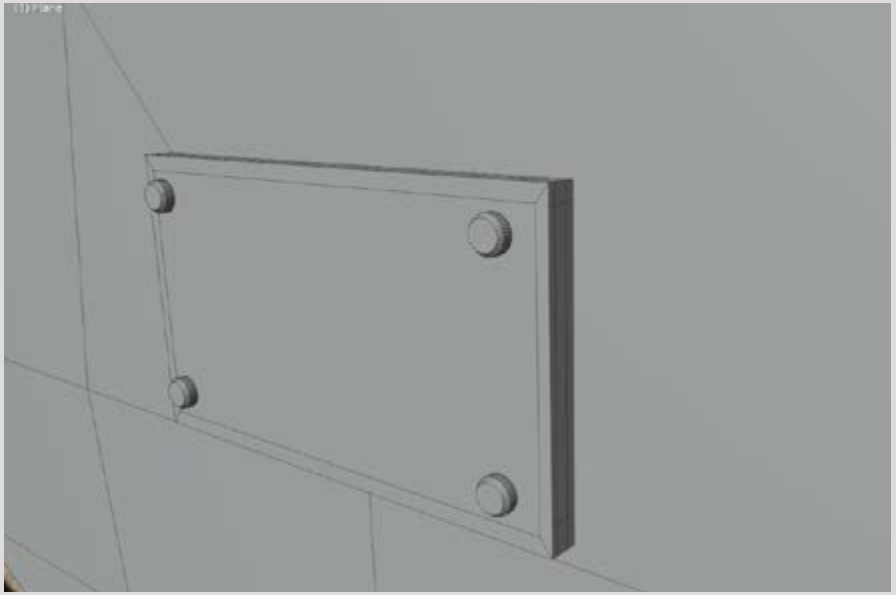
For the fretboard I created my own simple black material.

Next I worked on adding small details. I knew that I was not going to have the time or ability to complete all the small details on the guitar, so I focused on the ones that were the most prominent, such as the strings.

For the strings I utilized the technique from the metal railing video tutorial that I thought I had a better idea for. I created a thin cylinder then extruded and rotated in order to make it bend and wrap around the tuning keys.

For the tuning keys themselves I got the use my knowledge of the Array modifier in order to cut out having to manually duplicate and place each key.





My final challenge, and one that I did not anticipate, was rendering. I believed that I could simply move my viewpoint to a view of the guitar I liked and then export that image. As it turns out, it requires lighting and camera set ups. In order to learn the basics I watched a quick tutorial and creating a plain backdrop for my guitar to stand in front of. This allowed me to export a rendered image that I thought showed the detail of the model well.

In rendering I also found that the light colour of the wood I had chosen for the guitar made it hard to see the strings, so I changed to a darker colour wood.

Final Product

https://ixd1040.phoenix.sheridanc.on.ca/specialTopics/

Reflection and Next Steps

Overall, my peers said that my guitar was very well done and impressive for a first venture into Blender.

The main constructive feedback I received on my guitar was to keep working on realism in terms of cleaning up shapes and rounded edges, customizing textures, and maybe even adding some wear and tear. I agree with their input, as I found that some of the edges, particularly on the main body of the guitar looked a bit boxy instead of smooth, which in turn highlighted the way the textures and materials wrapped the guitar in an unrealistic way. The texture is something I tried to fix during my process of texture mapping, but could not get just right, and requires further exploration. The wear and tear was also a goal I had going into the project, as well as adding all the stickers that are on the guitar in real life, but found I did not have enough time.

The other constructive feedback given was about my rendering and the lighting/background set-up I used to render. They suggested working on at least some decorative lighting, and maybe adding a more interesting background or setting for the guitar to be in. I also agree with their feedback, as I feel the rendering I produced is the part of the project I am least pleased with, as I think it does not accurately display the detail of the guitar.

Reflection and Next Steps

The positive feedback I received was that the shape of the guitar was very close to real life, which they said was even more impressive as the guitar has good geometry and no holes or strange faces/edges. They also complimented the textures I used, saying that the textures really added to the photo-realism of the guitar. I agree with these comments also. I spent a long time and a few different tries to get the body of the guitar correct in a way that most, if not all, of the faces used were quads, and that the entire guitar was one solid piece, not a whole bunch of different models touching; this is something I noticed was done in the video tutorials I watched.

The feedback I received has solidified my plans for what I will work on in the next Module: rendering. I feel that my modeling skills are at an acceptable level that I can keep practicing my skills in order to work out the smaller issues such as rounded edges and super accurate textures, but that my rendering skills are what ultimately need an in-depth look at and exploration in.

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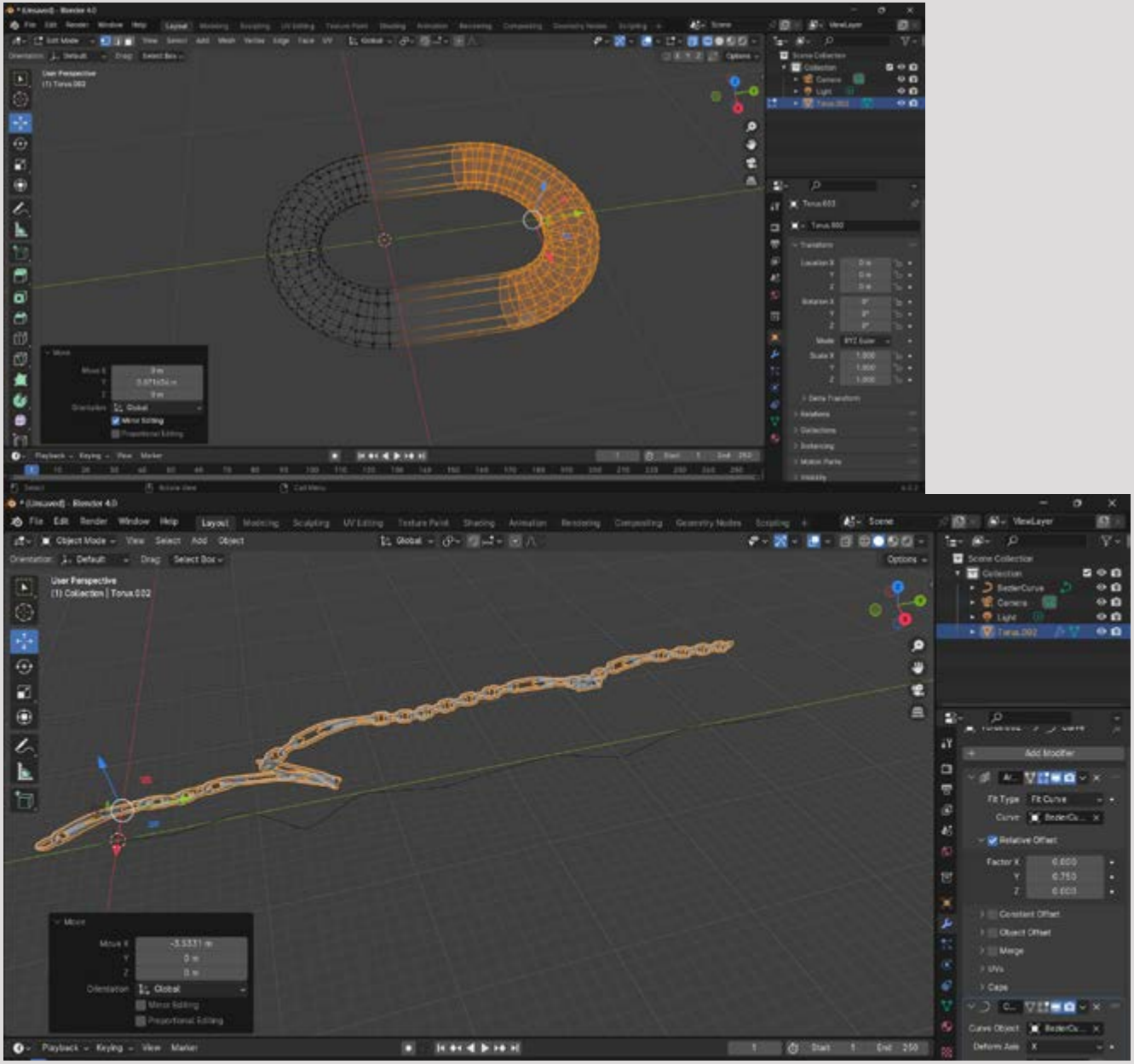
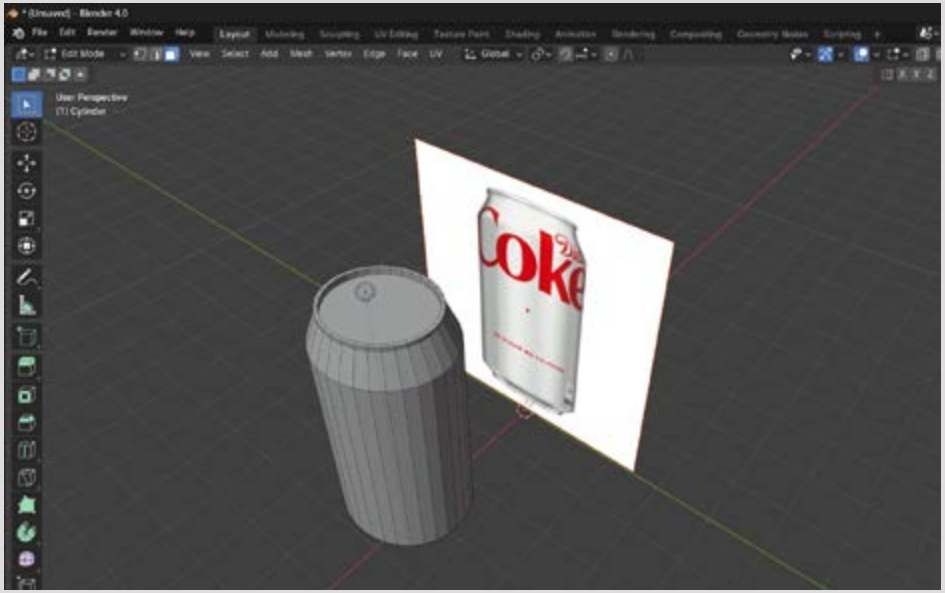
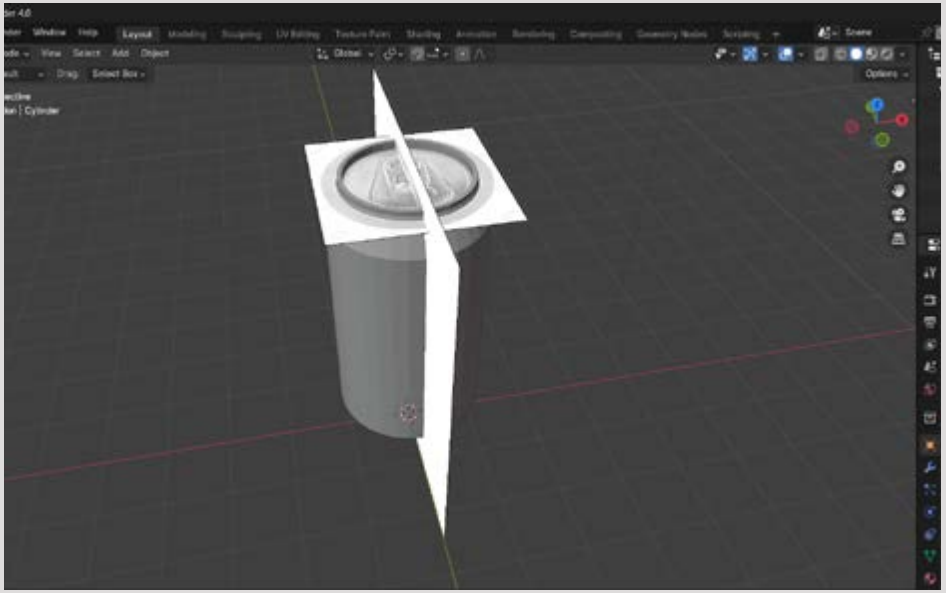
Appendix

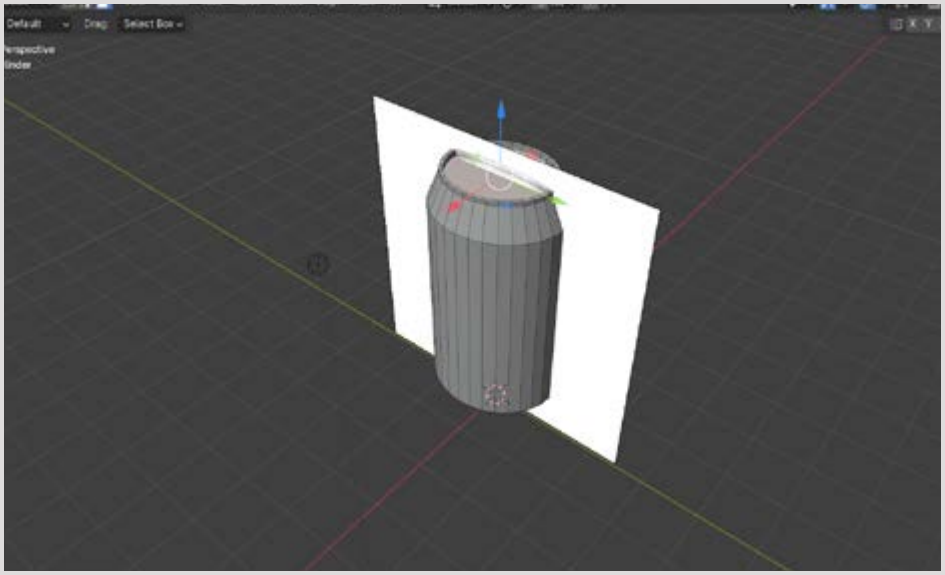


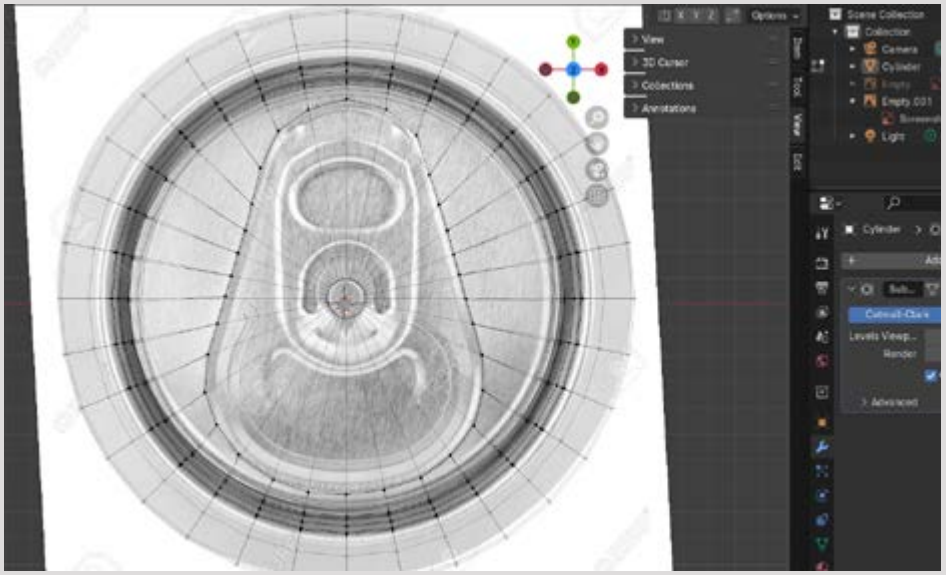
Learning how to link an array to a bezier curve.

Using reference images to make the pop can

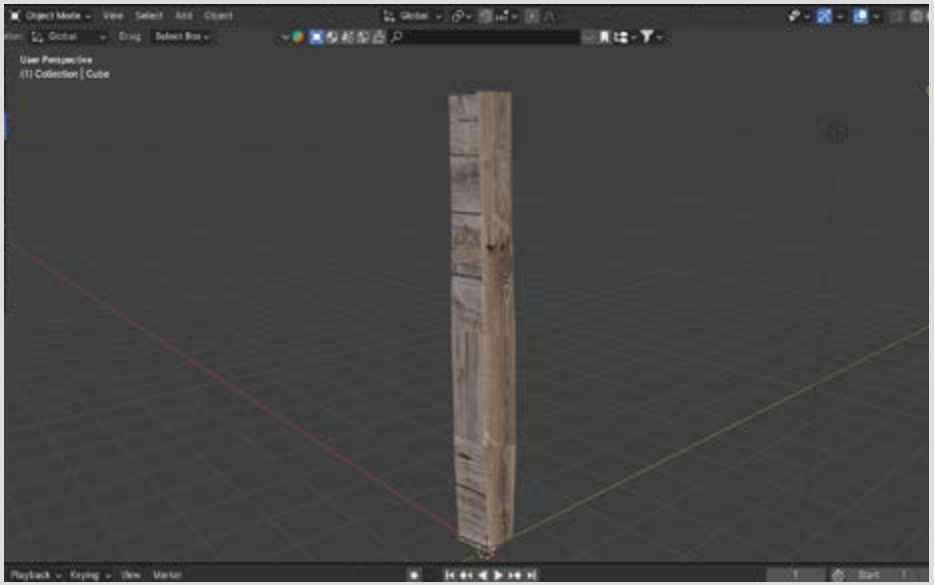


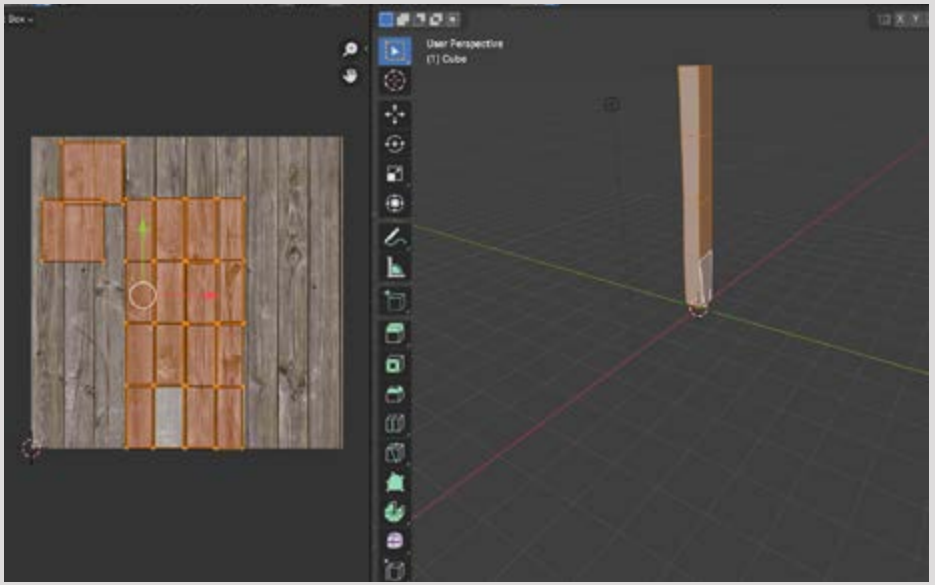




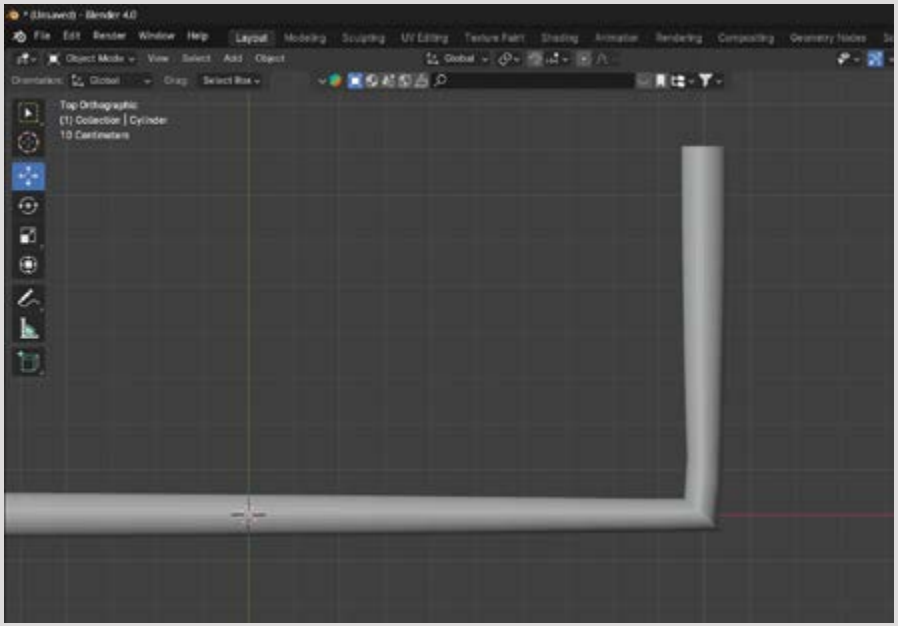


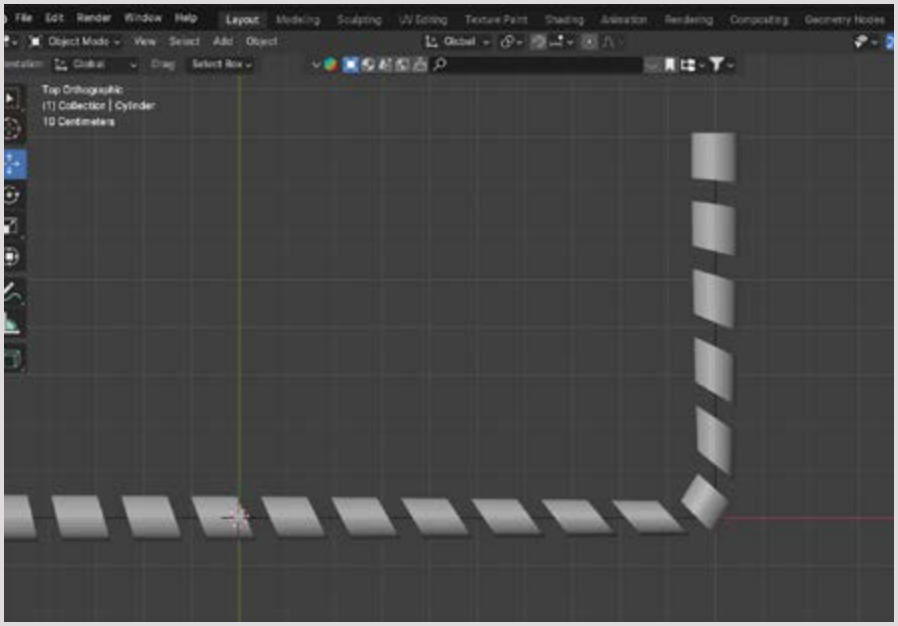
Shaping the lid of the pop can and making the tab through learning about the F key ‘make face’ shortcut





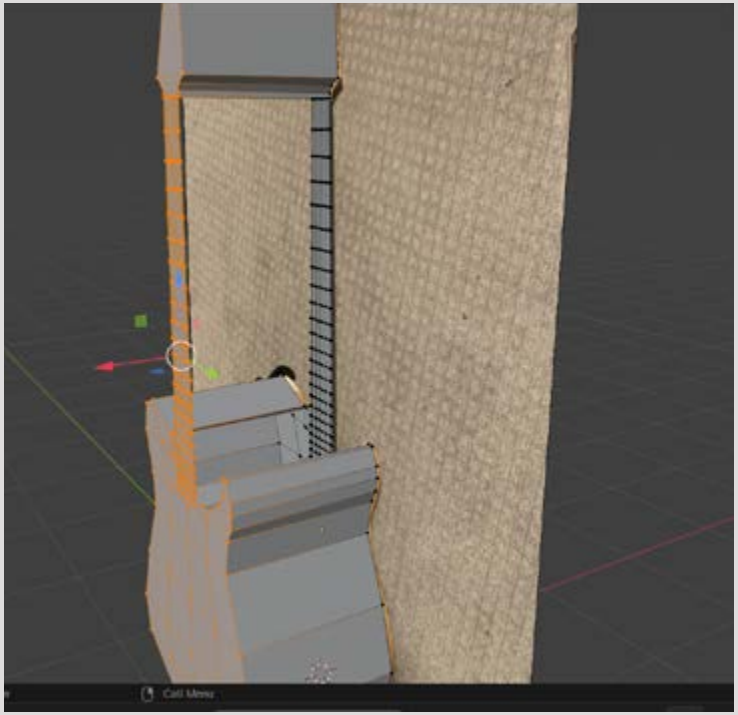
Failed attempts to texture map a wooden post





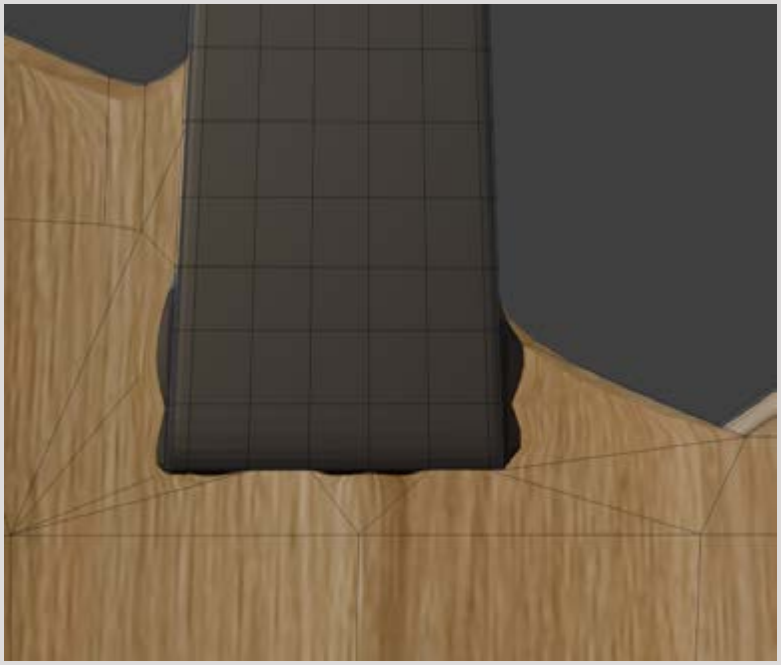
Failed attempted to wrap an array of cylinders to a sharp corner

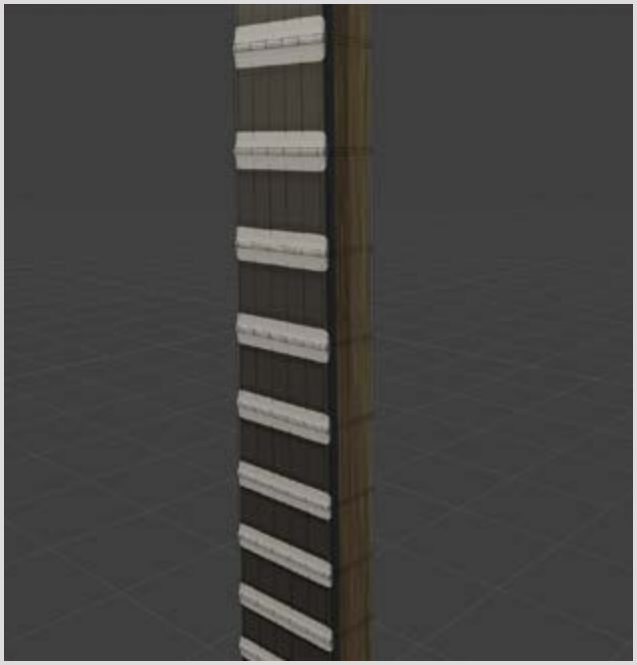
First attempt at making body of guitar



Trying different wooden textures

Learning how the Subdivision Modifier effects textures and materials, and how to add edge loops to fix it





Adding frets