Thinking Cap Adventure System

The Process in 42 easy steps

The Beginning

Before classes started we split up into teams by interest and sponsor. Along with Avery Caiazza, Ben Drake, and Nolan Green, I chose to work with Dayton Aviation Heritage National Historical Park. We were originally given the following prompt:

The Wright brothers were once inspired by the “puddle jumper,” a hand-propelled flying toy. Contemporary versions of this toy are now handed out to the Dayton Aviation Heritage National Historical Park visitor to demonstrate some aspects of the principles of flight. Yet, those puddle jumpers are made of single-use plastic and do not promote sustainable practices. How to continue educating about flying principals, share the heritage of the Wright brother, and mass produce a sustainable product?

And so we began the usual torture...

The first day of class

The Research Phase in 12 easy steps

Our first meeting with our sponsor

In our first meeting with our sponsor, our original prompt took a slight turn. Our contact Ryan Qualls expressed to us that the park most wants a project that inspires visitors to want to learn more about aviation.

And so the research began!

I started with questions...

What sort of people go to the aviation museum?
What principles about flight are least understood?
What kind of learning works best at a museum as opposed to a book or school?
Do people learn better with an object to link to the lesson?
How much do museums spend on educational materials?
What sort of learning is considered the theme of the aviation museum?
What does the aviation museum teach as opposed to the air-force museum or the science museum?
What ages of people need to learn about flight?
How do we compel people to want to learn about flight?

How do we bring the experience of flight itself into the experience of learning about it?
What makes the in person museum experience unique?
What is the purpose of learning about flight?
Why is flight important?
What is lacking from current flight education?
What about flight is interesting to younger people?
What about flight is interesting to older people?
What is the most common form of learning style?
What would combining historical style and modern interactive exhibits look like?
What makes flying hard to understand?

What is the definition of a museum?
What is the definition of flight?
How long ago was the exhibit updated?
Why might someone want to learn about flight?
What do aviation exhibits look like around the world?
What exhibit is people's favorite at a museum?
What does sustainable mean for exhibits and education?
Why has god abandoned us
What recent advances are there in flight? How might they apply?
How has the pandemic affected the museum going experience?
What are the future goals of the museum?
How might museums be different in the future?

Which supported me in creating a research plan

Maria Bowman

Week 1: Complete

- Questions
  - What information on flight is important right now?
    - Focus more on the history of flight than on the science of it, just enough to show how unique the wright brothers were
  - What defines museum learning?
    - Hard answer. Nothing? Many different environments in the park
  - What are museums lacking?
    - The aviation museum needs a spark or a wow. Something to really impress how cool it is. The red lipstick
  - What is the mission of the aviation museum?
    -
- Type of information
  - Secondary information
- Methodology
  - Secondary articles
  - Interview with sponsor
- Stakeholder focus: the museums themselves

Week 2

- Questions
  - What are museums lacking?
  - How might museums look in the future?
  - Why is flight important?
  - What do people usually know about aviation?
  - What is the definition of a museum?
  - What is the definition of flight?
    - Another hard question, dealt with at hoffman location
- Type of information
  - Secondary Information
  - Visual ideas
  - Mass informations (Survey)
  - Numbers
- Methodology
  - Secondary articles
  - Conjecture (how might museums look in the future sketch ideation)
  - Survey

Week 3

- Questions
  - How do people feel when leaving the aviation museum?
  - What do people remember from museums? What made an impression?
  - What do people not understand about flight?
- Type of information
  - Opinions
  - Secondary information
- Methodology
  - Interviews (hopefully at the aviation museum, given permission)
  - Secondary articles (focus on aeronautical museums)
- Stakeholder focus: Museum goers

Week 4

- Questions
  - What tools can change a person's experience of a space?
  - How do novelty and education mix in a museum setting?
- Type of information
  - Opinions
  - Conjectures
- Methodology
  - Prototyping
  - Minor peer testing

Week 5

- Questions
  - What current advances are there in flight? How are they taught?
  - What makes a successful museum exhibit?
- Type of information
  - Secondary information
  - Opinion
  - Observation
- Methodology
  - Museum visits
  - Interviews with museum goers
  - Secondary articles

Week 6

- Questions
  - How do different stakeholders benefit from previously discovered ideas?
  - What would be the worst museum exhibit ever? Why?
- Types of information
  - Conjecture
  - Testable concepts
- Methodology
  - Prototyping
  - Group discussion (either with fellow designers or third parties. Not sure if I need an official codesign activity. I do not believe so.)

Week 7

Presentation

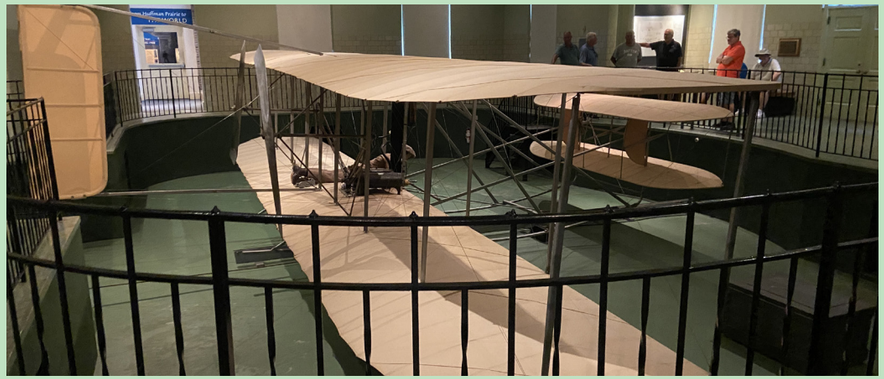
- Questions
  - What stakeholders am I designing for most?
  - What research goes together here?
- Types of information

Observational research

Started observational research by exploring the full extent of the park as an unguided visitor. What was it like to experience the park as a person knowing and expecting very little?

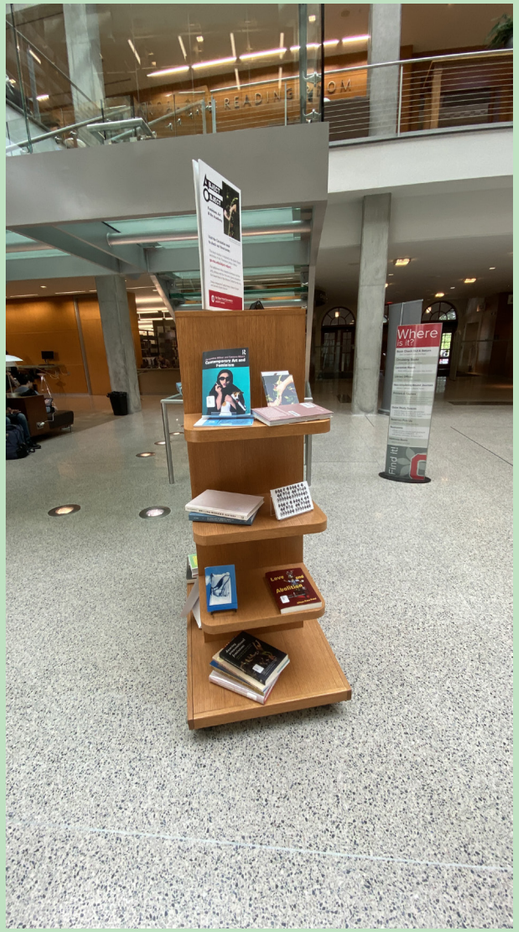
Guided visit

After visiting unguided, another observation of the park was in order. How were things different when visiting with a park ranger? How was each experience better or worse than the other?



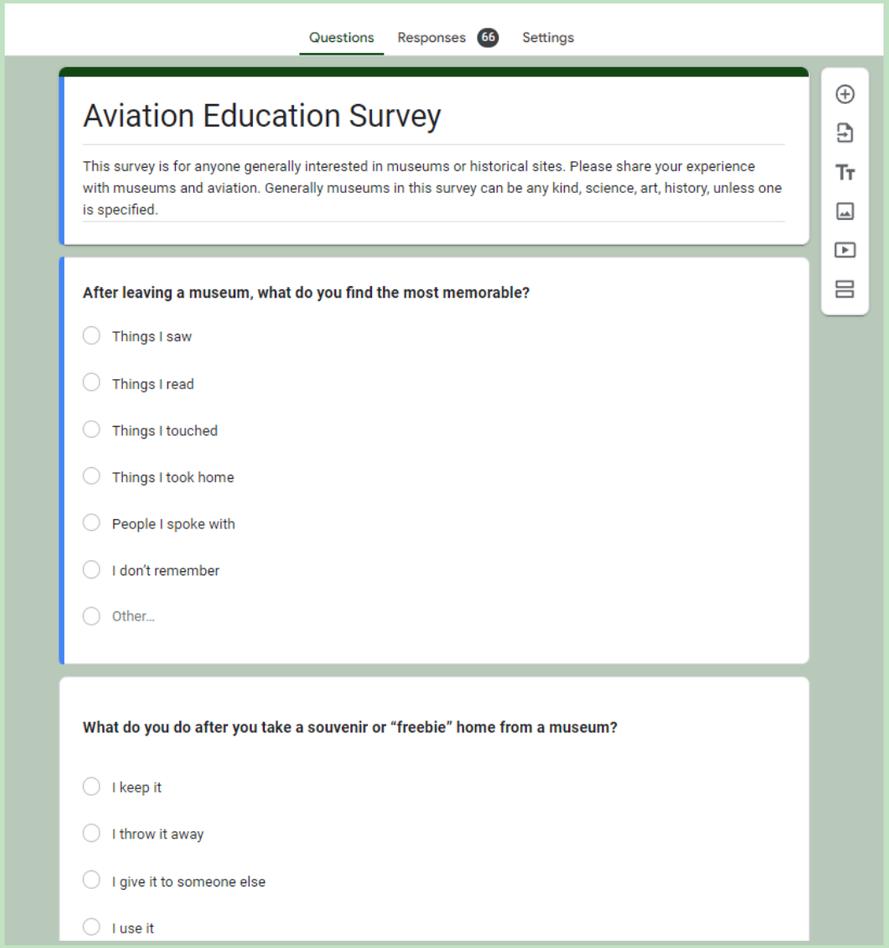
Other museum experiences

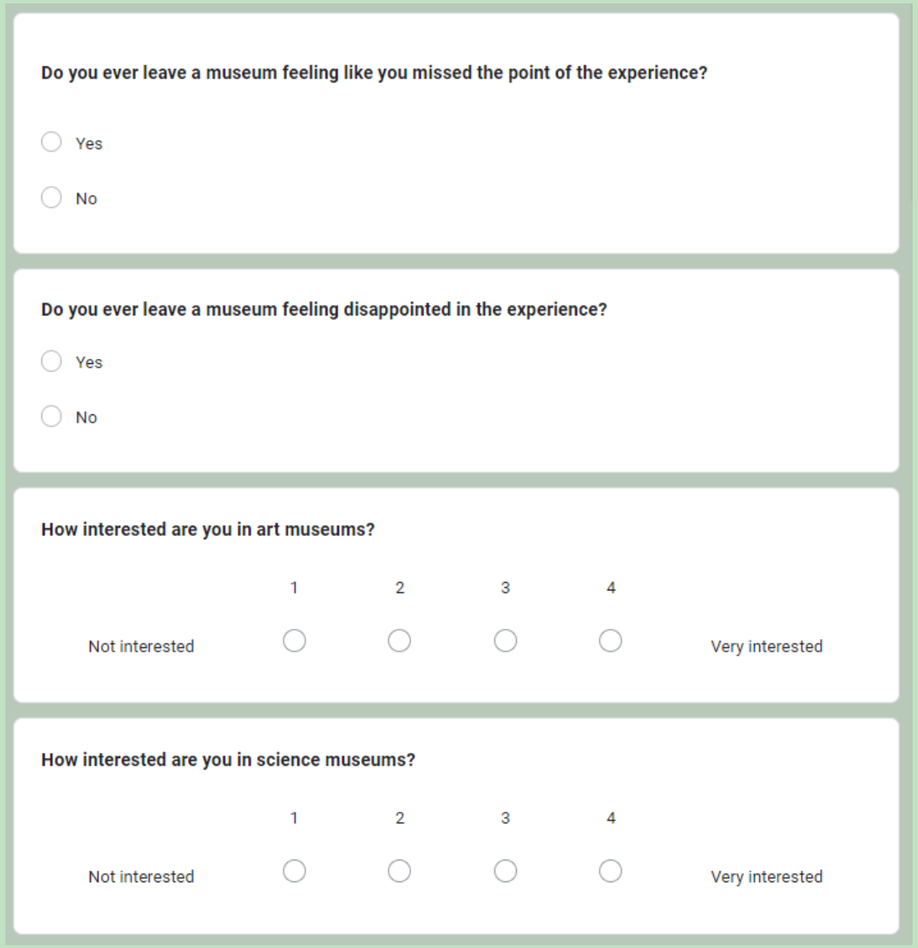
After getting a good understanding of the Dayton Aviation Heritage National Historical Park, our group visited many other museum experiences to compare how they resembled and differed from the park. What made experiences stand out? What made them memorable?



Online survey

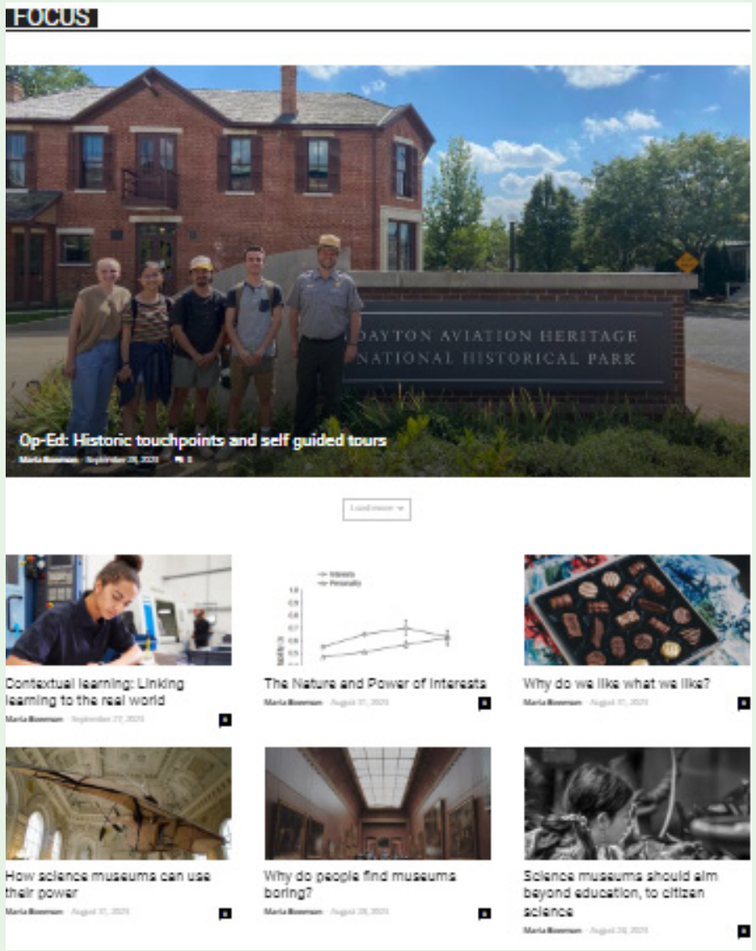
Using some preliminary questions about how others experience interactive learning areas, I wrote and distributed a short multiple question survey using Instagram, GroupMe, Reddit, and personal requests.

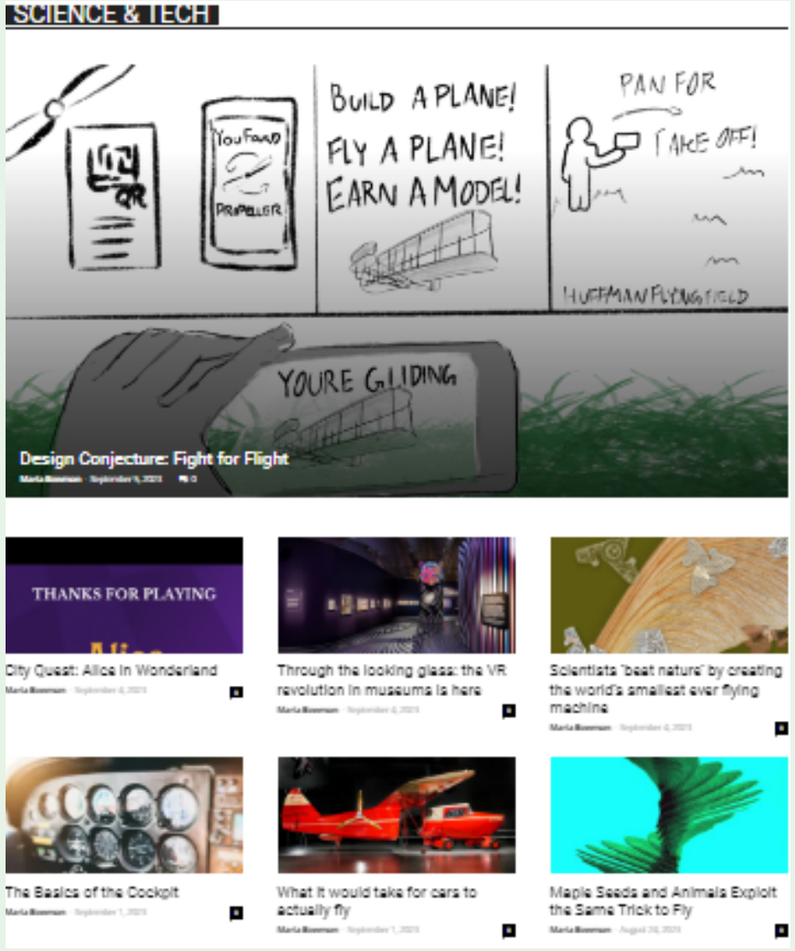


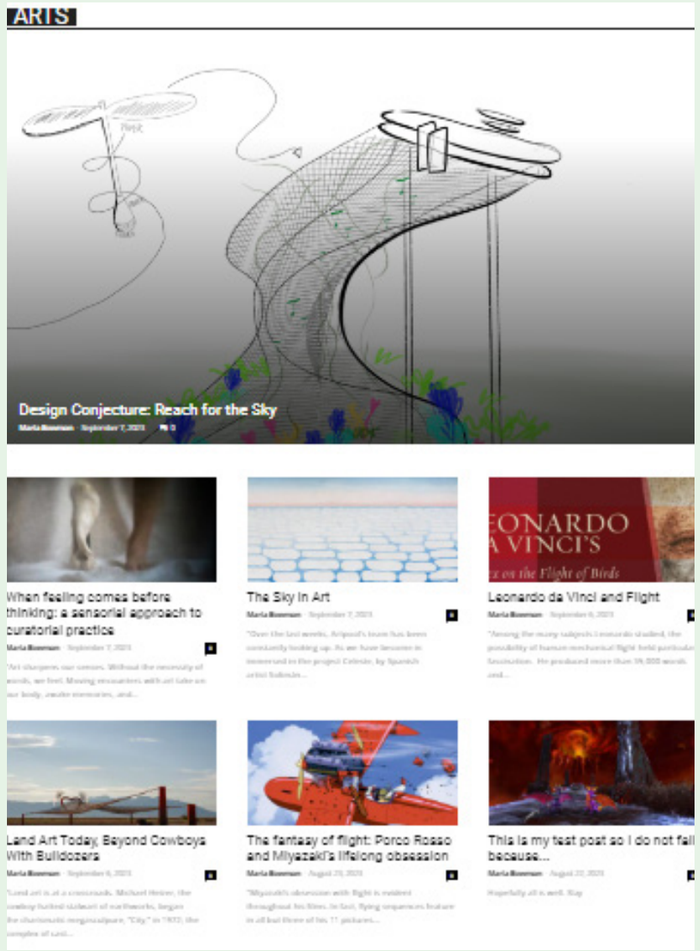


Secondary Research

I completed secondary research by exploring different topics related to my prompt, technology, arts, business, and focus (the topic of the prompt itself). I wrote short summaries on how information may be helpful in the research process.

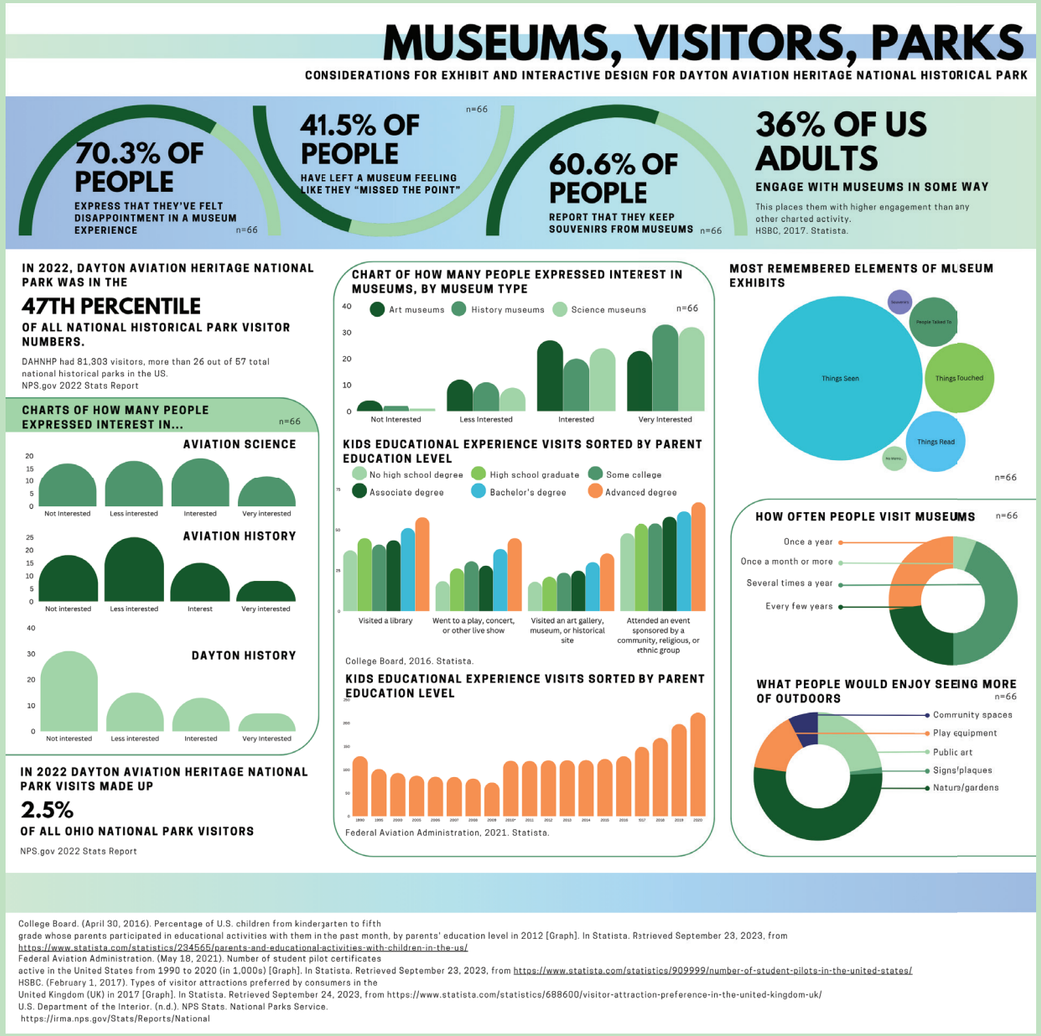






Secondary Research: numbers

After reading through articles, I created an info-graphic compiling both my survey data, and also whatever other numerical data I though might be useful.



College Board. (April 30, 2016). Percentage of U.S. children from kindergarten to fifth grade whose parents participated in educational activities with them in the past month, by parents' education level in 2012 [Graph]. In Statista. Rstrieved September 23, 2023, from https://www.statista.com/statistics/234565/parents-and-educational-activities-with-children-in-the-us/

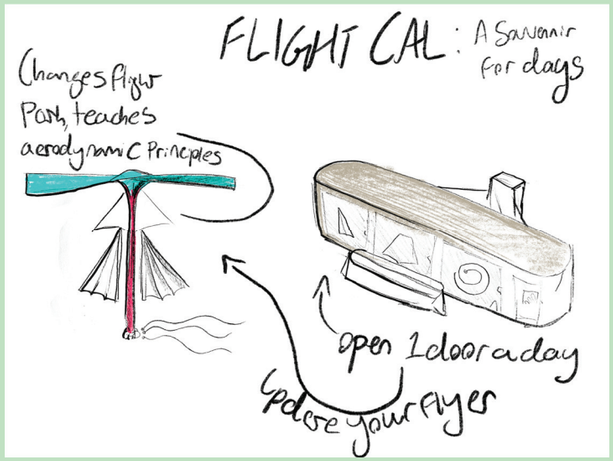
Federal Aviation Administration. (May 18, 2021). Number of student pilot certificates active in the United States from 1990 to 2020 (in 1,000s) [Graph]. In Statista. Retrieved September 23, 2023, from https://www.statista.com/statistics/909999/number-of-student-pilots-in-the-united-states/

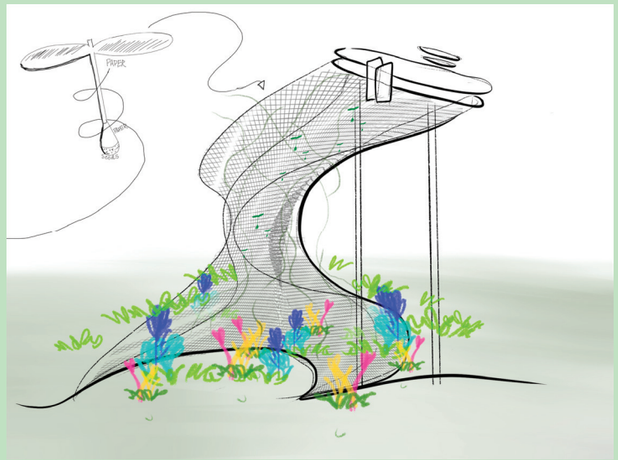
HSBC. (February 1, 2017). Types of visitor attractions preferred by consumers in the United Kingdom (UK) in 2017 [Graph]. In Statista. Retrieved September 24, 2023, from https://www.statista.com/statistics/688600/visitor-attraction-preference-in-the-united-kingdom-uk/

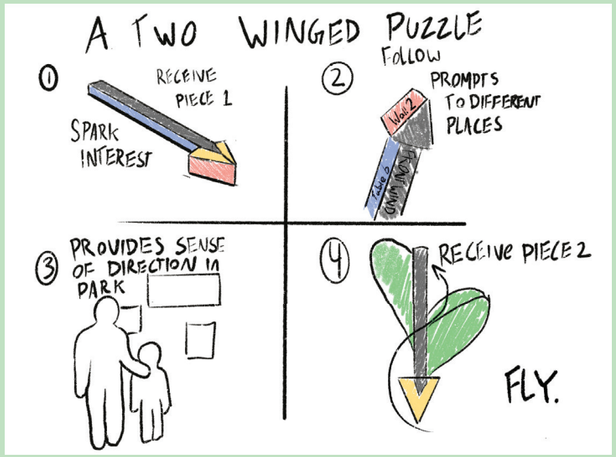
U.S. Department of the Interior. (n.d.). NPS Stats. National Parks Service. https://irma.nps.gov/Stats/Reports/National

Conjectures and Prototypes

As I went through the research process, I created conjectures. Conjectures are design ideas made just to help examine different perspectives on ideas, rather than as true solutions. At this point in the process, prototypes serve a similar purpose. These are some of mine during the process.

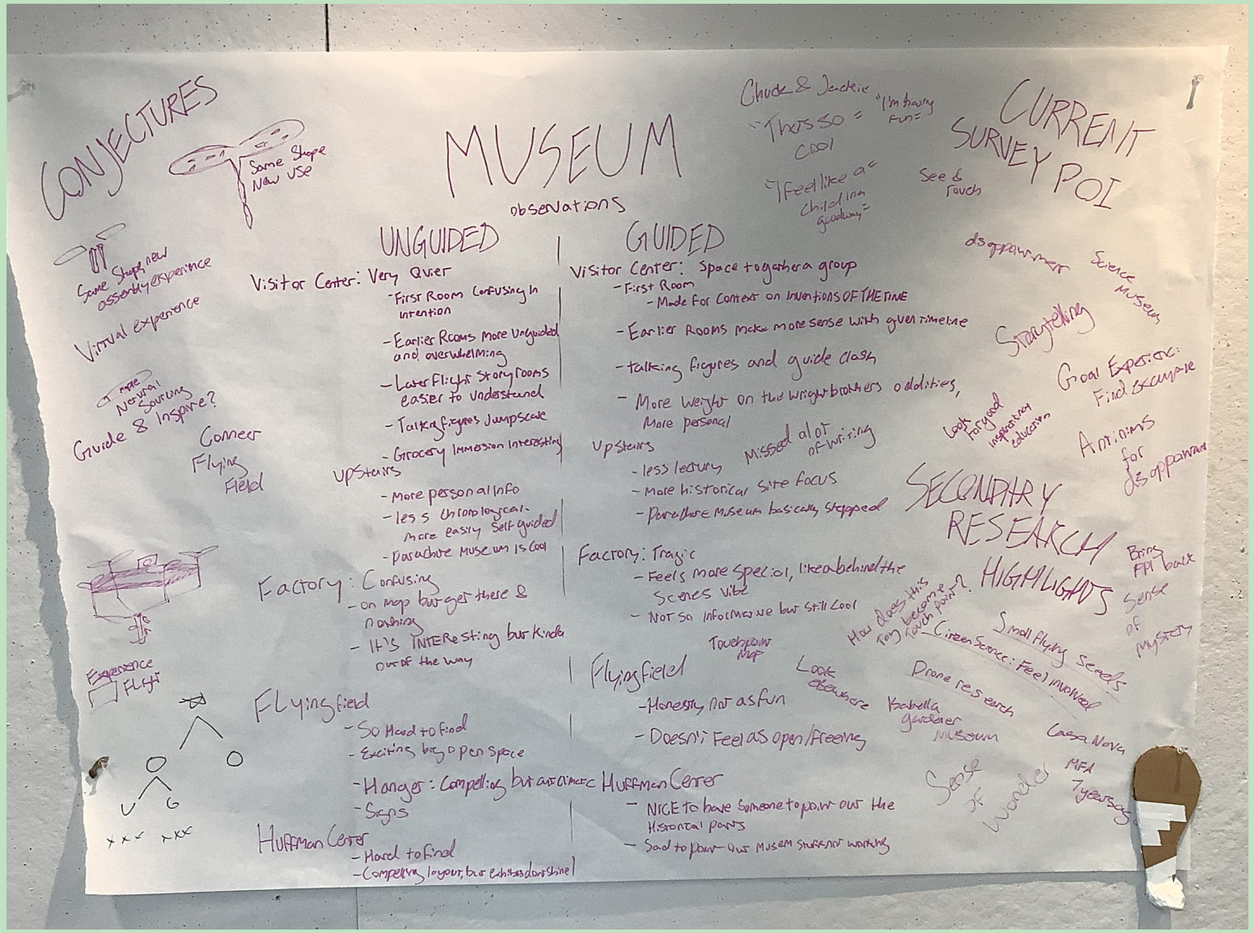






Connecting the Dots

Although I'd been recording and mapping out research as I went, things didn't really fully come together until I'd written my first "script" for our research presentation. Now it was a terrible script, but it was a good way of writing out everything and figuring out what was important.



Hi I'm Maria Bowman, and this is my research

Slide 1
So here's what I'll be showing to you today-
Dayton aviation heritage national historic park is both a museum on scientific advancement as well as a historic landmark. There is loads of information in the museum. Given this, there is a design opportunity to design the facets of each interweaving story to have their own touch points to give visitors an instinctually idea of what they'll learn and how it's important

.

Slide 2
This is the sign at Dayton aviation heritage national historical park, in front of their Wright Dunbar visitor center. Now the park is actually not just this visitor center, but a network of multiple locations in the area that relate to aviation history.

Slide 3
In downtown there's the visitor center, out near wright patterson air force base there is huffman flying field, the area where some of the earliest advancements in flight were tested, along with the huffman interpretive center. West of Dayton is the abandoned wright brother's factory. To the south east, there is carillon, a privately owned park that is connected to aviation history quite a bit.

Slide 4
This park is one of 57 National Historic Parks in the US, according to the parks service. The goal of the parks service is to "preserve unimpaired the natural and cultural resources and values of the National Park System for the enjoyment, education, and inspiration of this and future generations." The goal of the Dayton Aviation Heritage national historic park is to inspire visitors to further interest in aviation.

Presenting the Research

After rewriting the script many times, I'd found a way to tell the story I'd discovered, one of information overload, guiding activities, and the wonder of museums. I presented it in two forms, one as a Pecha Kucha style presentation, and one as a written paper, in the form of a newspaper op-ed. You can read my op-ed here: https://desis.osu.edu/seniorthesis/index.php/2023/09/28/op-ed-historic-touchpoints-and-self-guided-tours/

DAYTON AVIATION HERITAGE NATIONAL HISTORICAL PARK

LOST IN HISTORY

Mental wayfinding and touchpoints in historic experiences

PROBLEMATIC SITUATION STATEMENT

Given the interweaving scientific and historic learning goals for the Dayton Aviation Heritage National Historical Park, there is a need for a designed system of points, especially for the historic side, that **cue visitors on what information they should be taking from an area.**

The Development Phase in 17 easy steps

Design Brief

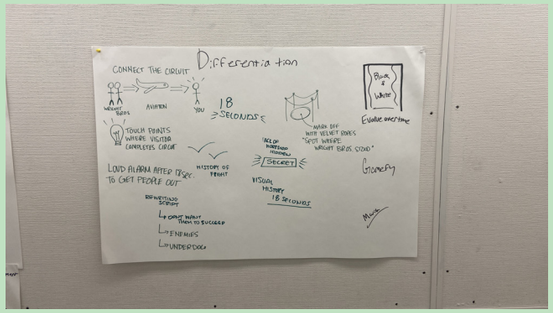
Based on my research problematic, I wrote out a design brief with goals, stakeholders, attributes, and objectives. This would serve as a guiding force and living document throughout the development process.

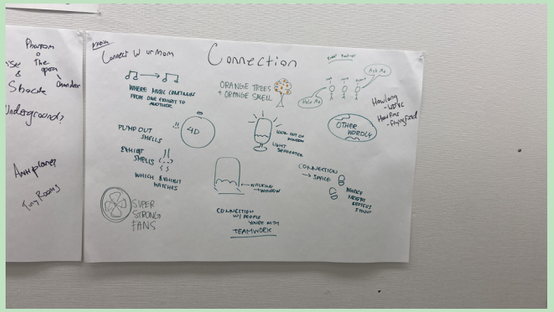
Maria Bowman Design Brief Draft

1. Given that Dayton Aviation Heritage National Historic Park contains both educationally dense and historically significant elements, and that there are many historic relics displayed, and that different areas focus on conveying different subjects, and that the experience of guided and unguided tours varies wildly, how can we cue visitors on the excitement of each segment in an intuitive and inspiring way?
2. General objective: Develop a way for attention checkpoints to guide visitors to what is important, and create distinct areas of interest to make material more digestible
3. Specific objectives:
    a. Call attention to distinct threads of information
    b. Lead visitors to understanding on a human level rather than a conceptual level
    c. Signify hierarchy of areas in the museum
4. Project Parameters
    a. Stakeholders
        i. Park visitors
            1. Young visitors, those with low literacy, those with short attention spans
        ii. Dayton Aviation Heritage NHP
        iii. National parks (general)
    b. Features
        i. Brings visitors in closer contact with historic sites
        ii. Individual experience to each person
        iii. Allows for people to personalize park experience to their interest
        iv. Creates a gamification of the experience, leading to a gratifying end to the visit
    c. Qualities and Attributes
        i. Approachable
        ii. Easily maintained
        iii. Environmental (works without direct interaction)
        iv. Stimulating and Novel (GT)

Group Ideation

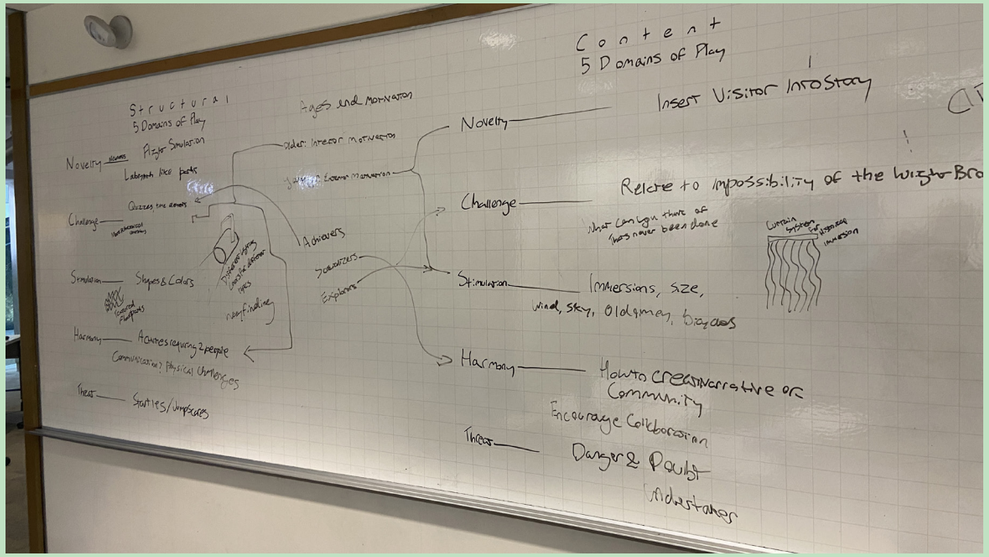
As a first step in the development process, we worked in groups of 4, one from each sponsor group, to review our design brief and ideate in the most broad and uncontrolled way. We put up posters with single word facets of our design brief and just went crazy.

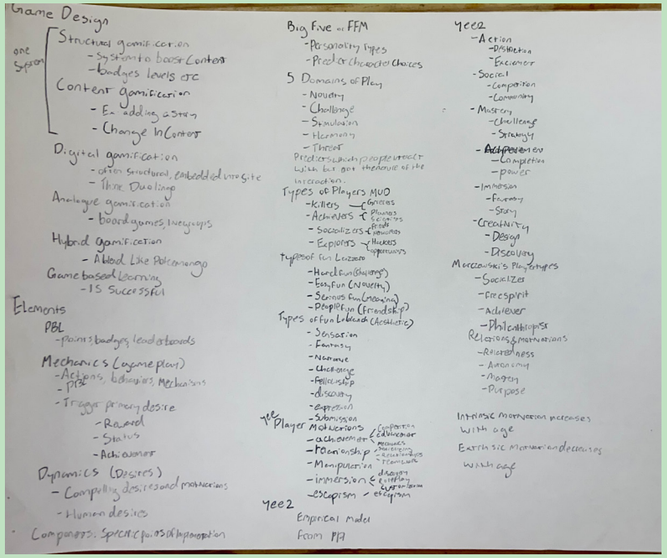


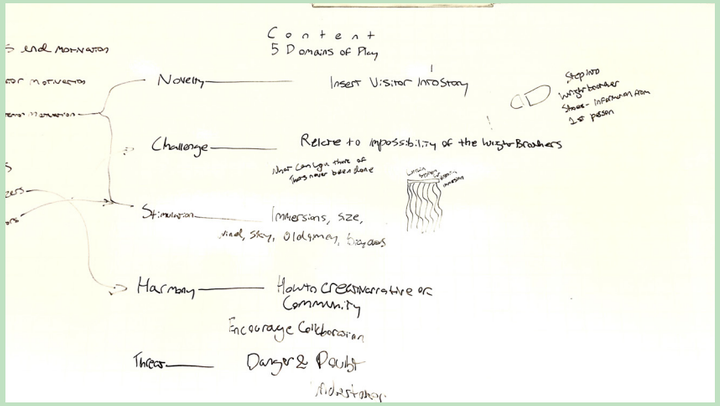


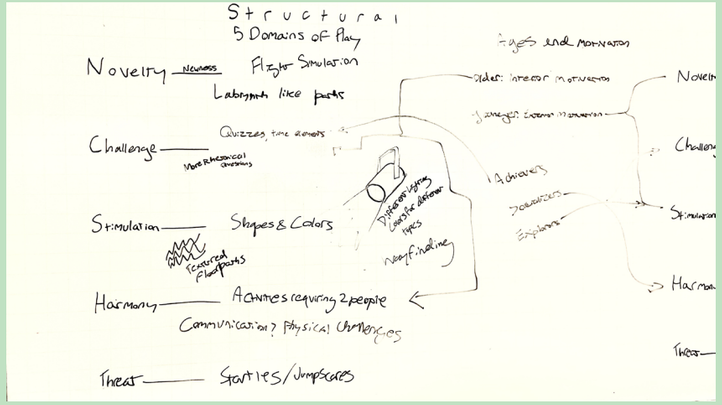
Individual Ideation

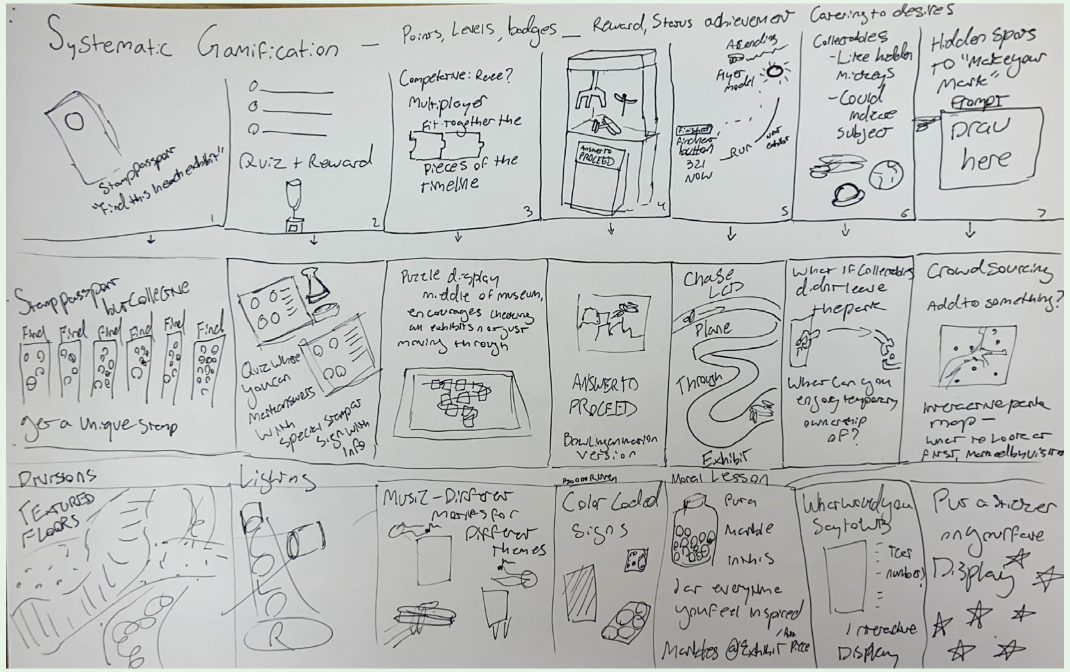
After reviewing the broad ideas, I wanted to find new ways to parse through the information of visitor interaction. I spent time investigating systems invented to analyze video game attention cues and interactive systems, and then used those as a framework to continue my ideation.

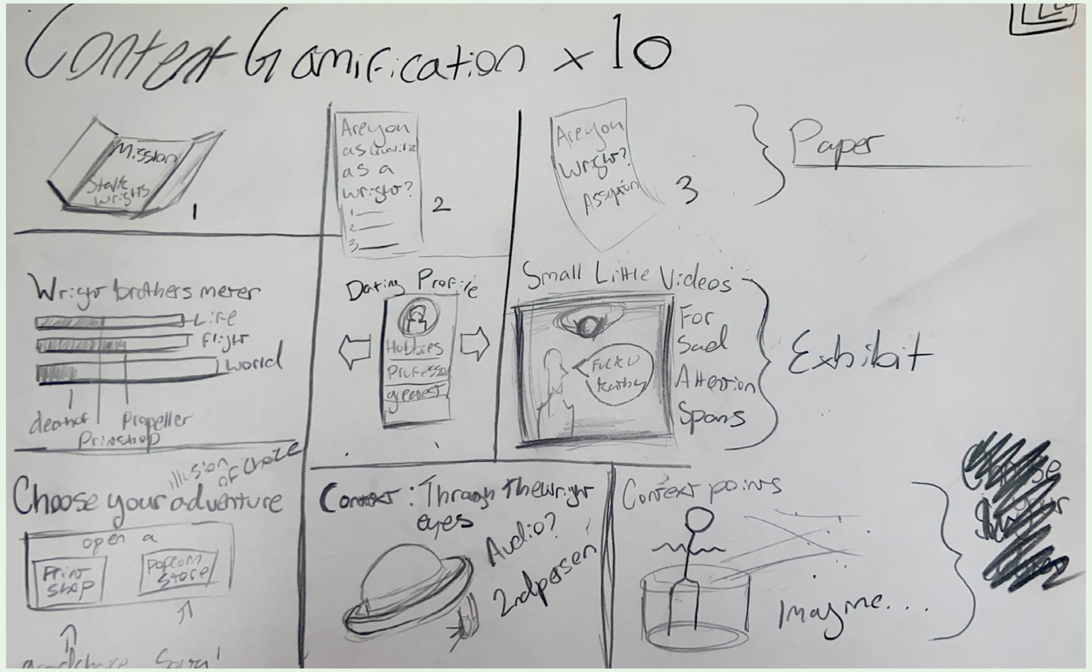


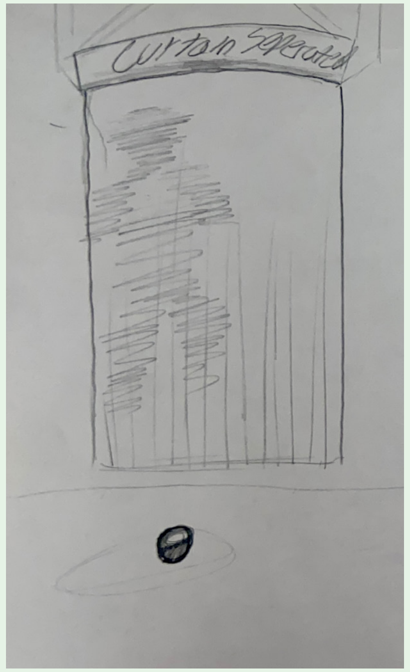


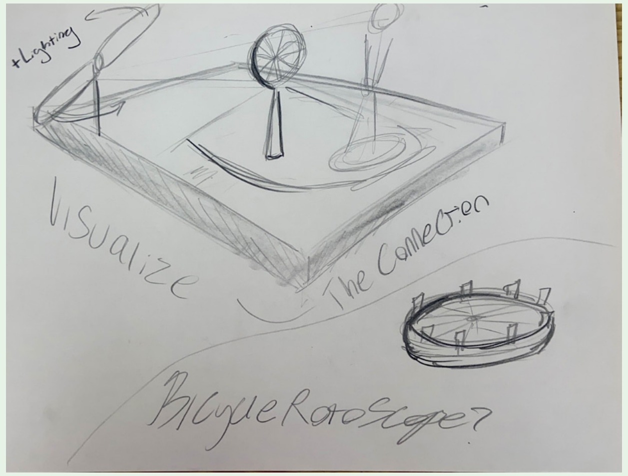


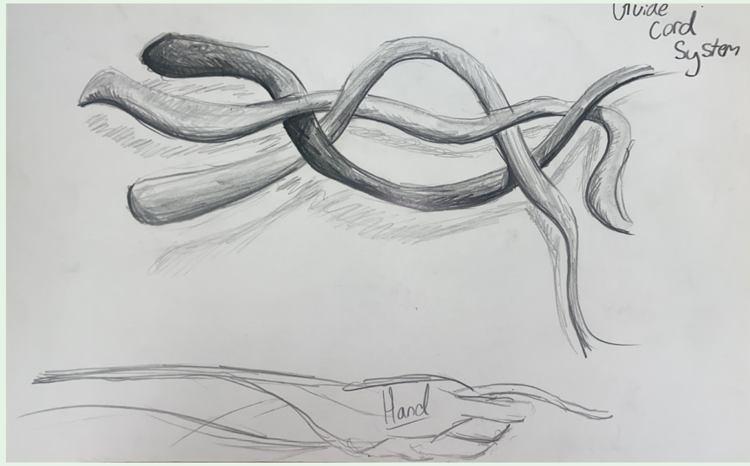


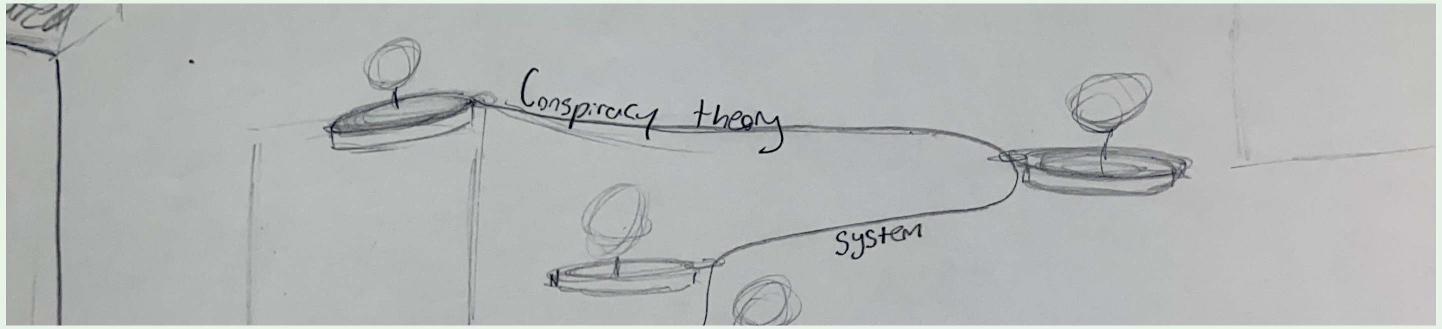

Systematic Gamification
Quiz + Reward
Hidden Spots
Draw here
Puzzle display
Chase
Plane
Through
Exhibit
Crowdsourcing
Divisions
Featured Floors
Lighting
Color Coded Signs
Put a sticker on your fave Display


Content Gamification x 10
Mission
Paper
Wright brothers meter
Life
Flight
World
Propeller
Small Little Videos
For Small Attention Spans
Exhibit
Choose your adventure
Audio?
Imagine...


Curtain Seperated

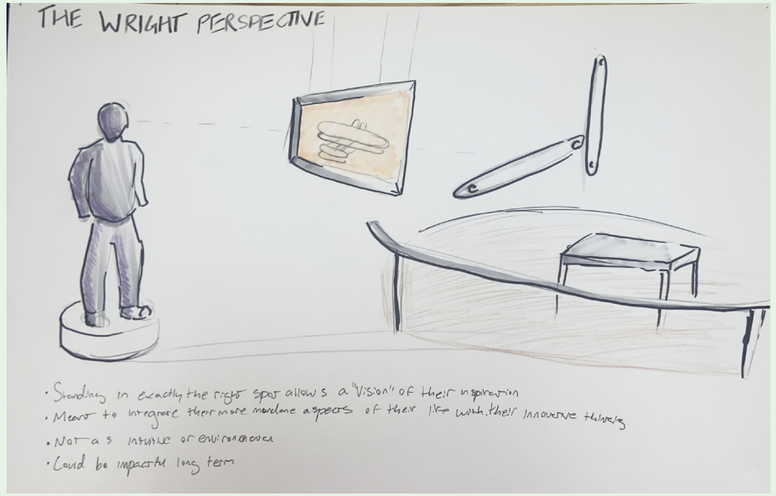

Lighting
Visualize
The Connection
Bicycle Rotoscope?

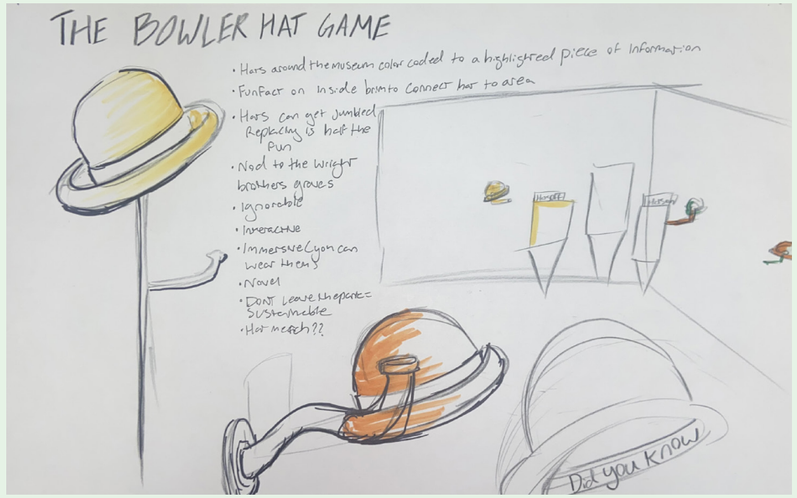

Guide Card System
Hand

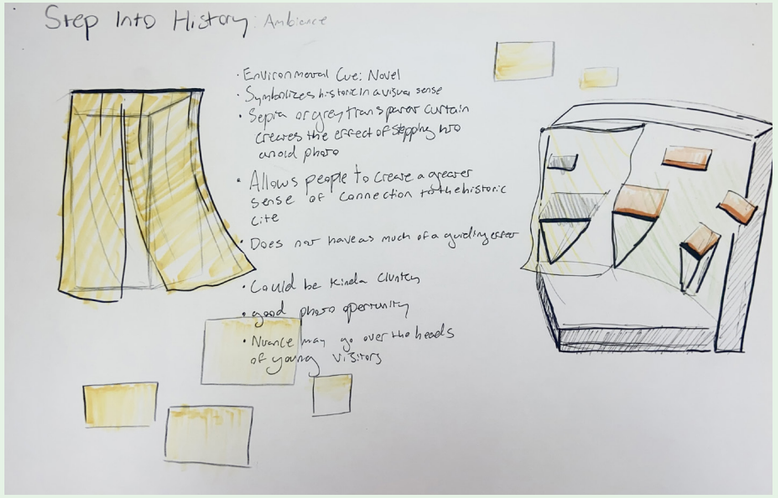

Conspiracy theory
System

Picking Favorite Children

As more developed ideas began to pop up, three had the most promise. So those are the ones who I decided got college funds and healthcare.

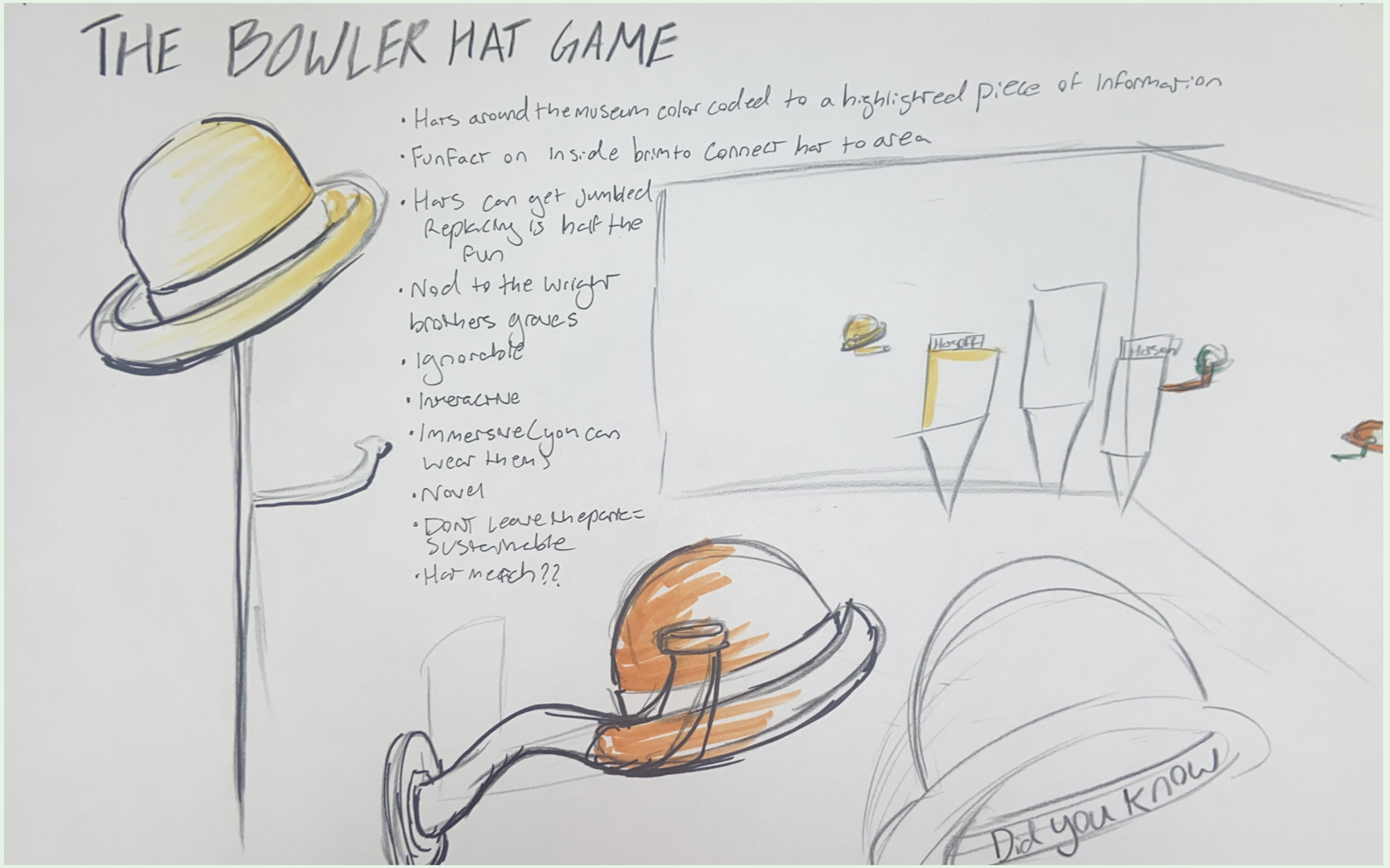






Decisiveness is a virtue

Time to take a chance on one of these and just go for it. Drum roll please: HATS!



Formative Testing (Goofy Version)

I started with some very unofficial formative tests, exploring how people felt when handed a hat, how they held it, different sizes, just all within my class. These weren't the most controlled tests, but they did help me figure out what I wanted to test with less knowledgeable participants.

Formative Testing (Official Version)

After getting a general idea of how people interact with hats, I spent some time planning out ways to test how effective cues might be, what people would notice about a hat, and if guiding someone to an exhibit encouraged them to read it. I had a group of three college aged folk as my testers, mostly due to accessibility and getting the test results in a timely manner.

Questions
Are people drawn to put like colors with like?
If given a hat, do people wear it?
Is being physically close to an area enough to get people to interact with it?
What would an educational payoff be for someone who is illiterate?
Is wearing hats fun?

Test 1
Are people drawn to put like colors with like?

What I hope to learn: How people react to what I've assumed is an intuitive cue, if they recognize the cue, if they follow it.

Hypothesis: people are likely to the color table of the object they were given, because they recognize the cue and perceive it as the "right answer".

Sampling:
Several ages
Possibly not available

Methodology:
Bring colored tablecloths and put them on tables
Give people colored (paper hats??) objects, let them choose the color
Allow them to enter the space with no instruction
See what happens

Things to look at:
Do people sit at a table matching their object color?
What do people do when given a random object?
Are they generally curious?

Test 2
Is being physically close to a display enough to entice people to interact with it?

What I hope to learn: are people struggling with where to go first, or do they not want to interact at all?

Hypothesis: People are likely to glance over a poster they were guided to with more attention than the other posters in the room.

Sampling:
Several ages
Possibly not available

Methodology
Have several posters with lots and lots of text
Guide people to a poster and leave without speaking
See if they read it

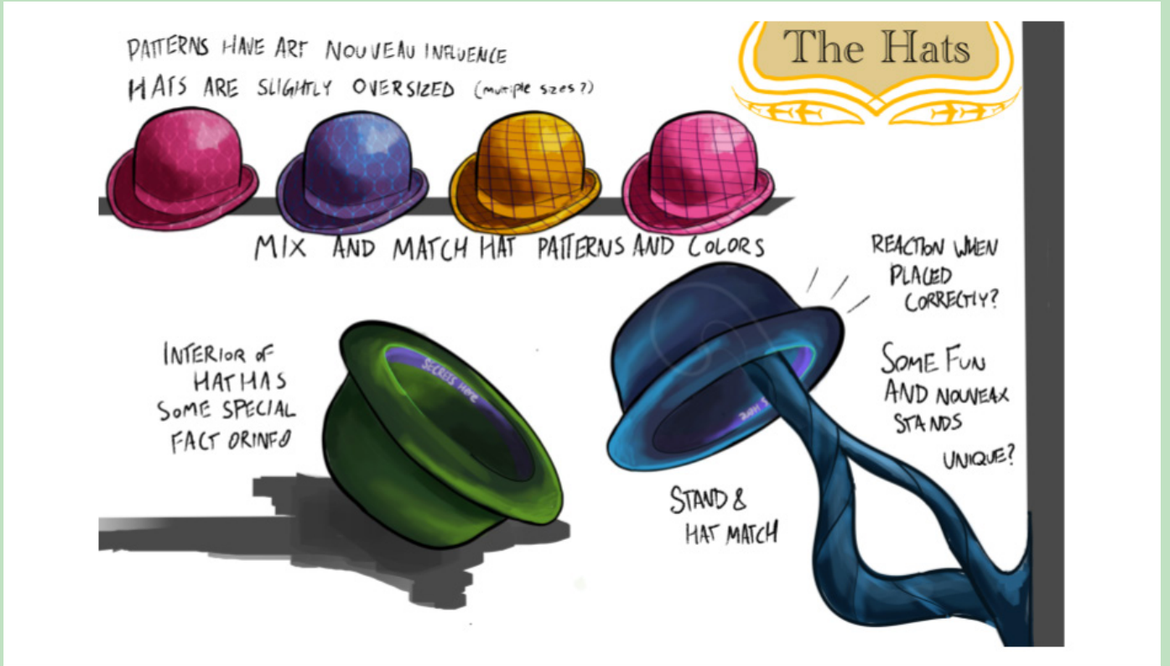
Things to look at
If people are likely to read what is nearby
How long people spend in an area when guided there (be it through cues or not)

User Scenario

With the help of my formative testing I outlined how a person might interact with the system.

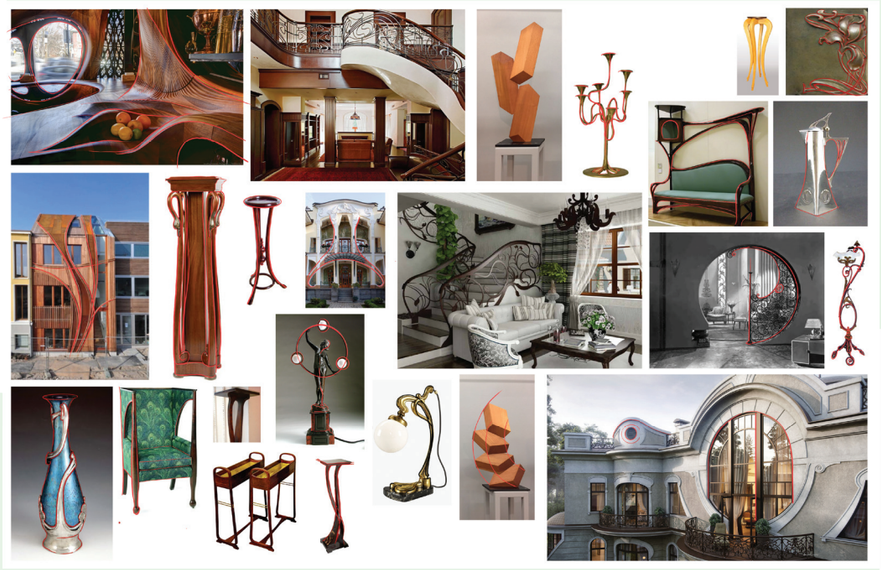
Midpoint Review

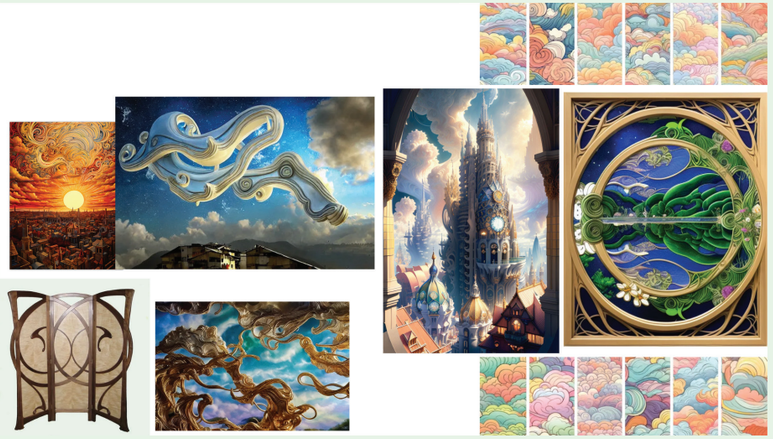
With a better understanding of how user interaction would go, a change in lighting taking the place of the color cue, the number of hats beginning to settle, the idea of trying many hat stands, I was able to move into formatting this information more clearly to guide me moving forward.



Aesthetic Effect

After midpoint review, it was time to figure out what the pieces of this system would look like. I started with several different visual reference boards based on the art nouveau period, which was the popular design style of the Wright Brothers time period. The first was very general, the next more focused on form, the next on specific motifs.





Another Visit

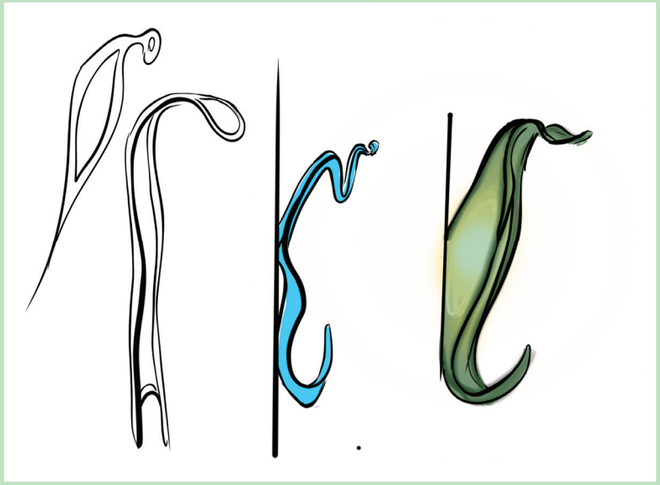
To help nail down what visual reference would work in the park, as well as the exact topics that might need highlighting, another visit to the park was in order. I spent several hours with a map of the park, color coding each display by topic, noting the year the history referenced, looking at how people might move through the museum, and taking many pictures.

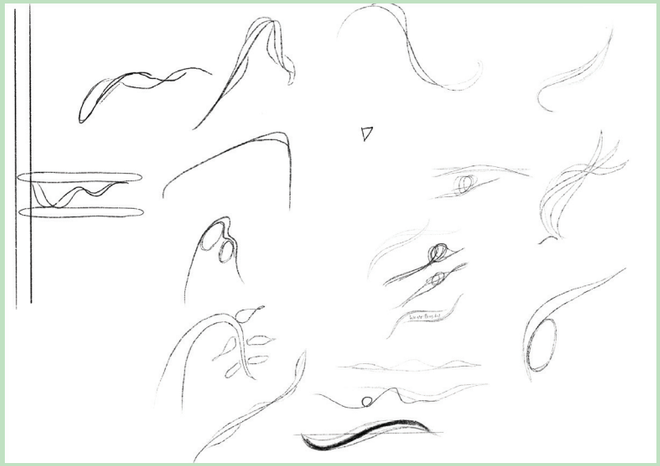
Hat Purgatory

And so began the extensive process of figuring out the most compelling form of a hat. These are just a few of the many, many iterations of hats and motifs.

Hat Stand Purgatory

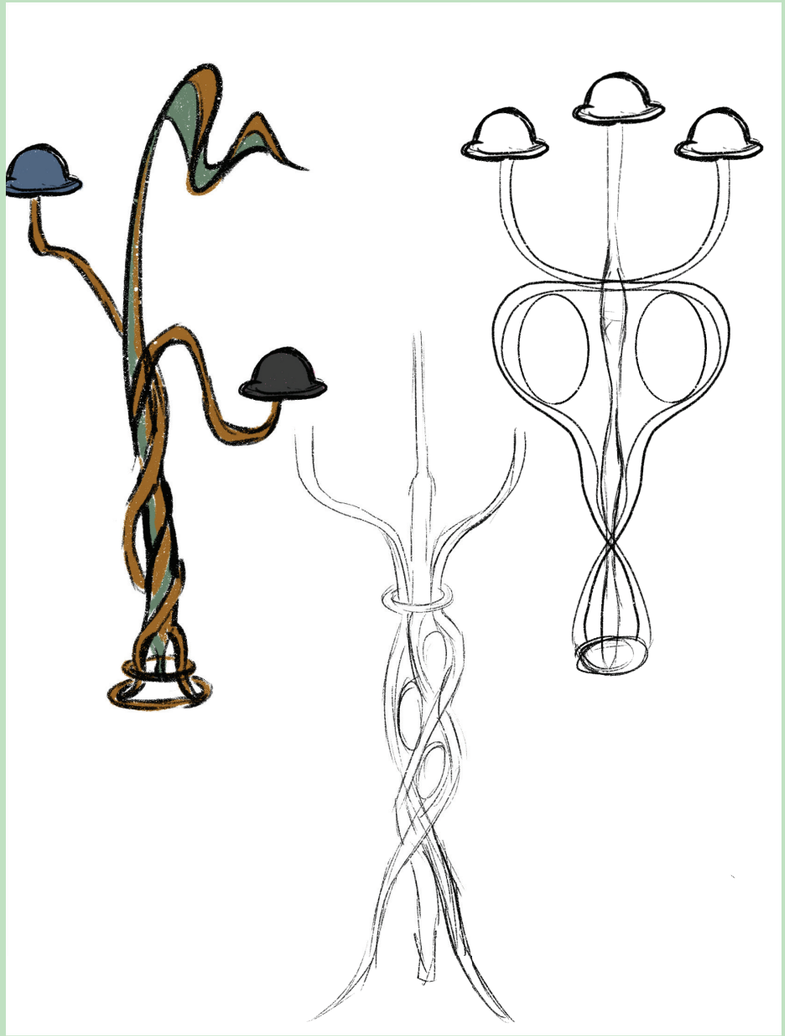
Just as hat forms are an imperative portion of this process, so are those of the hat stands. I knew that I wanted to follow some of the fluid forms of art nouveau, but try and bring it a slight otherworldly feel as well. The process of figuring out the curves took quite a bit of trial and error.

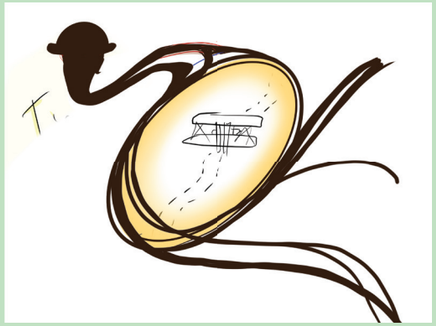


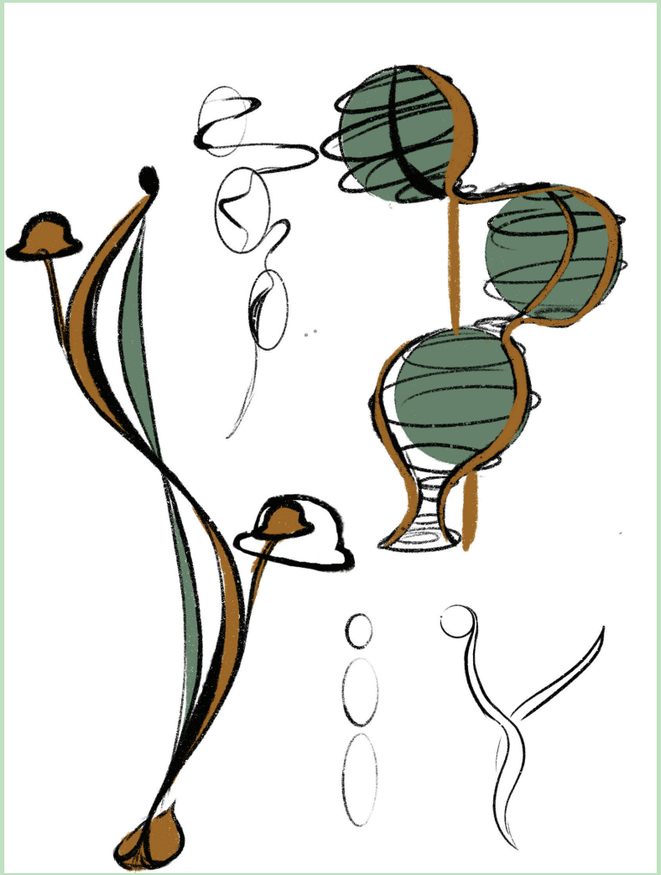


Hat Stand Heaven (psych it's still purgatory)

After taking abstract curves way too seriously for more than a week, things started to come together sort of.

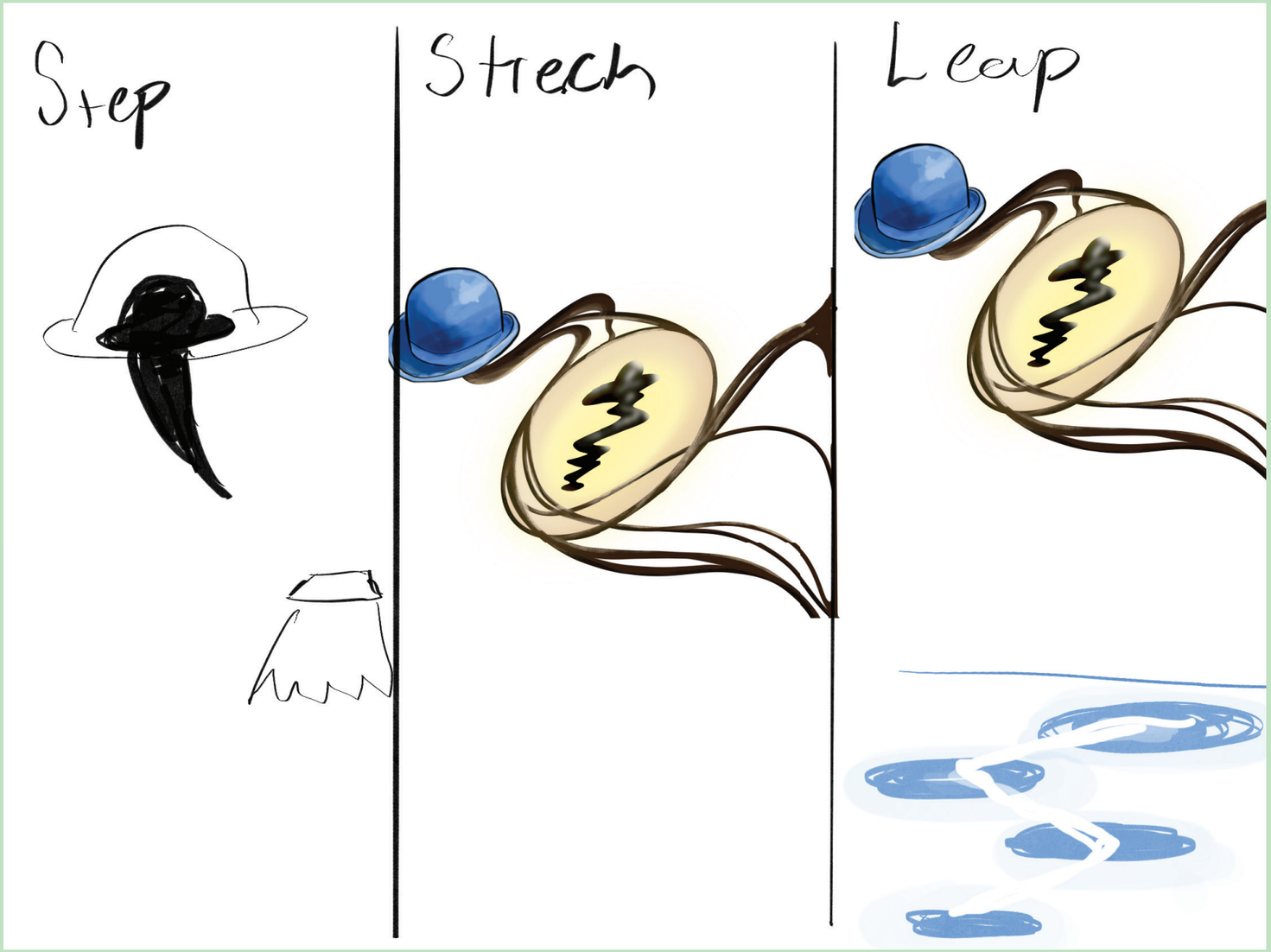






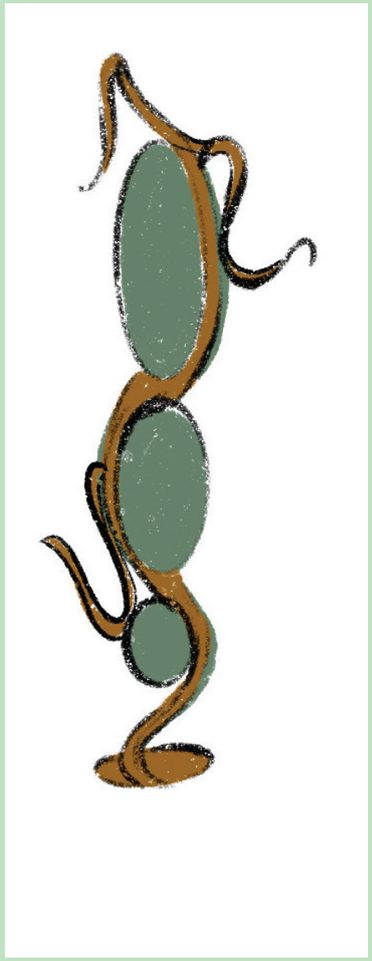
Three Levels

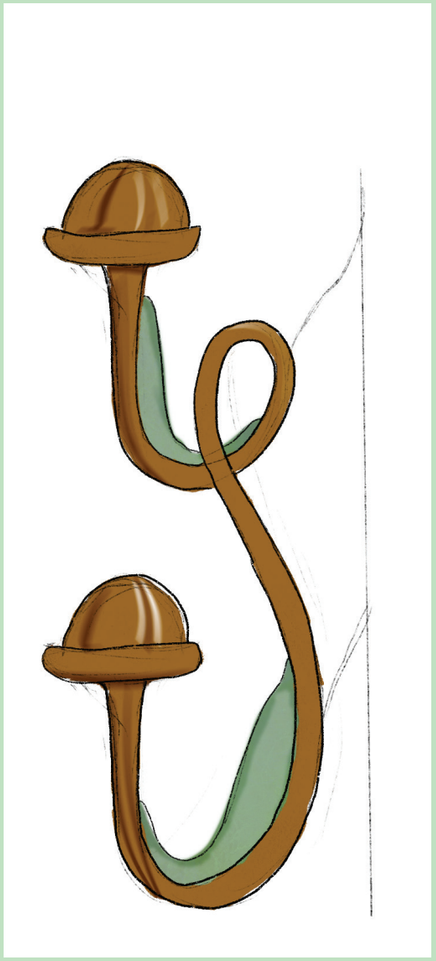
As the hatstands started to take form, three distinct types of experience began to form, a simple experience, a more involved one, and then the most complex and expensive. They each had their own design and use, but all followed the same goal. So I decided to pursue all three, as accessible alternatives in the project.

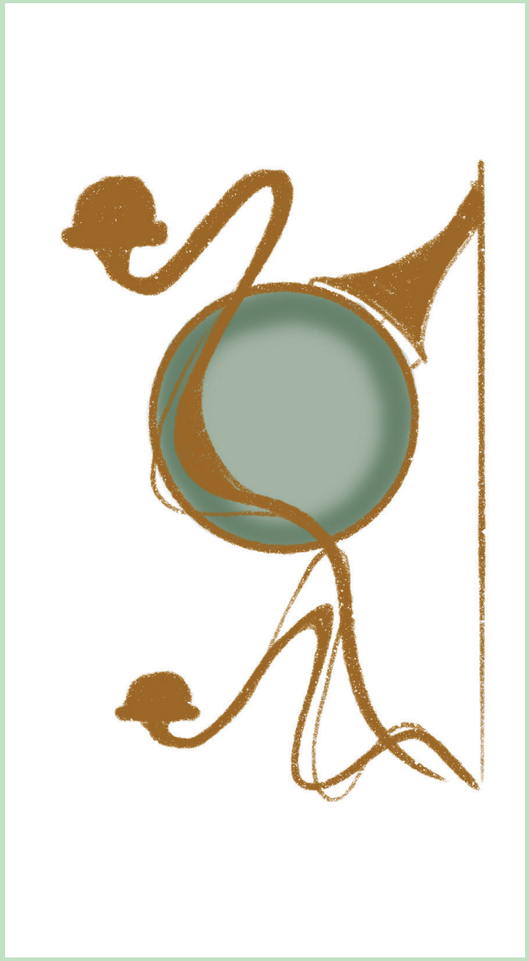


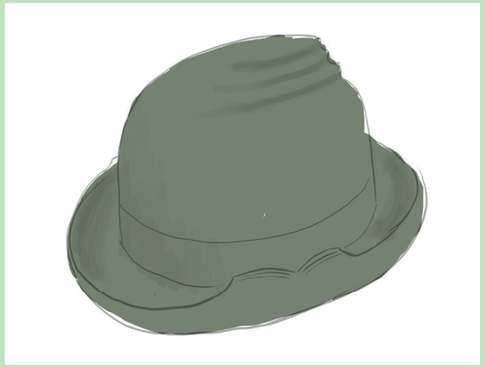
Settling on Roughs of Final Designs

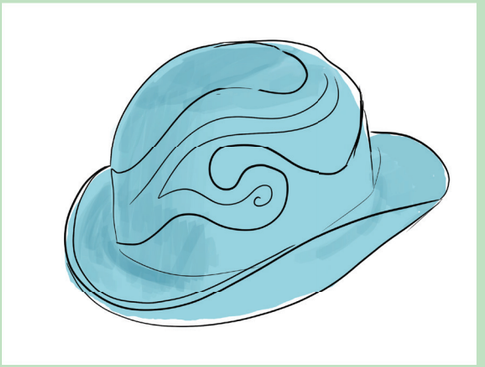
I finally found hat motifs that spoke to me for each of the four topics I'd isolated, and hat stands and associated actions that I felt worked with the process. The sketches weren't pretty yet, but the iteration phase was coming to a close.

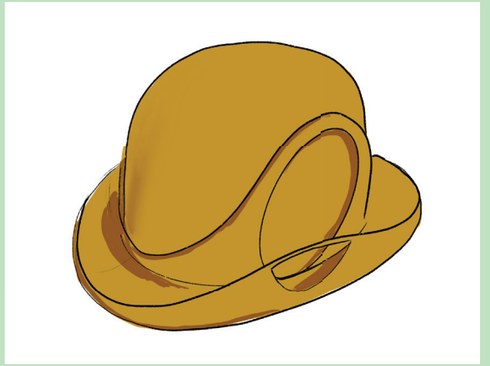


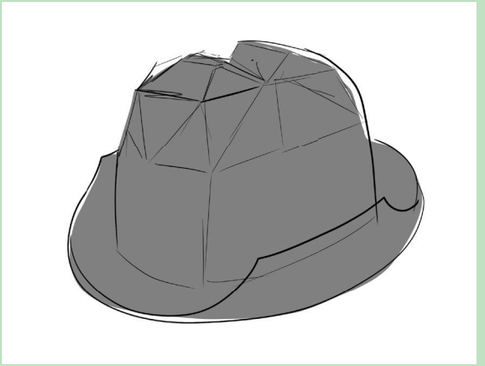








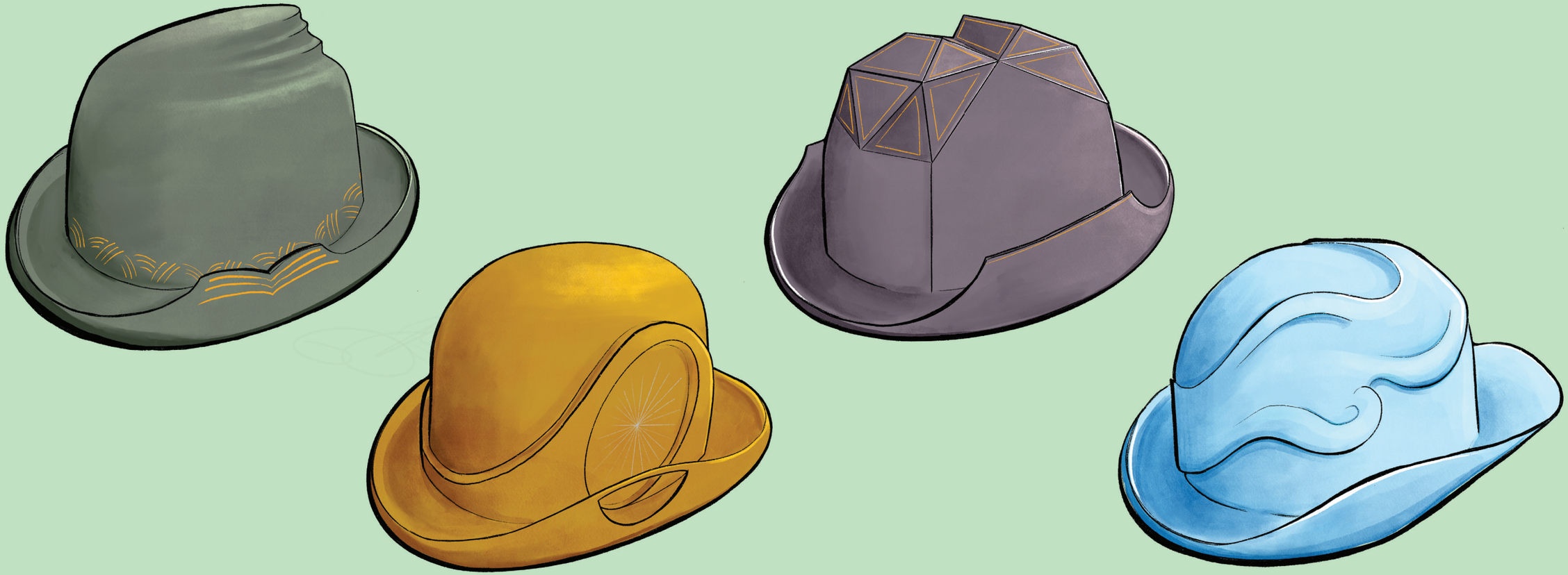


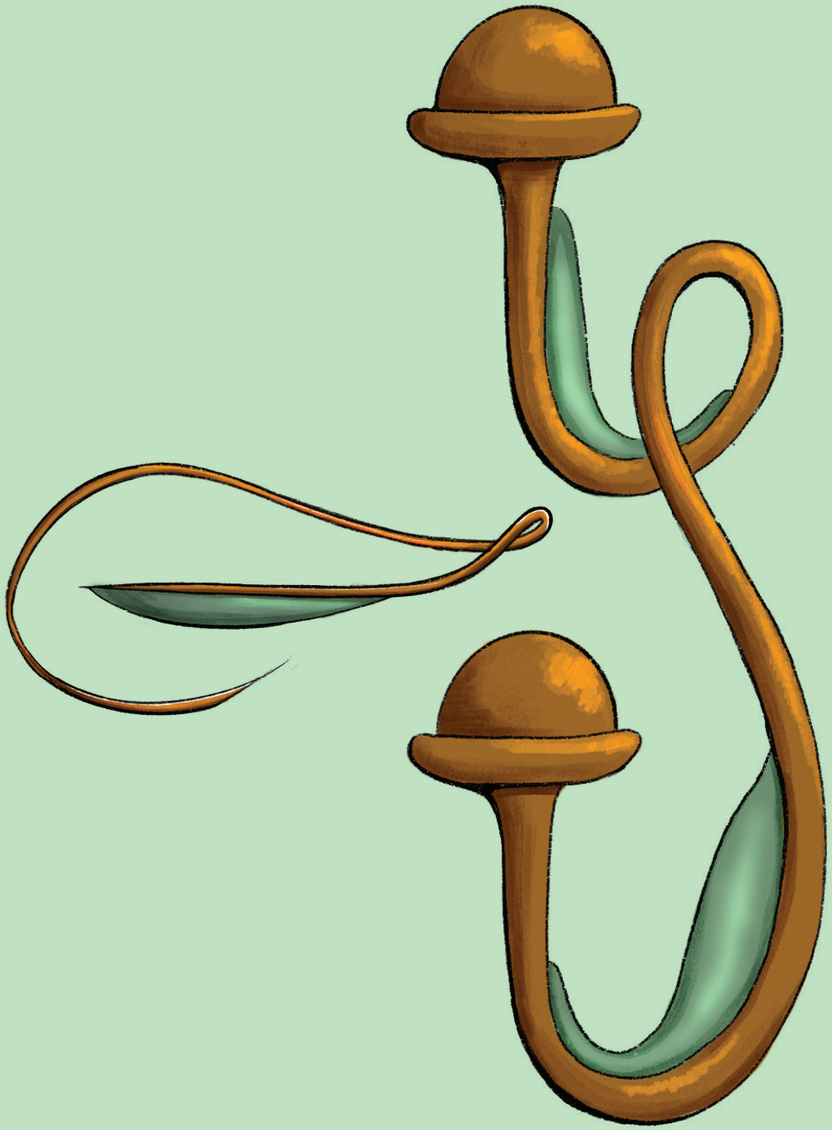


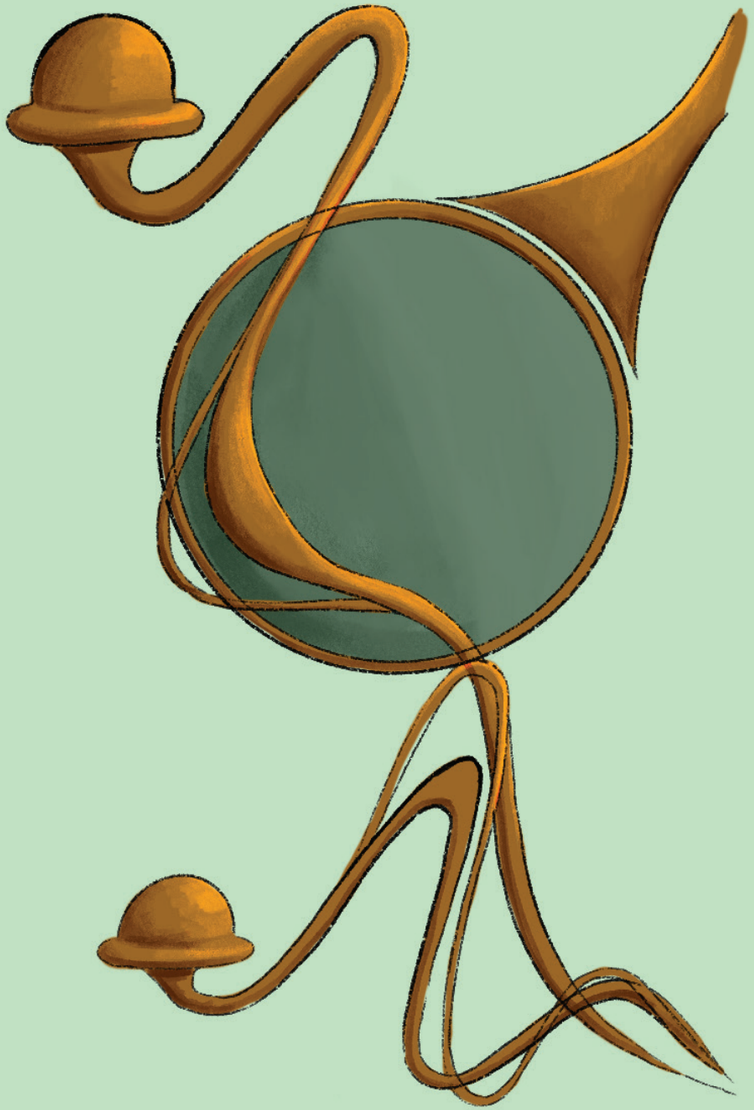
The Communication Phase in 13 easy steps

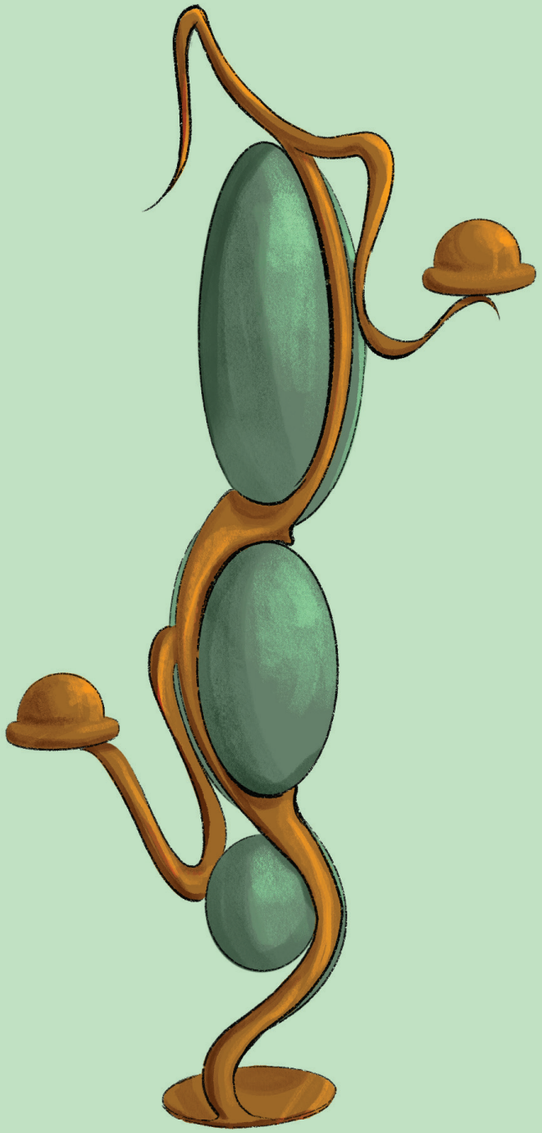
Creating Persuasive Visuals

I wasn't planning to 3D print any of these forms, the hat stands would be hand modeled, while the hats would be formed out of felt. So I decided 3D modeling the pieces was not the most effective use of my time. I tend to think well though stylized sketches, it works well given the storytelling aspect of this project, and as I had proportional, if rough, sketch ideas for each object already, it also seemed the most effective use of my time.



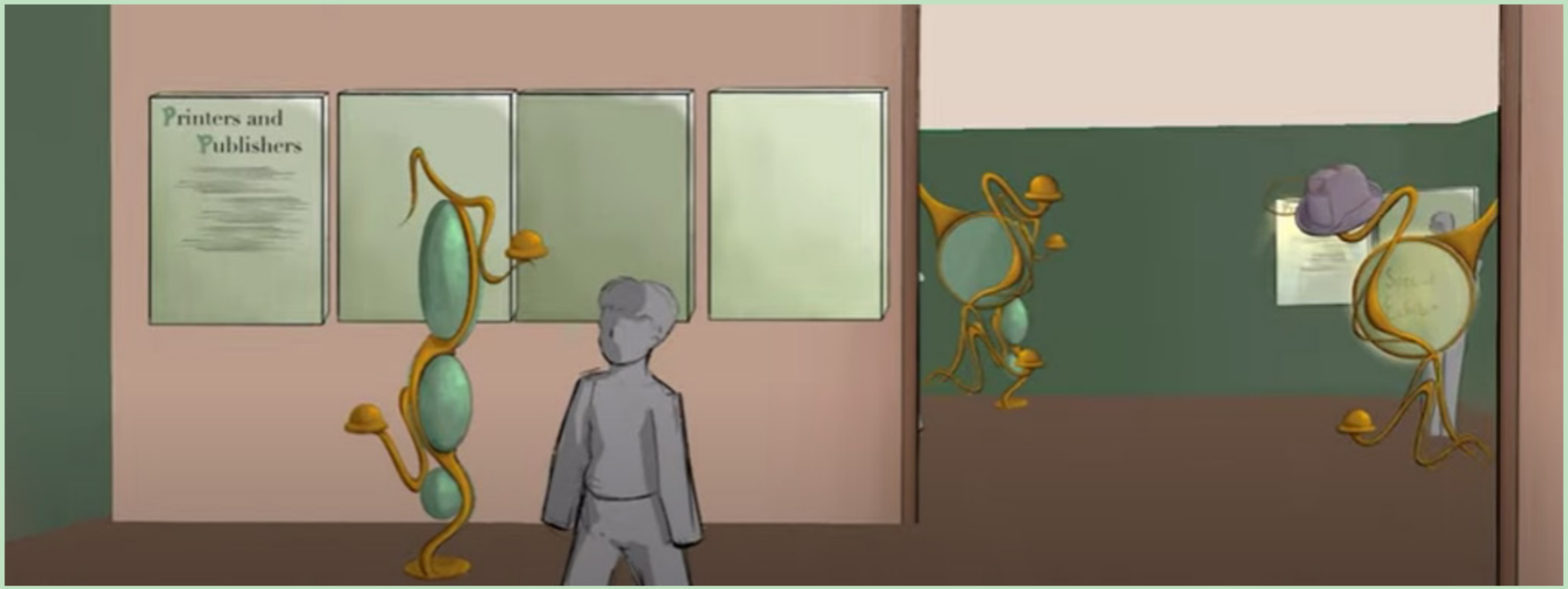






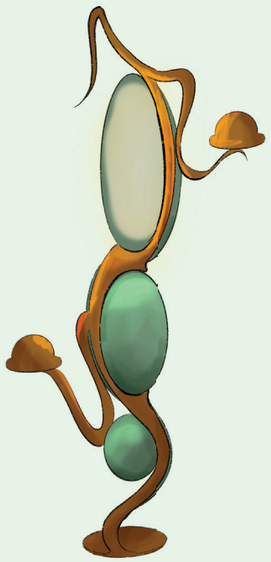
Explaining an Experience (new software!)

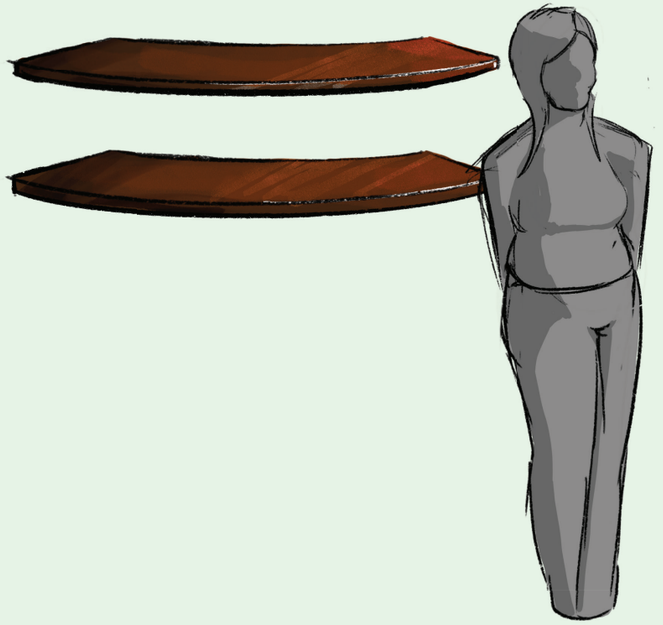
I wanted a way to walk people through an experience, making it feel like a journey even as I held onto the story-book vibe of the sketches. There was a software I'd been interested in learning for quite some time called "MentalCanvas." It allows the user to set 2D sketches onto planes in a 3D space, zooming from one layer to the next like layers in a glass painting. I used this to create a facsimile of the experience of walking through the park. Most of it was arranged in a way to let the narrative of the experience flow, and not based on any actual physical space. However, the opening of the video holds some spacial similarities to the lobby of the Wright-Dunbar Interpretive Center, the location I was focusing on. I wanted there to be just enough to establish it as a place, while simplified enough to not overdo it on the visual clutter.

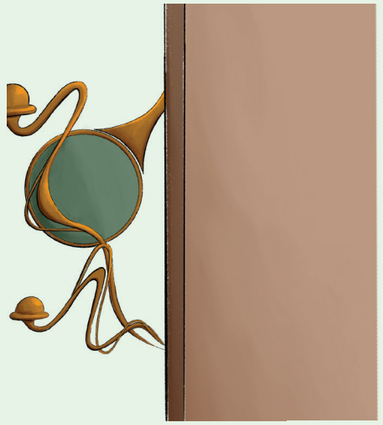


Creating Assets

To create even a minimal believable environment in something like MentalCanvas, a fair amount of assets are necessary. I didn't like the drawing tools in the program, so I used procreate, my go to digital sketching system, to create assets and then export them to MentalCanvas. I also created a separate animation, frame by frame, of the top complexity hatstand and how the lights would react to the stand being activated.

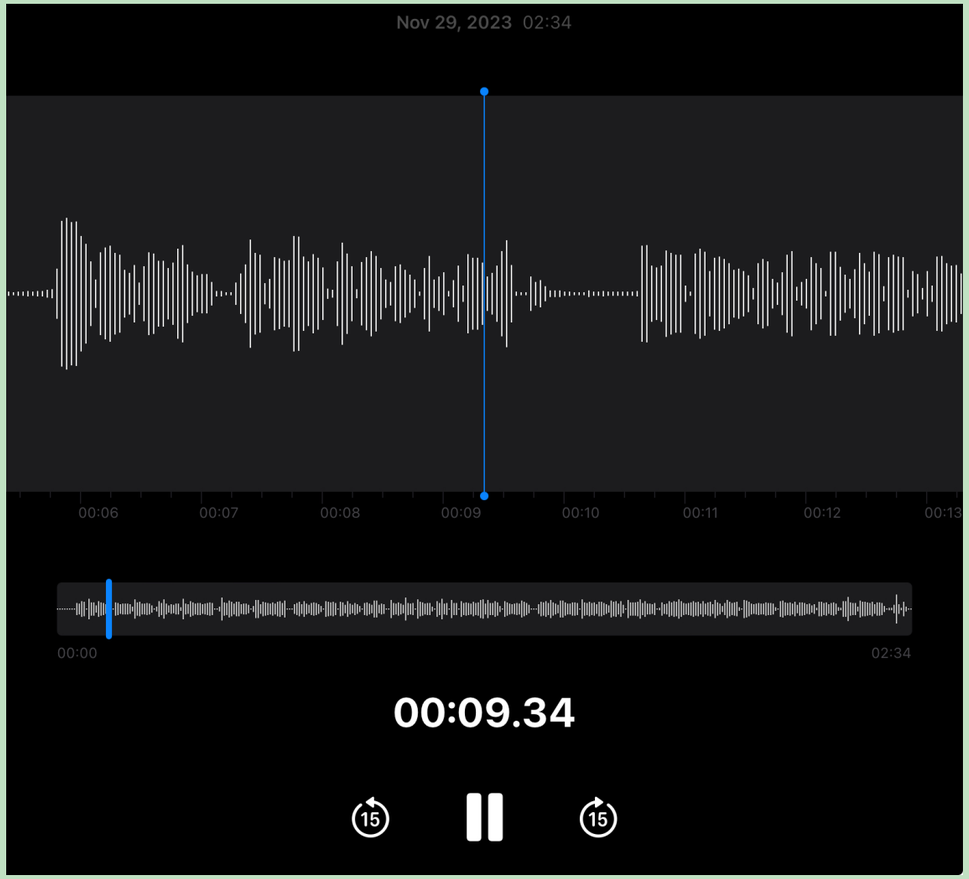






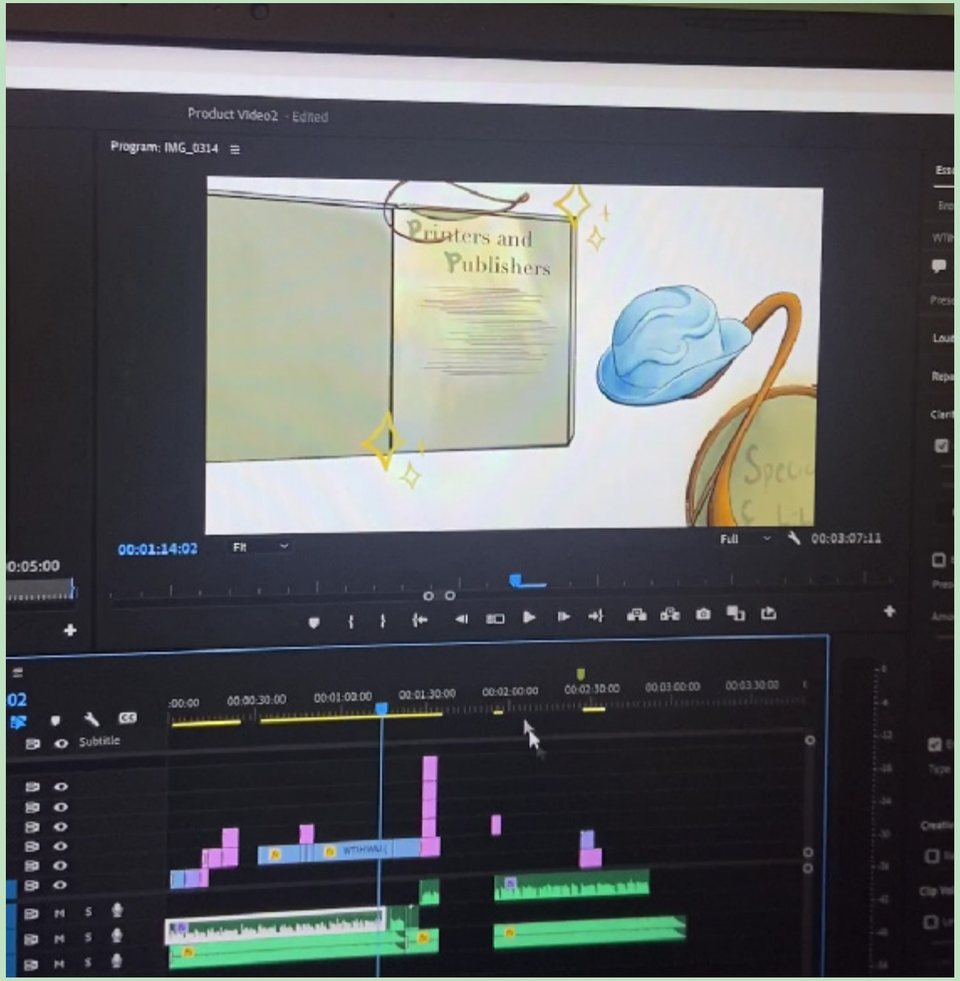
Timing Everything Together

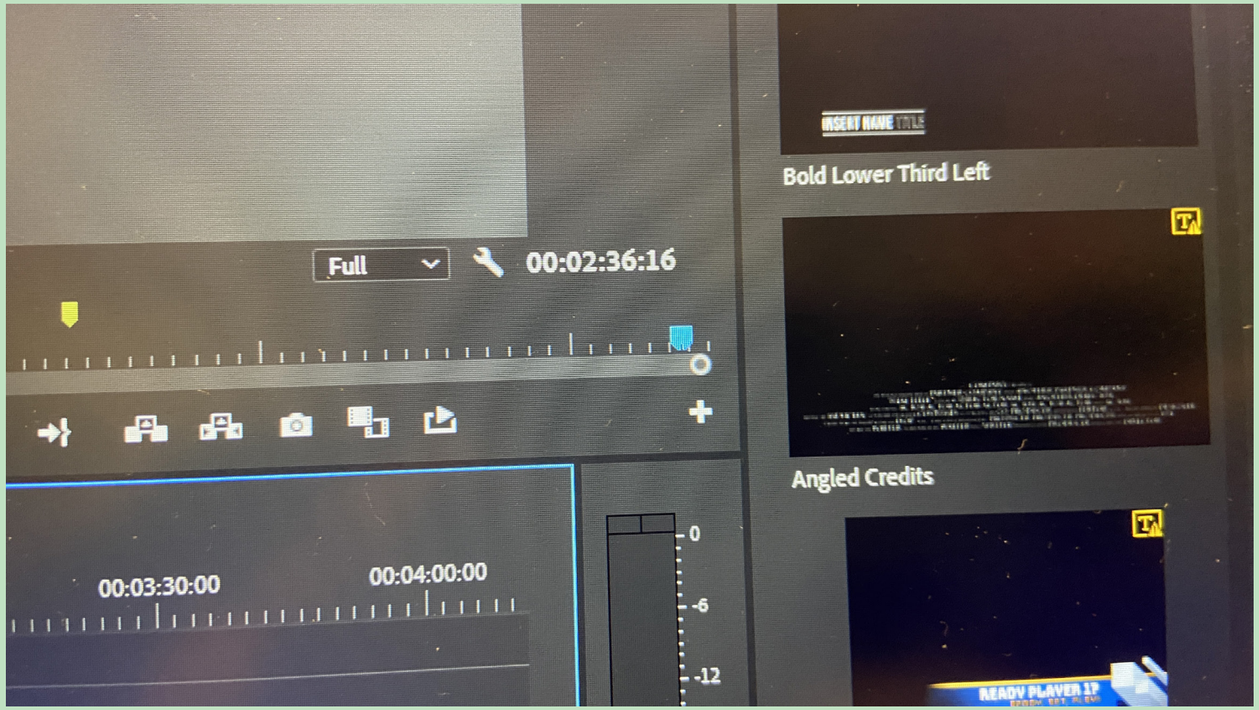
The next step was to write a script for my product video, because the timing for all other visual assets depended on the timing of the audio. It took a few rough cuts of audio to figure out how I wanted everything timed. I think used the bookmarks to match the timing of the MentalCanvas walk through in the program to the audio to allow a completely smooth path of motion in the final video.



Video Editing

Then came a lot of fighting with premier pro, as usual, and making careful note of exactly how long the product video was. That's a secret tool that will help us later!





Physical Model: Hat Stand

A miniature works like model needed to be made, just to give a sense of the system in 3D space. I chose to do a 1/6th size model. For the model I first transferred by profile sketch onto paper at the exact right size to use as a pattern. Then I made a wire armature that I covered and shaped using air dry clay. This took time as each piece needed to dry before being painted, and it all needed to be painted with several coats before being assembled. I chose to make the medium complexity hat stand so I could demonstrate the included light up exhibit.

For that center section I re-purposed a clear holiday bauble by removing the top and pour coating the inside with diluted acyclic paint. I used a second bauble of the same size to make the wire armature and form the clay to ensure that everything would fit together. Finally all the pieces had to be put together, for which I used a variety of adhesives including school glue, tacky glue, Superglue, more wet clay, and tape. The top piece of clay had a hollow tunnel that met the opening of the bauble, which allowed me to poke miniature string lights through the base and into the translucent bauble, allowing the light up effect to be shown.

Physical Model: Miniature Hat

To complement the miniature hat stand, I also made a miniature hat. I made the hat out of felt in order to make sure it had a similar charm to the larger hat model. I used needle felting and loose carded wool for this. I started by just making a rectangle, then turned it into a cylinder and sealed the top with more wool. I continued to flip it inside out and back to make sure it developed no harsh lines and had been tightly enough felted on the inside and outside.

I chose to use the Wright Brothers themed hat for this as it seemed the most thematically appropriate. For the wheel well from on the hat, I made a separate flat piece that I felted, folded in half, and then trimmed to force it to be symmetrical. I felted it onto the hat base, I then added the brim in a similar fashion. I stuffed some foam inside to keep the hat from felting to itself, and gave it all a once over with my newest finest felting needle to tighten up the wool. I've needle felted as a hobby for a long time, so this part was very fun for me.

Physical Model: Wearable Hat

Full size milliners work is not something I'd ever done before. I order a few colored felt hat blanks, watched a YouTube tutorial, read a blog, and charged in blindly. I set my sink to make water as hot as it could. Originally the instructions said to boil water but I was tentative so decided boiling water and my bare hands should be a last resort. My kitchen sink gets very hot, so I ran a big pot full of water that was just slightly too hot to touch, and submerged my hat blank. I held it underwater like I was a shifty mobster and it owed me money until it was fully saturated.

I stretched the saturated blank over a Styrofoam head. Usually milliners use wood blocks, but they're quite expensive and I already had the head from wig styling so I just made do. I then took the wet wool and stretched it and pinned it into the shape of the Dunbar Hat, which most closely resembled the color. I used rolled plastic bads to bolster the brim, and let it dry for 24 hours. I then made a paper jig to help me and I trimmed the brim into the shape I designed in my digital sketches. I took gold paint and hand painted on the pattern details.

Milliners felt blanks are kind of shaped like a cone!

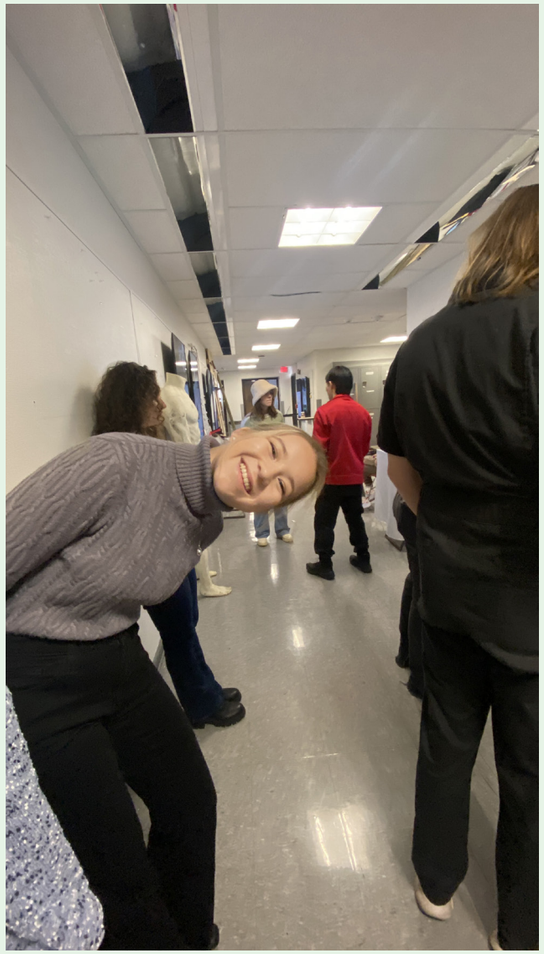
The Physical Models

Pulling It All Together

Finally I finished editing my video portrait, took my abstract that I'd written in between creating assets and organized my assets into some slides that highlighted the things the video didn't. I put them all together in premier pro to the exact length of my product video. I uploaded it to YouTube sideways so it would work the technology provided for our showcase.

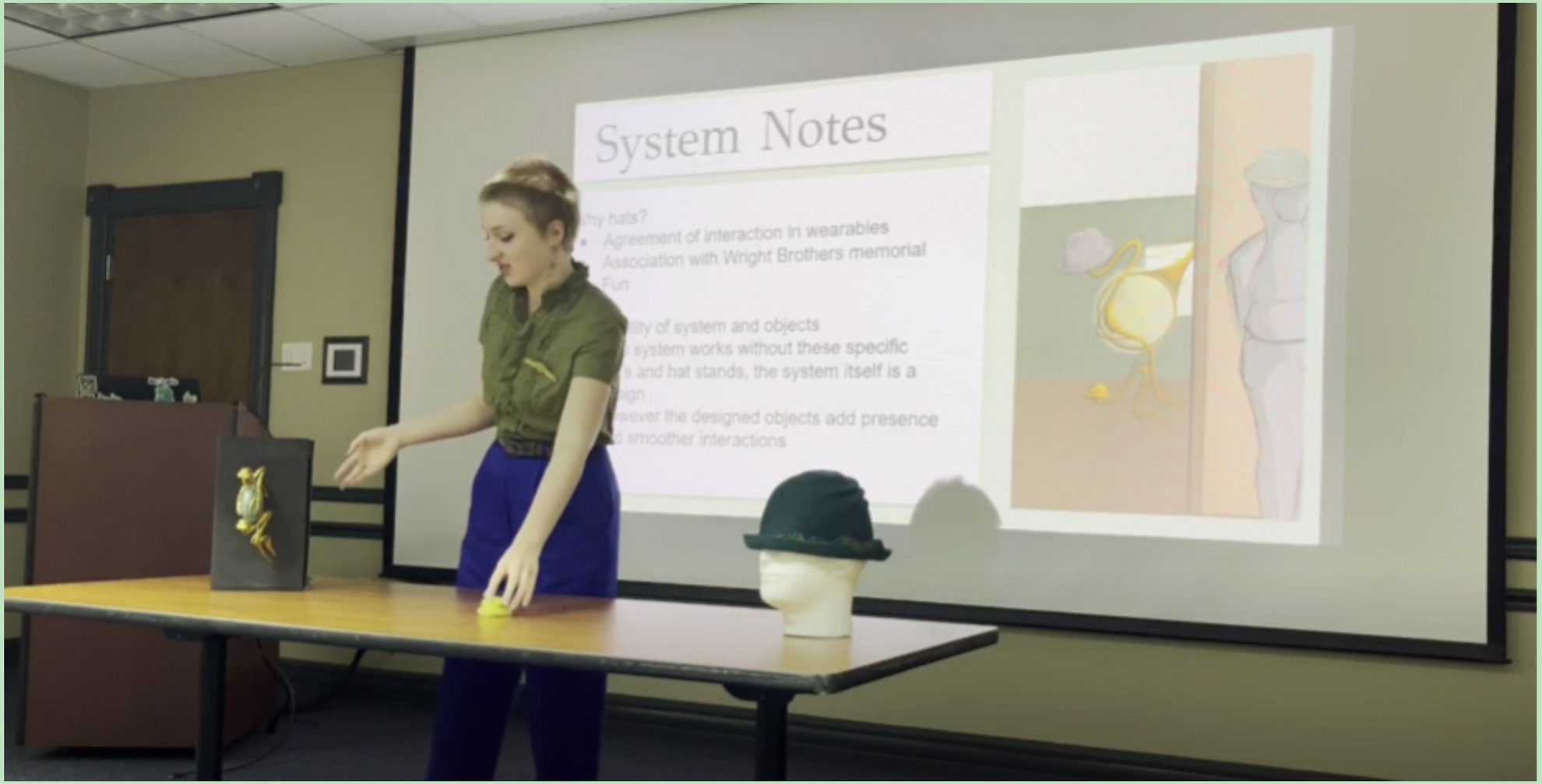
Showcase Day

With less sleep than I probably should have gotten, I brought my models and my video and had a great time sharing with everyone and seeing every design my classmates worked on this semester. After almost dropping my model of course.



Sponsor Presentation

To cap off our semester, we were invited to Dayton to visit the Wright Dunbar Interpretive Center and present our projects to representatives of the park! Then we celebrated with lunch.



The End

Bonus Slide!

Just a few memorable moments from this semester! After all, it wasn't all work.