WESTERN SYDNEY
UNIVERSITY

SCHOOL OF School of Engineering, Design and Built Enviroment

ASSIGNMENT COVER SHEET

STUDENT DETAILS

Student name: Blake Reed

Student ID number: 22030016

UNIT AND TUTORIAL DETAILS

Unit name: Studio: Interdisciplinary Global

Unit number: ENGR4021

Tutorial group: 09:00

Tutorial day and time: Thursday 9am-12pm

Lecturer or Tutor name: Sasha Alexander

ASSIGNMENT DETAILS

Title: Final Report and Presentation: Design iteration stage 3

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Home campus (where you are enrolled): 6 Hassall Street

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Final Report

Blake reed 22030016

Design Brief

Dane
In order to support the crew members living and sustaining themselves on the lunar surface, shipments of supplies must be periodically sent to the base and stored accordingly. To accomplish this, an offsite resource storage facility is needed in order to store the bulk resources supplied by cargo spacecraft. Taking inspiration from Antarctic research stations, the storage facility will be off-site to reduce the risk of accidents occurring and to ensure that any incidents are isolated to the facility.

The storage facility includes enough space to comfortably store 2 shipments of cargo from 2 H-II Transfer Vehicles and also includes a central, dedicated workshop space to store large tools and perform large repairs. This workshop space also includes storage of various maintenance tools to provide further upkeep for various areas outside of the overall storage facility. The importance of this large space is paramount for mission success, as it houses and stores the tools and objects required for long-term survival and lunar sustainability, with the ability to collect and comfortably store valuable, mined resources. Lunar ice and minerals allow for the crew to support other key functions, such as farming, and allow for the crew to be less dependent on cargo shipments. By reducing the need for these shipments, the cost of having a crew on the lunar surface decreases as funding does not need to be placed for frequent deliveries of crucial goods.

Nawid
An important factor in an astronaut's mental health is depression, which is why creating a game board to combat mental disease is done. To make sure everything goes according to plan and to guarantee the safety of all other crew members in the base, astronauts must complete 16 hours of active duty within the spacecraft or base. This results in eight hours for the astronauts: two hours for exercise and four hours for sleep, leaving two hours for leisure and free time.
The game board's concept is to guarantee this objective is accomplished by utilizing a variety of materials, including magnets, tungsten, and sophisticated ceramics. The purpose of using magnets is to prevent parts and boards from falling off or gently floating away on the moon owing to the absence of gravity. Tungsten is utilized similarly, but it also plays a significant part in increasing the game's effectiveness. To make sure the dice don't float away or adhere to the magnets within the board, tungsten is carved into them. Advanced ceramics serve as the foundational model, guaranteeing that the components are not hazardous towards the astronauts. To make sure that there is no obstacle in the way of the game piece, the game board is integrated into the sofa that was constructed by a different group member. Colour coexistence between these two initiatives is essential to provide an aesthetically pleasing perspective for the astronauts.

Bernice

The main reason for this direction of the design is the accessibility and efficiency of industries which may or may not allow for access for certain community groups. The aim is to expand and become much more inclusive for all community groups while maintaining the efficiency of products and services.

Efficiency allows astronauts to move freely and safely. Making more space for other items to be stored at the base camp. This is done as a need for the crew member's mental health as they live in a co-habitable space together for long periods of time, which can cause discontent within the crew, therefore affecting both mental health and their responsibilities. Due to this, the importance of mental health and personal privacy has been a priority within the team, the neatness and tidiness of the room can help astronauts to stay focused on their work.

The basis of my design is how to arrange the use of limited space as efficiently as possible factoring in other conditions such as equipment hardware, adaptability to different situations and the necessary structural integrity. This leads to further investigation into the work and development of a theoretical space station should this project be implemented. This would allow us to understand the future challenges that we face when designing an environment for space, to know its limitations and to better understand the available opportunities.

Emity

For our project, my focus has been designing and refining the lunar base's interior and exterior layout, ensuring both functionality and safety features for the astronauts. I followed my initial concept, staying to creating a central module surrounded by smaller, inward-connecting modules. This evolved by elongating the hallways, compacting the leisure room to the main area (now housing kitchen, dining, and leisure) reshaping the bedroom a final time by cutting the size in half and forming a bunking system. As everyone has become more compacted this gave more room to install a communications room, a medical bay, and removable panels to access the electrical and plumping system beneath the base, utilising the space to its fullest.
A large consideration when designing the layout was addressing safety and the sustainability of the lunar base. I established a thick (2.5m) regolith coating to shield against radiation. Also designed were the airlocks located throughout the base, stationed at each end of the hallway, this was to prevent chain reactions of fire hazards and dust contamination. Electricity was to be wired within the walls and floor of the base, this was to have easy access to the wiring for efficient repairs and inspections.

Kaiyuan

Lounge seating in the living space - sofas
The health of astronauts in space is critical and requires ergonomic furniture to protect the bones and spine. Choose a material that fits the astronaut's body for the seating material. Latex with high resilience is the preferred choice, as the properties of latex allow it to fit the astronauts comfortably and at the same time. For the external fabric wrapping, a piece of warm and tactile velvet fabric was chosen to provide the astronauts with a warm and cozy experience. The body of the seat is made of cardboard, which is environmentally friendly, lightweight, sustainable and reduces the cost of fuel for the flight.

On the moon base astronauts need a place to relax and have fun, so the sofa is designed with a set of sofas to meet the needs of users who can sit together to communicate or have fun during their leisure time, which can reduce the appearance of mental health disorders among astronauts. The usefulness of the sofa is not limited to the living space, it can be used in any place where the seat is needed, which greatly improves the utilization of the seat.

Blake

For this project, my focus has been creating a design to facilitate the indefinite production of food through the use of plants.

As our project involves 6 adults living on the moon for 12 months it is unavoidable that a large quantity of food will be required. With such a quantity of food, it will be unreasonable to transport the required amount to the moon. Therefore I have decided that the best option is to provide the astronauts with the means to create food. As plants are sustainable, in theory the astronauts will have access to an unlimited amount of food. To allow for a consistent food supply I have chosen to use 2 garden beds

Due to the nature of the moon, radiation will be a problem. Therefore as a team, we have elected to cover the base in moon dust, to be a natural deterrent to immense radiation from the sun. Therefore, considering the sun's rays will be blocked from accessing the garden bed, which will be located within the base, I have elected to make use of full spectrum grow lights. These lights will provide the light source the plants need, furthermore the height of these lights will be adjustable to facilitate any growth stage of any plant(s) that may be chosen.

Additionally, my design makes use of horticultural foam to allow for water (mixed with additional nutrients) to be evenly distributed to each plant, due to the saturating nature of the foam gravity will not be an issue here.

The mental health of the astronauts has also been considered, with the shape and colours specially chosen to invoke a sense of nature within the moonbase.

As many plants have been grown in space I have confidence in my design.

Jazmyn

Designed a food packaging and storage system that introduces the main concept of being fun and interactive to eat. This food packaging allows crew members to have a place for casual gatherings. In space, there are limitations to the weight and it means that people have to be considerate of the weight being taken up into space. With this design of origami packaging, it allows for it to be biodegradable and be useful for Blake's gardening bed. It also has elements to tie into Jessy's sleeping pod shape of being a hexagon to have uniformity throughout the moonbase habitation.

Upon researching how food is stored, in Assessment 2 I then developed an idea to store food that can be clean and stored nicely. I also considered the cross-contamination and the variety enjoyable. It's stored in a way that comes in a grid with other packages inserted into the grid so that it can be placed as a visual cue and a way to attract the crew member to take a snack and remember to eat. (As food in space can become repetitive to eat due to the shelf life of food and limited resources allowed to be brought up by spaceship.)

The space packaging is mounted on a wall or a fridge with a string and hook so that it can easily be

moved around and it is meant to be seen at all times, as a visual cue for a life-cycle to view the food being taken out. It can also visually indicate what food is being eaten to take notice of how much is being eaten. They can also stack on each other for storage for a cleaner look

Bowen

Having a consistent sleeping schedule has a direct impact on all essential day-to-day tasks completed by us humans, especially within the vulnerable environment of space. Hence the importance of astronauts achieving lengthy quality sleep cycles (minimum of 8 hours) with minimal-to-no disruptions to the circadian rhythms, within the 16 daily sunrises & sunsets. Without quality sleep, important tasks would be significantly impacted due to fatigue and sleep deprivation, whilst daily activities become strenuous often leading to poor mental health & other related disorders.

Due to this factor, my sleeping pods in conjunction with Jess' sleep pod have immense value in ensuring the mission goes to plan for the six crew onboard. The overall design has had three main iteration changes which had it first designed in a circular shape with a larger area consumed. However, I then tweaked the design to become a rectangular shape as the circular design was too hard to fit within the provided section of the base. The final iterations mainly were layout adjustments and shrinking the overall area of the sleeping POD as we had some major floor plan changes that required less space to be taken up.

The final design sees the pod to have most features from previous iterations but in a more logical and confined space to ensure space efficiency. There were some changes such as utilizing a projector instead of a TV screen, to both improve safety and use of space.

Merral

My primary focus for the project was developing the plumbing and piping system for the lunar base. The goal was to efficiently distribute clean water to all areas of the base and recycle wastewater back to the filtration system for reuse. Since conventional pipes are unsuitable for the subterranean lunar environment, I devised the concept of self-healing water pipes to mitigate the risk of system malfunctions. These pipes are constructed using advanced materials and nanobots, enabling autonomous water transport and self-repair in response to environmental conditions. This innovation significantly reduces maintenance needs and enhances the reliability of the water distribution infrastructure.

The self-healing pipes are integrated with a sophisticated control system designed to alert the control centre in the event of leaks or faults. When a pipe issue is detected, the affected area changes colour on the floor or wall, providing a clear visual cue for astronauts. This immediate indication of the exact location of the problem ensures that any necessary manual repairs are conducted quickly and accurately, maximizing both efficiency and reliability.

By employing nanotechnology and advanced materials, these self-healing pipes can adapt to the harsh lunar environment and autonomously address minor damages. This reduces the frequency and extent of required maintenance interventions. Additionally, the integration with the control system not only ensures timely detection and response to issues but also enhances the overall safety and functionality of the lunar base's water management system. Overall, the development of self-healing

pipes represents a significant advancement in maintaining a sustainable and reliable water supply for lunar habitation, ensuring that astronauts can focus on their missions without worrying about infrastructure failures.

Weiting

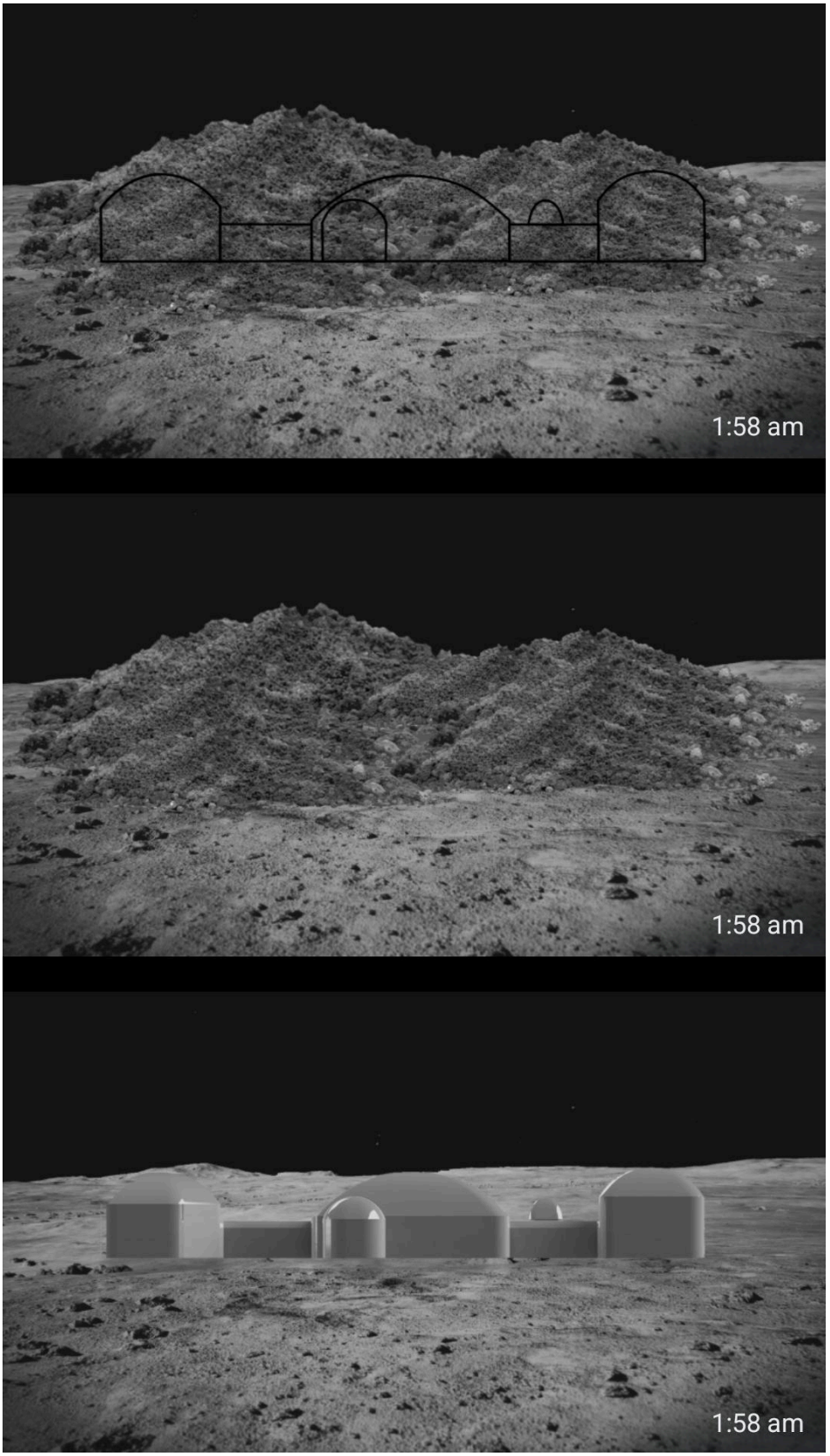
The importance of a neat and tidy workplace cannot be overstated. Research has consistently shown that working in a tidy environment enhances the human brain's efficiency and concentration. By minimising distractions, a tidy workplace can significantly improve productivity and focus. This is a crucial factor in the success of any mission, especially spending there for 12 months. A tidy workplace will not only enhance the crew's well-being but also contribute to the overall success of the mission.

The current table designs are small and can only accommodate one to two people, providing insufficient space for users to work. The surroundings are also messy, with no room for tablework storage, causing everything to be disorganised. Within the internal habitat, several tables are designed for specific purposes, including a wardroom table for gatherings, a workspace table for repairs, a computer station for work, and a galley table for food preparation. All of these tables lack storage, resulting in a disorganised space.

Introducing an innovative storage table design that revolutionises the astronaut's workspace. This table serves a dual purpose, functioning as a wardroom and workshop table. At 2x1.2 meters, it allows all six astronauts to work simultaneously, promoting collaboration and efficiency. The table's height is adjustable, catering to the user's preference. This design not only maximizes space but also enhances the astronaut's work experience, improving the efficiency of long-duration space missions.

Jessy

Having a consistent sleeping schedule has a direct impact on all essential day-to-day tasks completed by us humans, especially within the vulnerable environment of space. Hence the importance of astronauts achieving lengthy quality sleep cycles (minimum of 8 hours) with minimal-to-no disruptions to the circadian rhythms, within the 16 daily sunrises & sunsets. Without quality sleep, important tasks would be significantly impacted due to fatigue and sleep deprivation, whilst daily activities become strenuous often leading to poor mental health & other related disorders.



These images show the moonbase in context, on the moon, along with a representation of the plan to bury it in moondust.

Research

Through my research, I came across NASA's "VEGGIE" system. (Massa et al. 2017). This was the main inspiration for my design, I took inspiration from the foam used to hold the plants, and the UV lights used to provide nutrients.

The main reason I chose a garden bed, is through my research I have discovered that it is unreasonable to simply transport the needed food for a long-duration mission, which has been found before, "Space explorers have always had to face the problem of how to carry enough food for their journeys as adequate storage space has been a problem." (Oluwafemi et al. 2018).

Providing the correct nutritional values to each astronaut is paramount, "The greatest number of fatalities and mission failures in the history of human exploration on Earth were due to food system inadequacies, such as deficiency of one or more nutrients, insufficient caloric supply and underconsumption, inadequate preservation, or even nutrient toxicities" (Douglas, Zwart & Smith 2020). My design allows for any plant to be grown and multiple plants to be grown at once. Due to the controlled water drip feature, along with the adjustable lights, my design can facilitate almost any plant desired by the astronauts.

Variety is important, astronauts would benefit from having an array of foods to choose from, "Salad crops can provide a variety of colours, flavours, and textures, which along with some horticultural activities may contribute to psychosocial benefits in spaceflight" (Douglas, Wheeler & Fritsche 2021). With my design, the addition of colour, flavour and texture varieties would greatly benefit each astronaut both physically and mentally.

Finally, my design is possible as plants have already been successfully grown in space, time and time again "Incremental improvements in our understanding of the spaceflight environment have led to the development of specialized hardware that enables plants to grow in space." (Musgrave 2007).

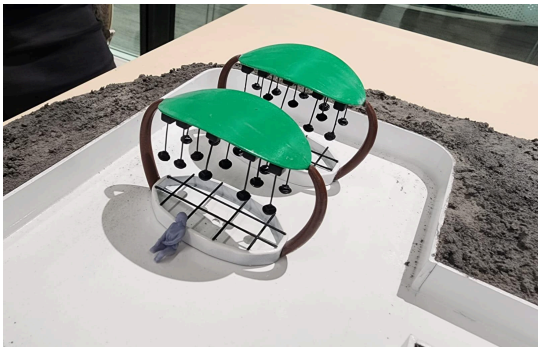
My Design Proposal

My design will make use of high-strength PAI plastic. This is because the design will need to be quite strong to hold the lights and winches, whilst allowing for a lightweight design for transport. PAI plastic is both light and strong (Dodda & Bělský 2016).

The design will be split into parts. The main parts are; the base, the stems (supports) the top, and the smaller parts are; the winches, the lights, the wires and the piping. Each part will be moulded such as the base and supports, or outsourced, such as the winches and lights.

The pieces will be designed to be slotted together and bolted. The final design will be sturdy yet not unreasonably heavy. Additionally, the design will have no permanent fixturing, such as the use of glue, so parts can be easily disassembled for repair or removal if needed. If parts are damaged smaller panels and electronic parts can be transported with the moon for replacement.

Detailed Feature 1:1 model

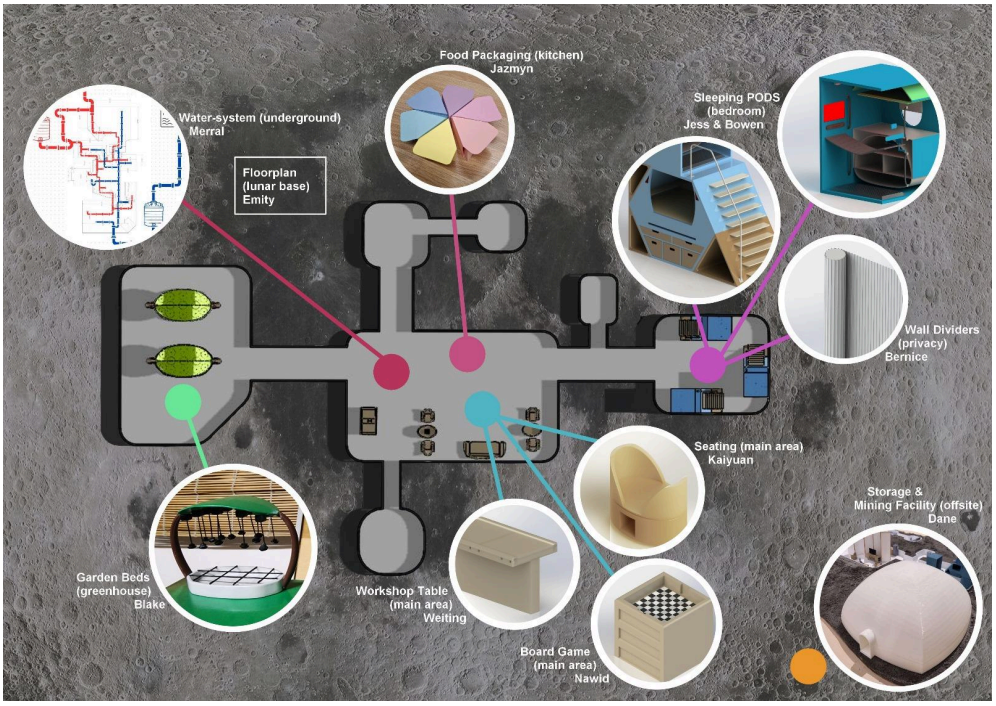



These Images show a human scale of my design. As seen the design is not overly tall, therefore an astronaut may reach the winches and lamps quite simply, and repair them if needed. Additionally, the bed itself is not too large, so an astronaut may reach over and access any part of the bed with ease.

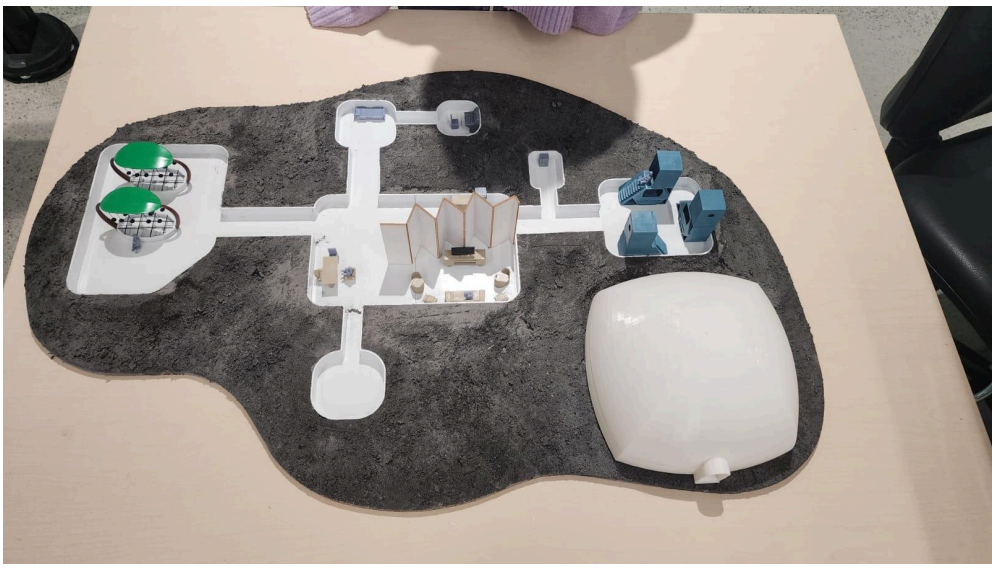


These images show the pieces of the large-scale model I finished, with working lights and plants.

Final Team Proposal

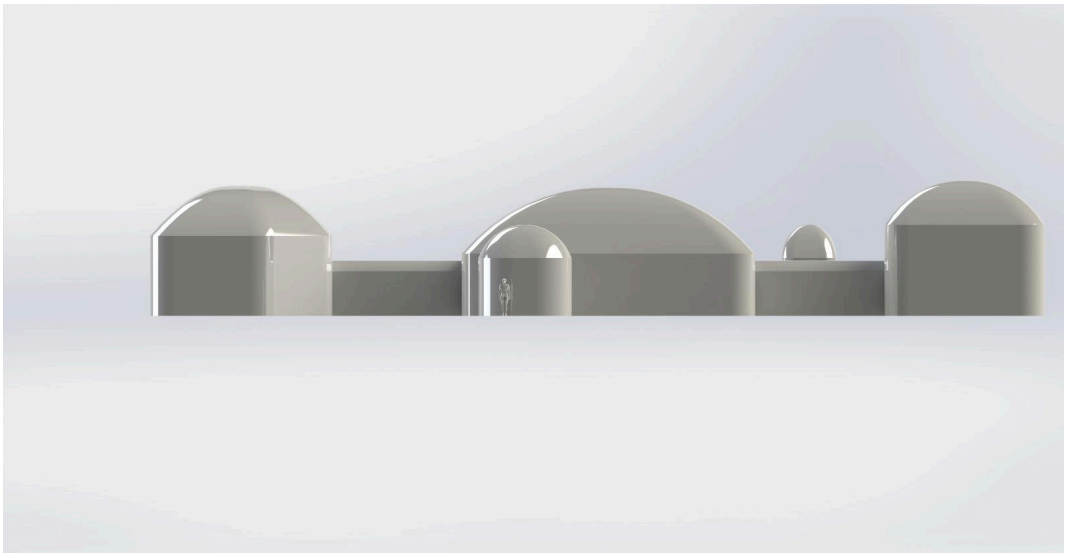


This diagram shows how and where each design will fit within the moonbase. My particular design has its own room, with a 1-meter space around the two designs as well as additional space for possible storage solutions.



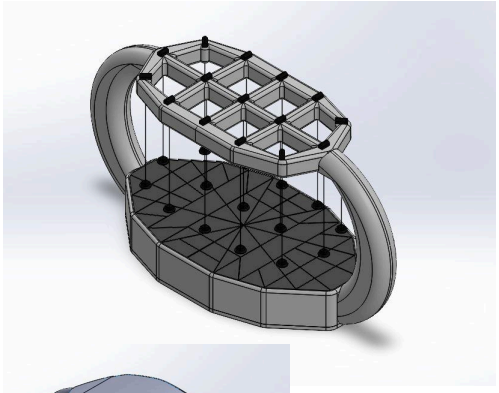
This image shows a 1:50 scale model, showing all the designs with human context, within the same environment, as well as providing context through showing moon dust.

Using this mood board I can explain my colour choices. We can see that the colour of white is quite prevalent, therefore I chose to make this the base colour. Shades of green and brown are also found in this mood board, however, I decided to make them more vibrant in my design to allow contrast with the man-made and natural aspects within the base, the benefits of which have already been discussed. Furthermore black is an accent colour within this board, therefore I chose black for the water pipes, to act as an accent colour and to allow the simple use of one shade throughout all designs.



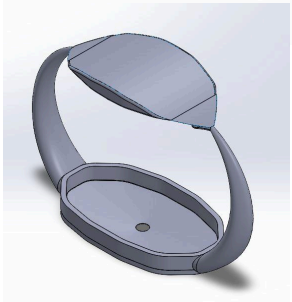
In terms of shape, I took inspiration from our team-designed outer base. One outstanding feature of the base is its curves. My design makes use of similar curves to create an organic shape.

Original Discovery



In my first CAD design the basic shape is shown, the top is a grid-like structure with small winches on top. The water grid creates small spaces for each plant.

Whilst this design is solid, it consists of sharp edges and the winches are hard to reach.



In this design, I have made the design mostly smooth, except for the top. As well as adding a drain hole to recycle the water.

Additionally, there is no space left for the winches.

In my final CAD design, I have made all parts smooth and structurally sound. I have found space for the winches and made them a feature. The water grid allows for adequate space for each plant. The base is at the right height for ease of access, as well as the winches being on the bottom instead of the top, this design is quite ergonomic.

Additionally, I have added colour to allow the design to simulate a plant.

- Size, allowance for access and maintenance
- Lights allow plants to grow
- Winches allow for multiple plants to be used in the same bed
- The water grid allows for different plants to be grown at once
- Structurally sound
- Smooth edges
- Natural colours

System Design Process: synthesis of considerations and consultations

Each team member has endeavoured to share curved edges in their designs. While also designing with crew interaction in mind. Our team placed great emphasis on crew interaction, mental health and comfortability. Being comfortable is very important for an effective crew, especially in a space where everything is so unfamiliar (Kumamoto, Yanagida & Kawahara 2023).

LobStars Presents: Lunar Habitation

LDM Overview

6 crew members on the Moon for 12 months “for scientific discovery, economic benefits, and inspiration for a new generation of explorers: the Artemis Generation” (NASA, 2024)

Moon Base Domains:

Moonbase Floor Plan: Emity

Main Focus:

- Structural Integrity
- Safety and Failsafes
- Ventilation/Air Pressure/Airlocks

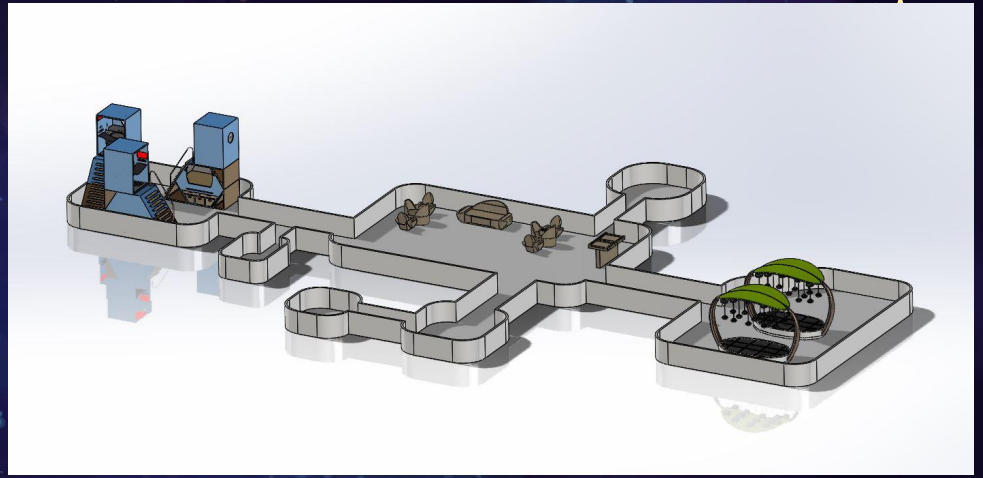
Considerations:

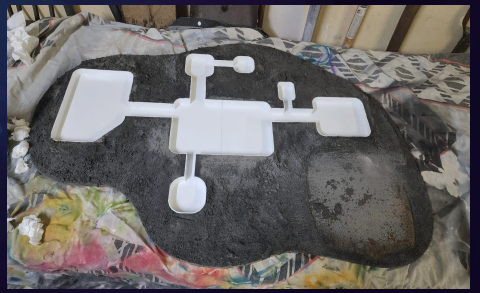
- Bigger does NOT mean better
- Wall to roof ratio
- Density of walls (material type/layering)

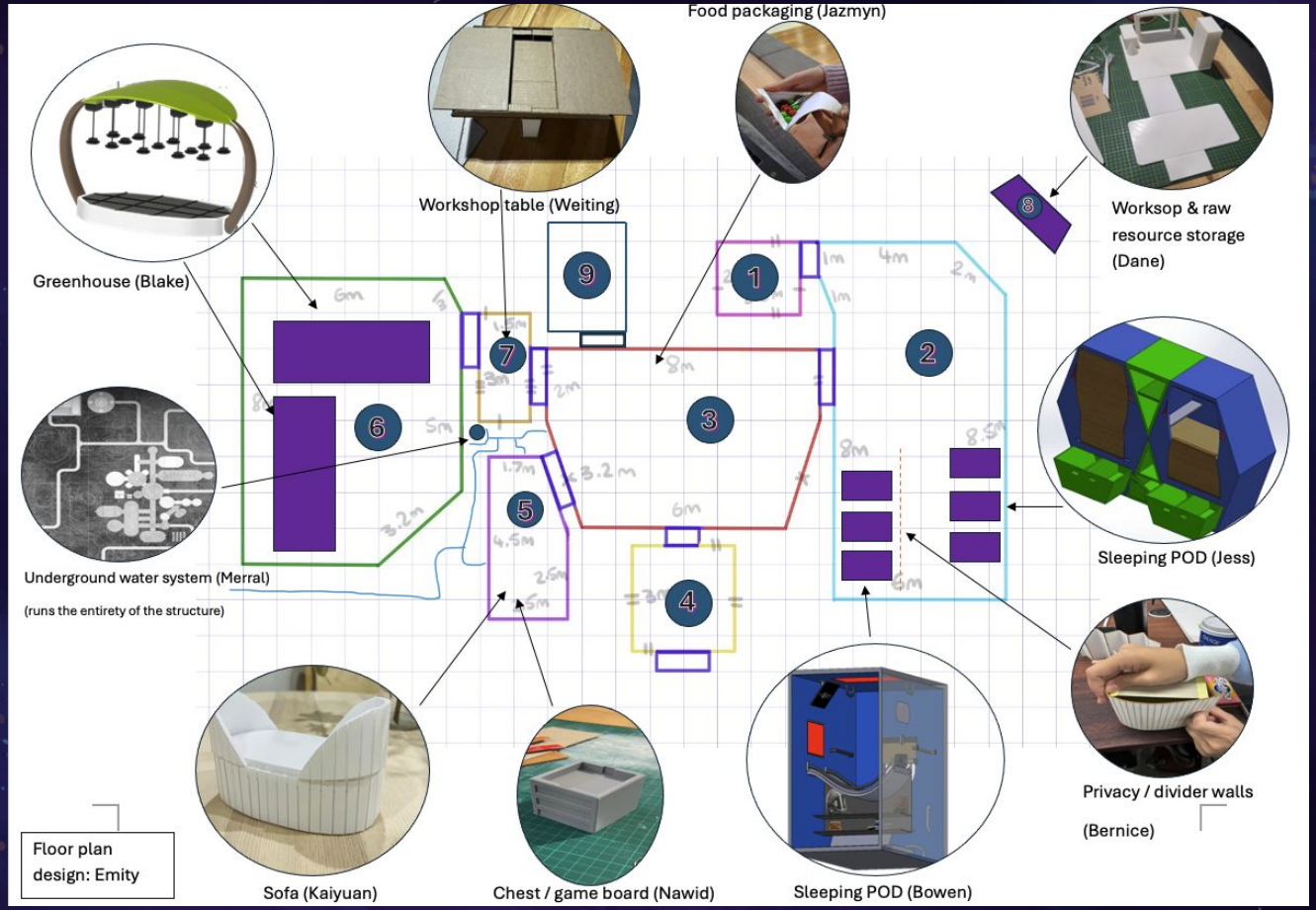
Changes:

- Limited the bedroom, utilising the minimum space
- Kitchen, living and lesture in main area
- Elongated hallways to even out regolith pressure
- Redesigned shape to withstand weight of the roof

Final Concept






Food packaging (Jazmyn)
Workshop table (Weiting)
Worksop & raw resource storage (Dane)
Greenhouse (Blake)
Underground water system (Merral)
(runs the entirety of the structure)
Sleeping POD (Jess)
Privacy / divider walls
(Bernice)
Floor plan design: Emity
Sofa (Kaiyuan)
Chest / game board (Nawid)
Sleeping POD (Bowen)

Living Space: Bernice

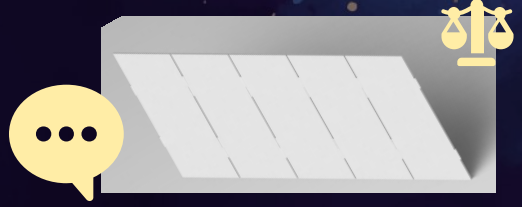
Proxemics - A term used for personal space

Space divider

Considerations:
- The size of each paneling
- Replaceability
- Balance

Future Changes:
- Flexibility
- Compactability
- Storage

Main Focus:
- The balance between Functions
- Adaptability between different designs & products



Currently

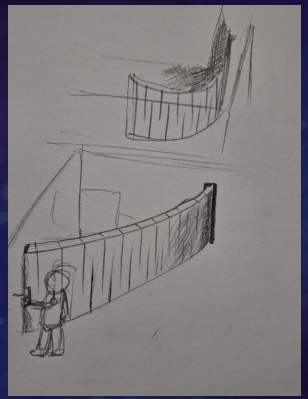
- Concurrent use of design concepts in conjunction with other

Future Changes:

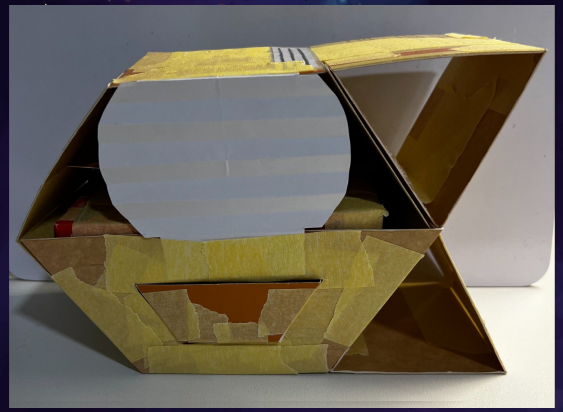
- Material changes
- Much more durability along with the flexibility

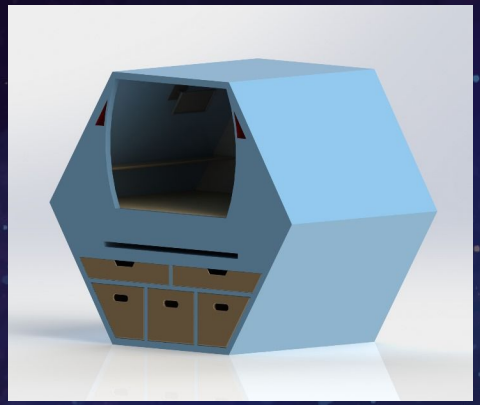
Main Focus:
- The balance between Functions when working in conjunction with others
- Adaptability between different designs & products

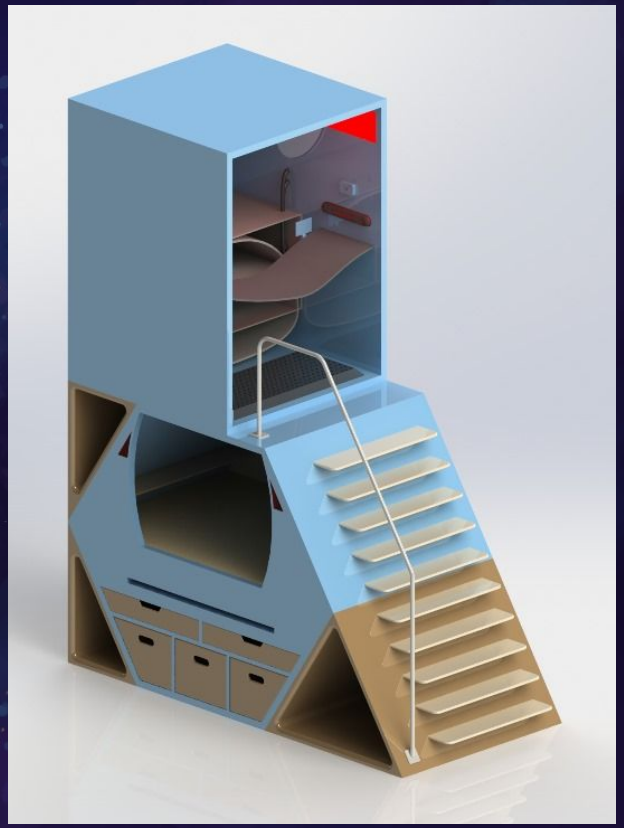
Living Space: Bernice



Sleeping Quarter: Jessy





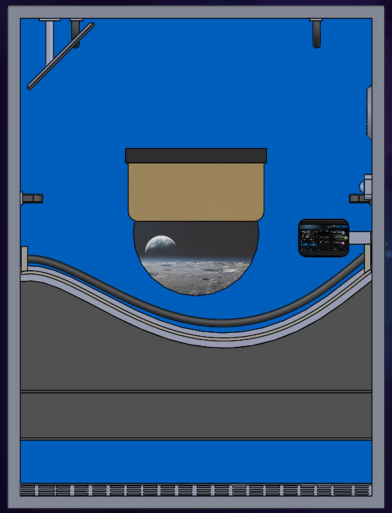


Sleeping Quarter: Jessy

Sleeping Quarter: Bowen

1st Iteration

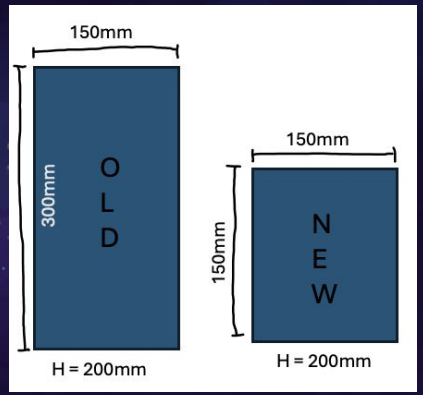
2nd Iteration



3rd Iteration

My sleeping pod ensures all aspects below are considered

Size Reduction



Sleeping Quarter: Bowen

Design considerations

- Safety standards (health & safety)
- Ergonomics
- Material selection
- Accessibility
- Automation
- Functionality
- Touch & feel
- Proximity

I have done research to find the findings behind the different lighting colours and its effect on our human brain psychologically.

Research has been done on NASA standards to ensure all aspects are fit for space exploration and does not pose any health & wellbeing hazards for crew

Lighting color and its purpose within the environment

Amber: Reading / studying purposes

Blue: Music listening / vibes

Yellow: Journal writing

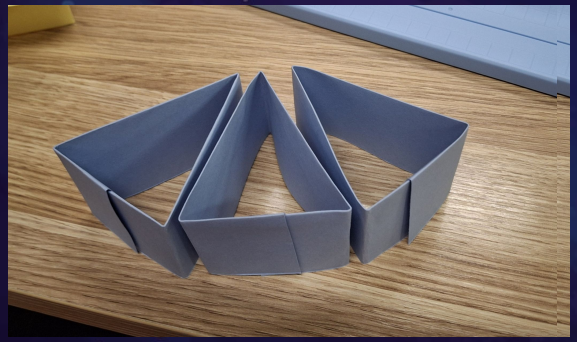
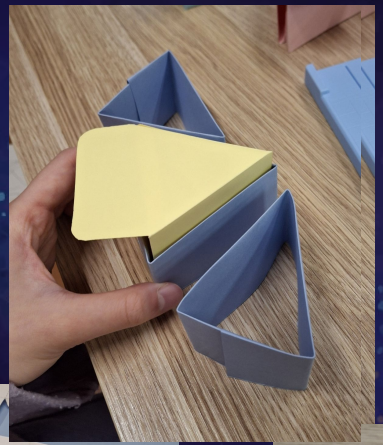
Pink: Skin care routine

Purple: Podcast listening

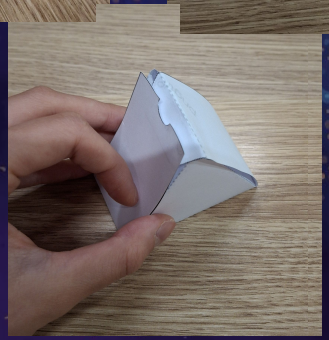
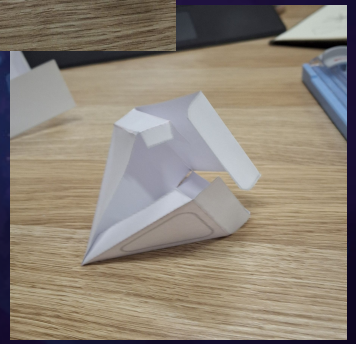
Red: Sleeping / resting

This enhances overall customization of the environment for the crew as they have control over the lighting to bests suit their tasks and maximise efficiency. This customizable feature improves overall user experience for the crew and a sense of home/connection to the POD

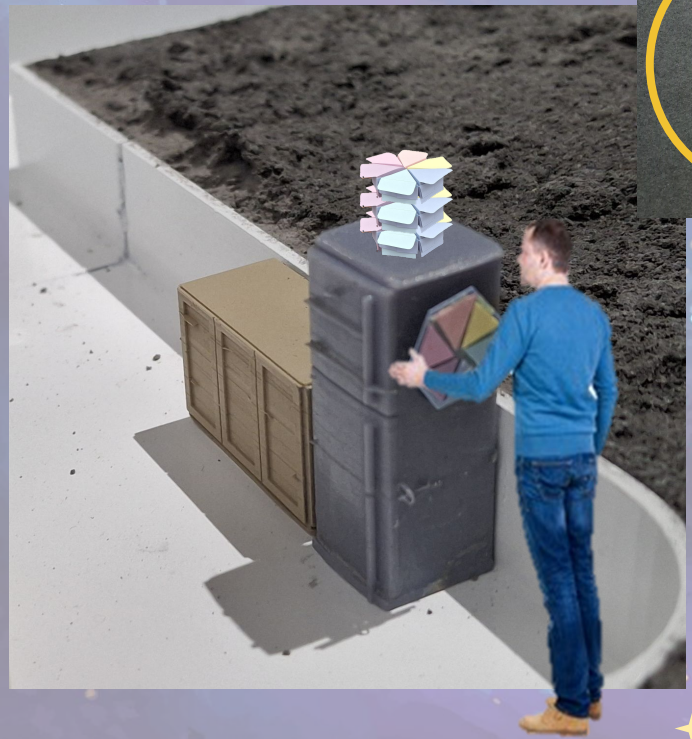
Dining Area: Jazmyn

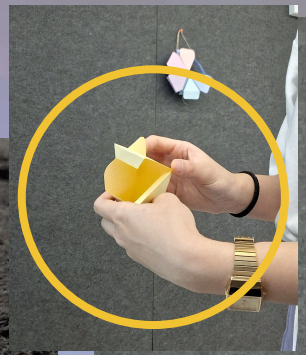



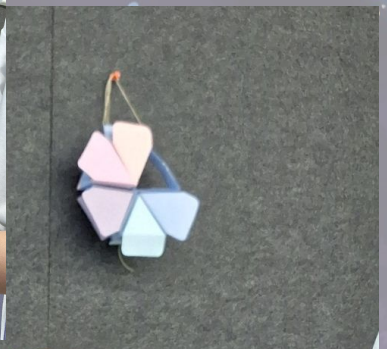


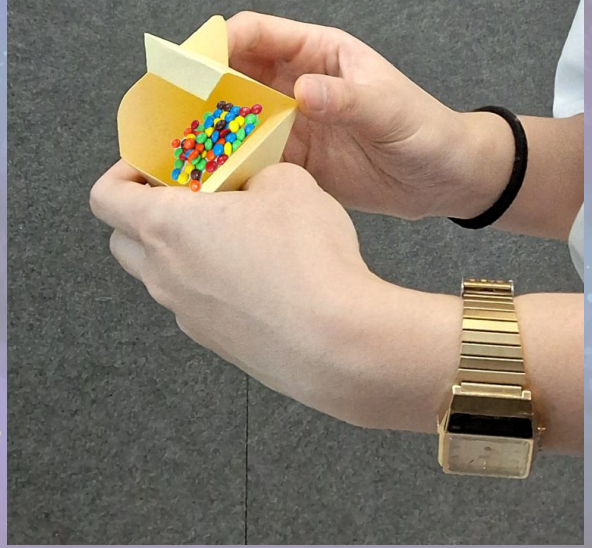



Final Design









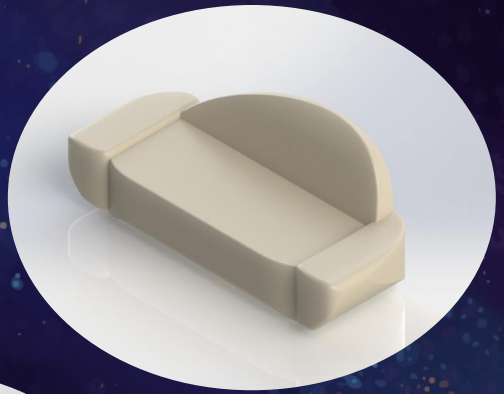
Leisure Room: Kaiyuan

Design considerations

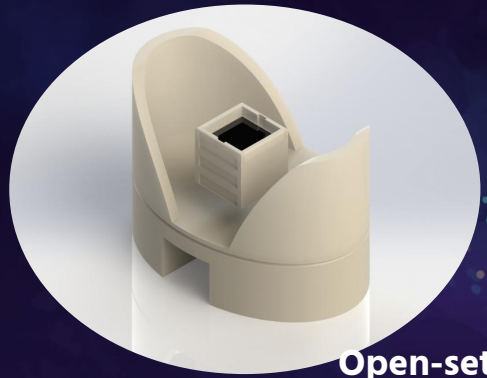
- Ergonomics
- Functionality
- Tactility
- Colours
- Visual Experience
- Material

one -set sofa

&



Three-set sofa



Open-set sofa

Future changes

- Colour
- material

Link to Nawid's game box design
The Nawid game box fits right inside the sofa

Leisure Room: Kaiyuan

Material

The overall frame of the sofa will be made of cardboard shell material

and the cardboard shell will be filled with latex upholstery and wrapped in fabric-health for user,ergonomics

Fabric will be fine pile-good playability

colour

The colour scheme will be filled with light beige colours-feel comforts

All three materials are independently separated and can be freely disassembled for maintenance

Leisure Room: Nawid

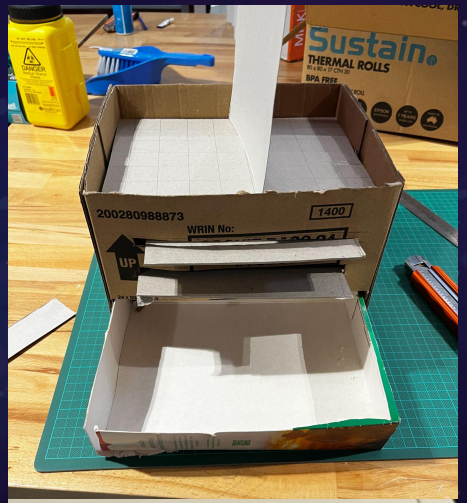
Concepts/progress

Overall design

Which board games should be displayed in the design?

Where on the sofa does it fit and how detailed is it?

What material is used (advanced ceramics, tungsten on game pieces and magnets



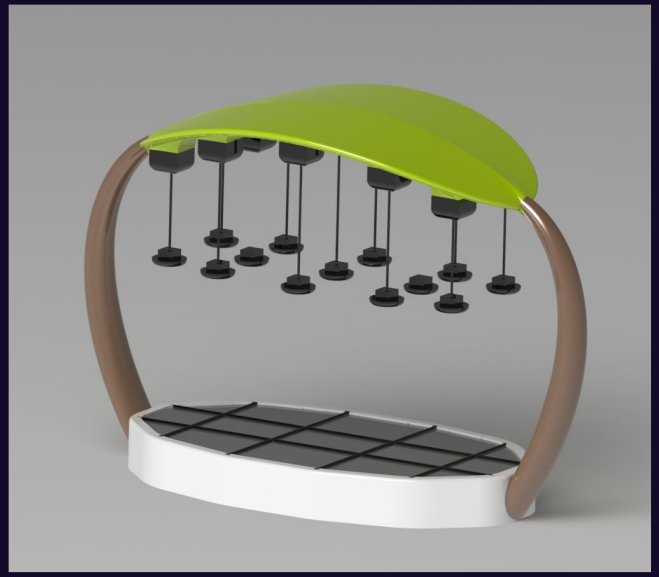
Greenhouse: Blake

Considerations:

- Quantity - 2 Beds
- Variation - 5 Species
- Light - Full Spectrum Lights with Winches
- Water - Adjustable drips
- Gravity - horticultural Foam
- Nutrients - Insert Into Water
- Materials - Plastic
- Maintenance and Interaction - Not too Large
- Aesthetics - Natural Design

Future Changes:

- Size
- Plant Species
- Lights



Low-G Garden Bed

Greenhouse: Blake

Discovery Process

Research:

- Plants have been grown and eaten in space

NASA, 2021

Why:

- Need for sustainable food source

NASA, 2013

Is it Attainable:

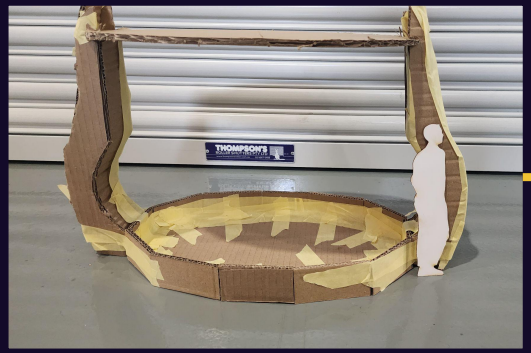
- NASA is working on larger plant growing facilities

NASA, 2017

Greenhouse: Blake

Design Process

Iteration 1



Low Fidelity
Cardboard Model

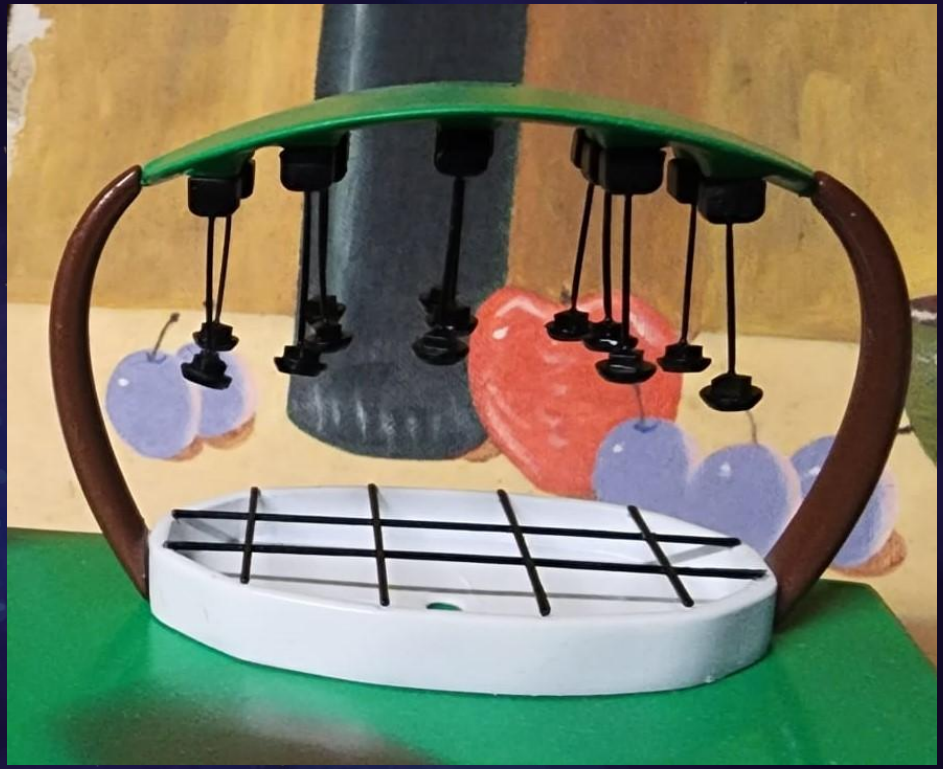
Iteration 2

Low-Medium Fidelity
Foam Model

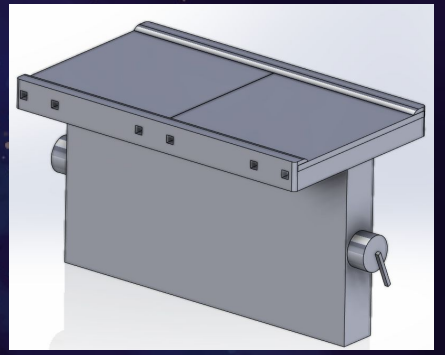
Iteration 3

Medium Fidelity
3D Printed Model

Final Model



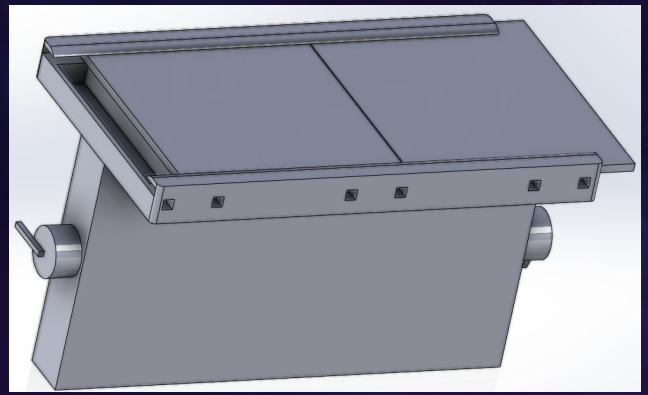
Workshop: Weiting



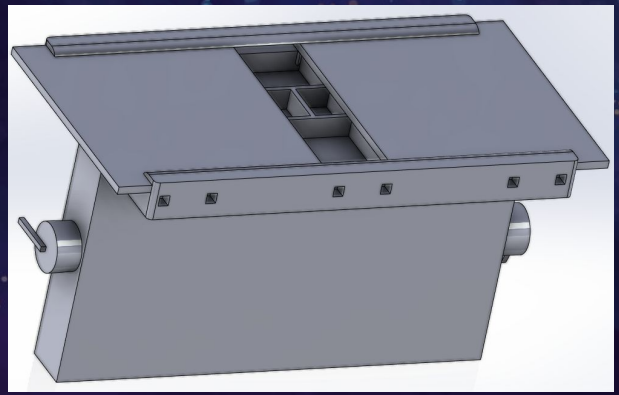
Consideration

- Free up space
  - 2 in 1 product
    - Wardroom + Work surface
  - Multifunctional table

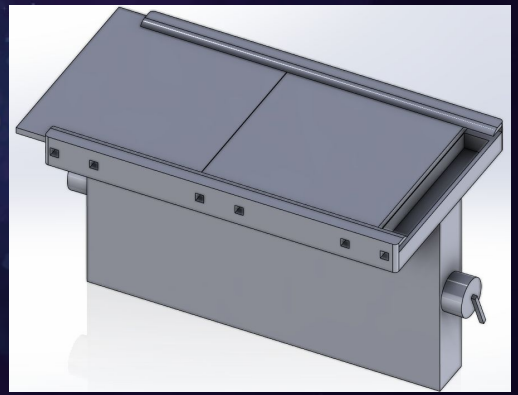
Slide to the right



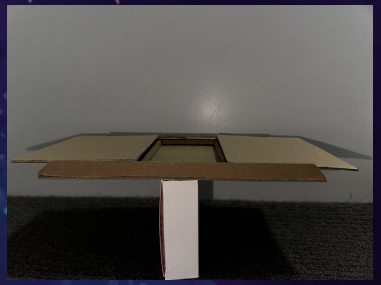
Slide out



Slide to the left

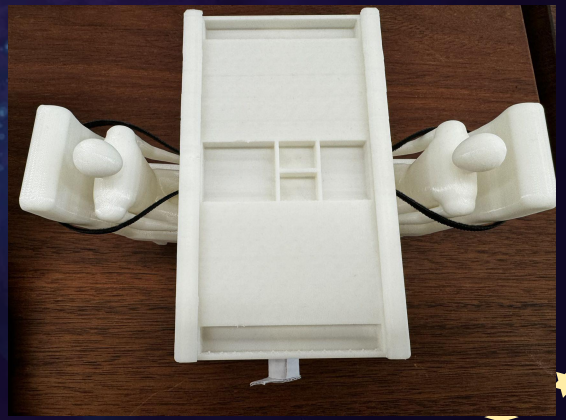


Workshop: Weiting



Changes

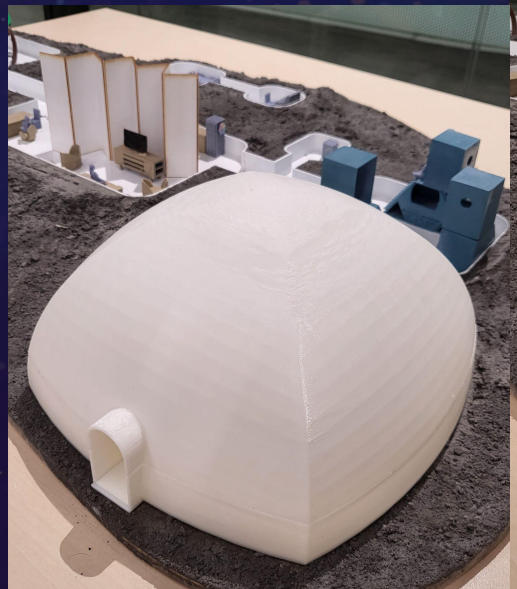
- Adjust the height of the table
  - Can be use as a sitting and standing
- Adjust the shape of the table stand

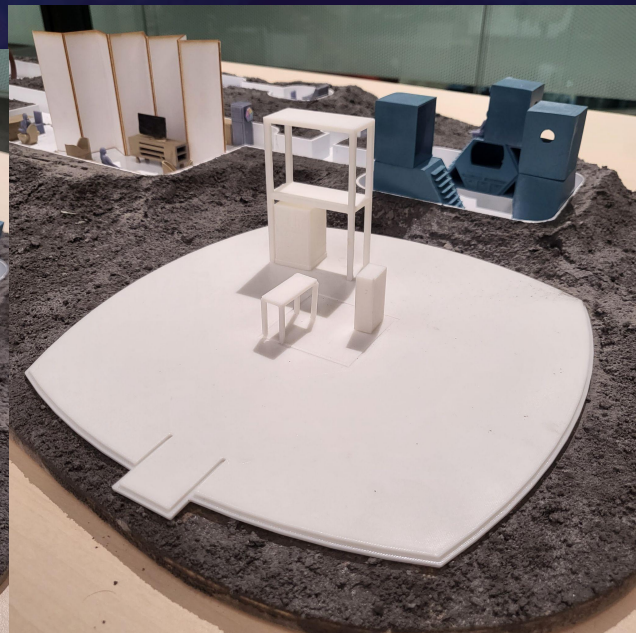


Offsite Workshop + Storage: Dane

Design Considerations:

- Size, Space & Safety
- Shipment storage solutions for long-term habitation
- Storage solutions for raw materials
- Dome shape for structural integrity
- Workshop space for large repairs + maintenance

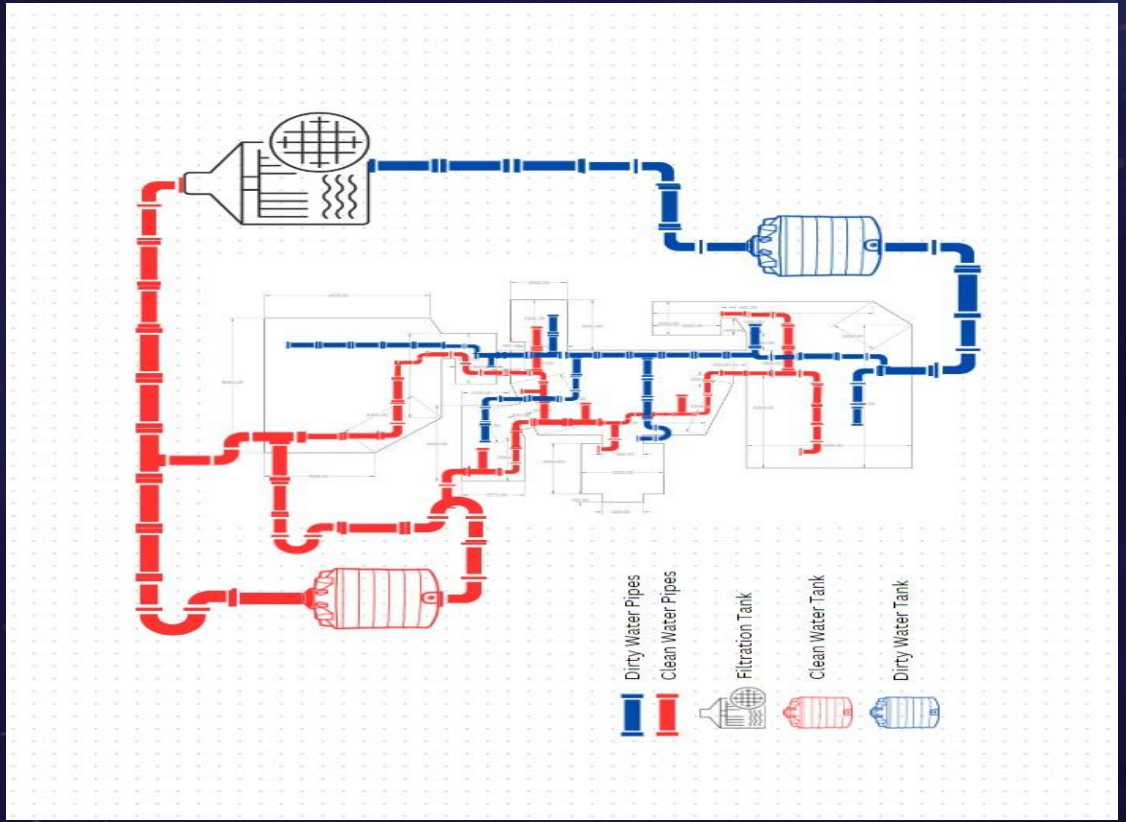




Water Transport System: Merral

Design Considerations:

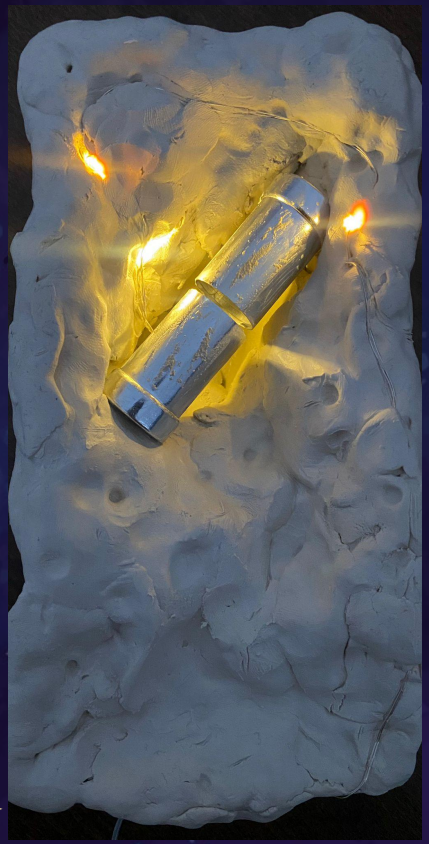
- **Self healing mechanism**
- **Sensors Integration**
- **Type of materials**



Plumbing and piping floor plan

Water Transport System: Merral

Water Transport System: Merral



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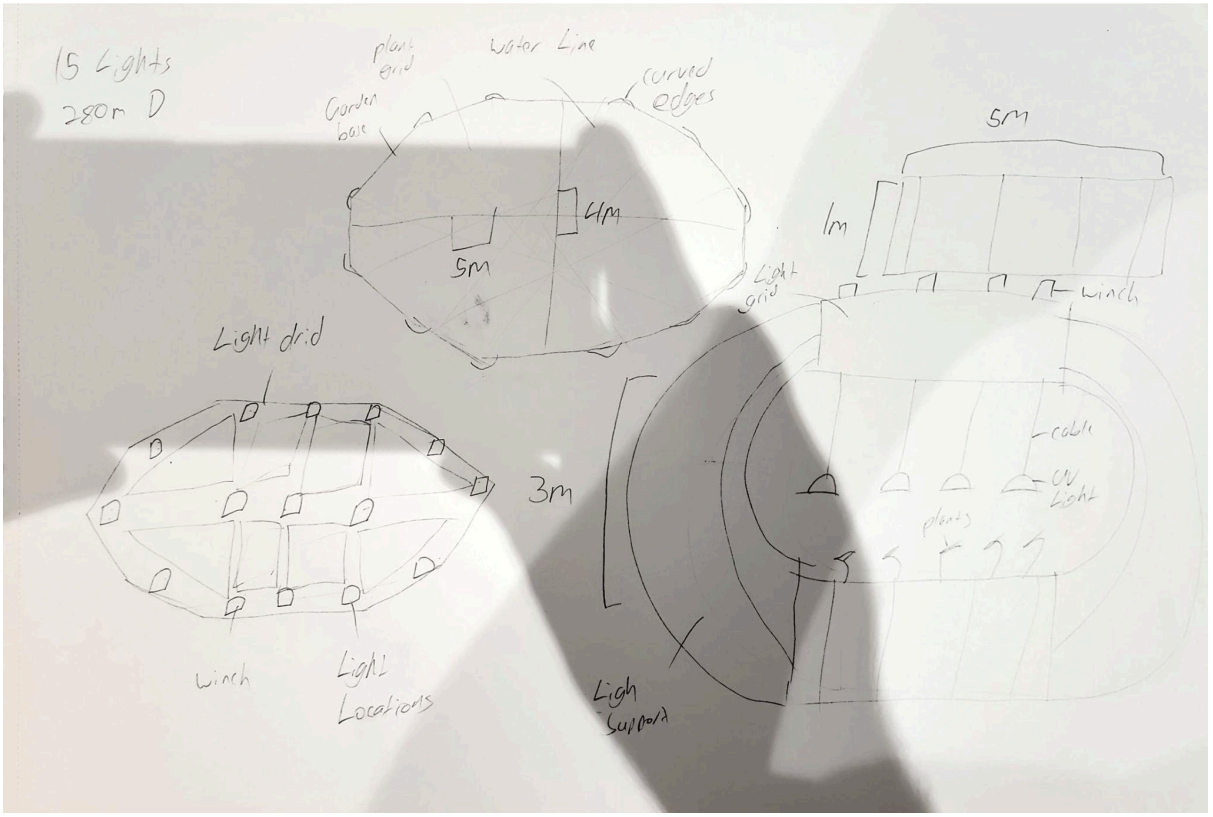
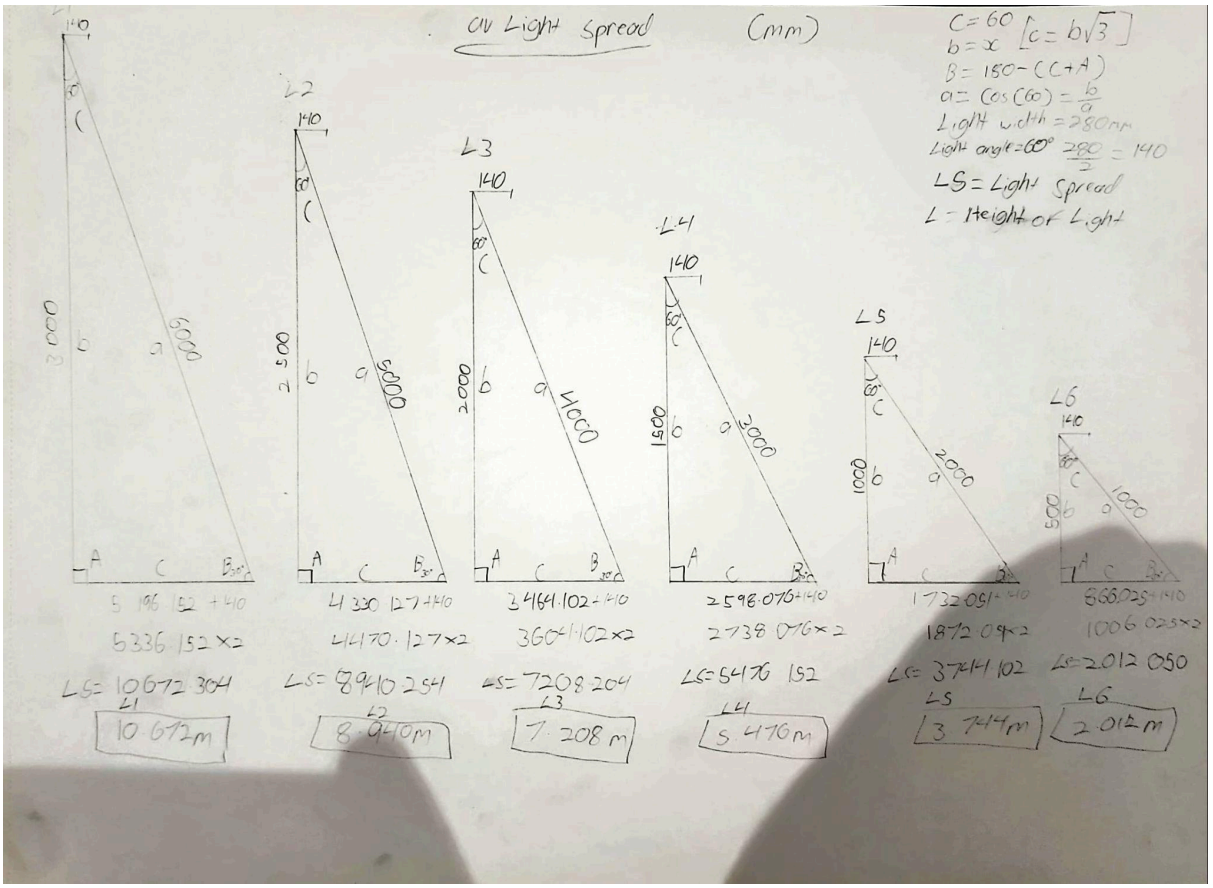
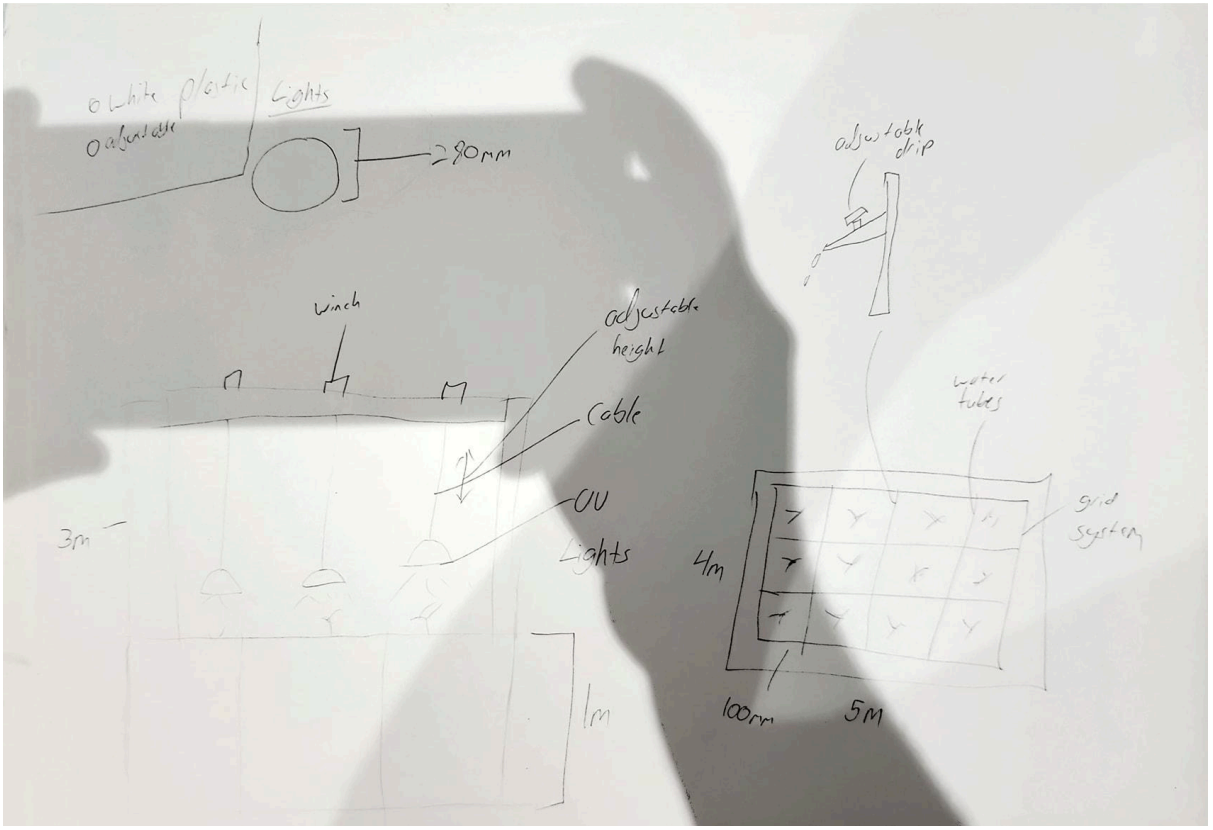
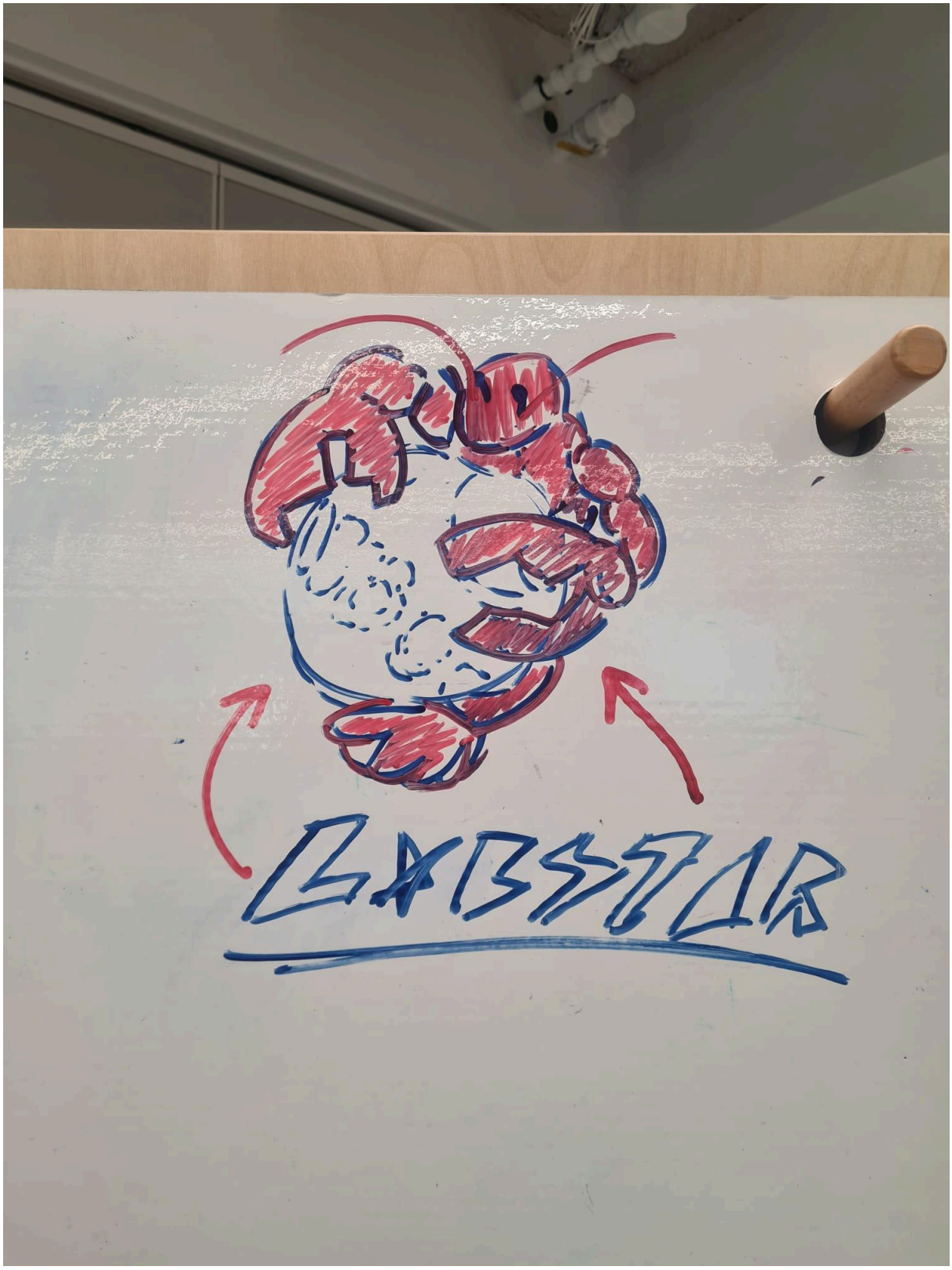
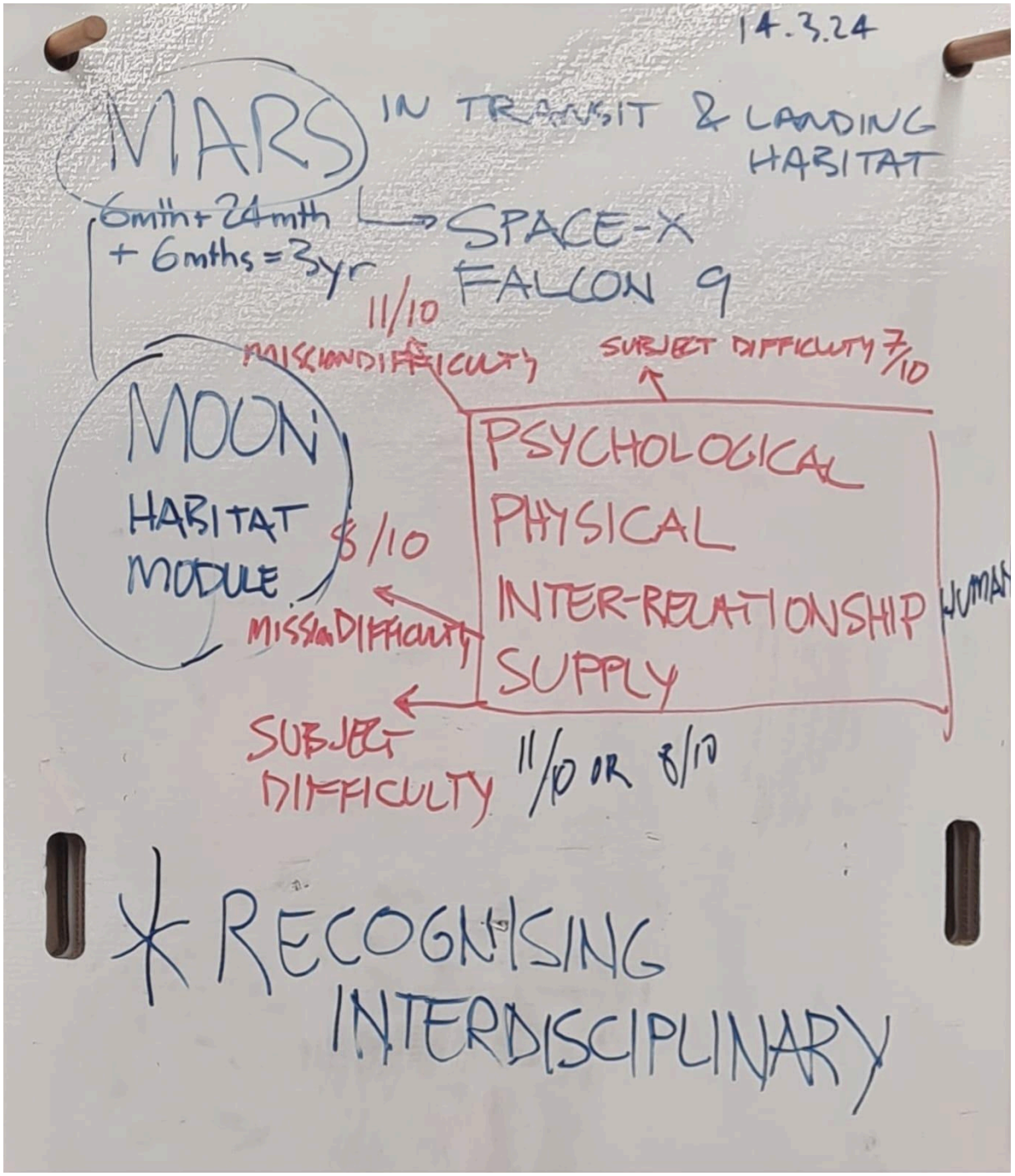
Appendix


15 Lights
280m D
plant grid
water Line
curved edges
Garden base
4m
5m
5m
1m
Light grid
winch
Light grid
cable
UV Light
plants
3m
Winch
Light Locations
Light Support


UV Light Spread (mm)
C = 60 [c = b√3]
b = x
B = 180 - (C + A)
cos(60) = b/a
Light width = 280mm
Light angle = 60° 280/2 = 140
LS = Light Spread
L = Height of Light
L1
L2
L3
L4
L5
L6
140
3000
2500
2000
1500
1000
500
5000
4000
3000
2000
1000
5336.152 x2
4270.127 x2
3641.102 x2
2598.076 x2
1732.051 x2
866.025 x2
LS = 10672.304
LS = 8940.254
LS = 7208.204
LS = 5476.152
LS = 3744.102
LS = 2012.050
10.672m
8.940m
7.208m
5.476m
3.744m
2.012m


white plastic
adjustable
Lights
280mm
adjustable drip
winch
adjustable height
cable
UV
Lights
water tubes
grid system
3m
4m
1m
100mm
5m


BABSTAR


14.3.24
MARS
IN TRANSIT & LANDING HABITAT
6mth + 24mth + 6mths = 3yr
SPACE-X FALCON 9
11/10 MISSION DIFFICULTY
SUBJECT DIFFICULTY 7/10
MOON HABITAT MODULE
8/10 MISSION DIFFICULTY
PSYCHOLOGICAL
PHYSICAL
INTER-RELATIONSHIP
SUPPLY
HUMAN
SUBJECT DIFFICULTY 11/10 OR 8/10
* RECOGNISING INTERDISCIPLINARY

DESIGN SCENARIOS

1) MAGNETIC BOARDGAME! } FUNTURE LIGHTING

*FISH FARMING (SUSTAINABILITY ON MOON)

2) ~~SLEEP CAPSULE~~
~~→ Blocks Blue & Radiation~~

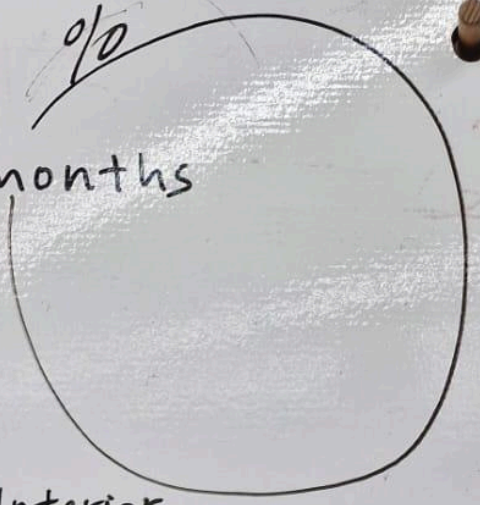
★ → Produce Artificial Light
↳ promote melatonin
→ Built in sleep schedule (time zone)

3) MODUALALITY PROMOTES SOCIALISATION
→ RADIATION MOON

Crew: 6 people

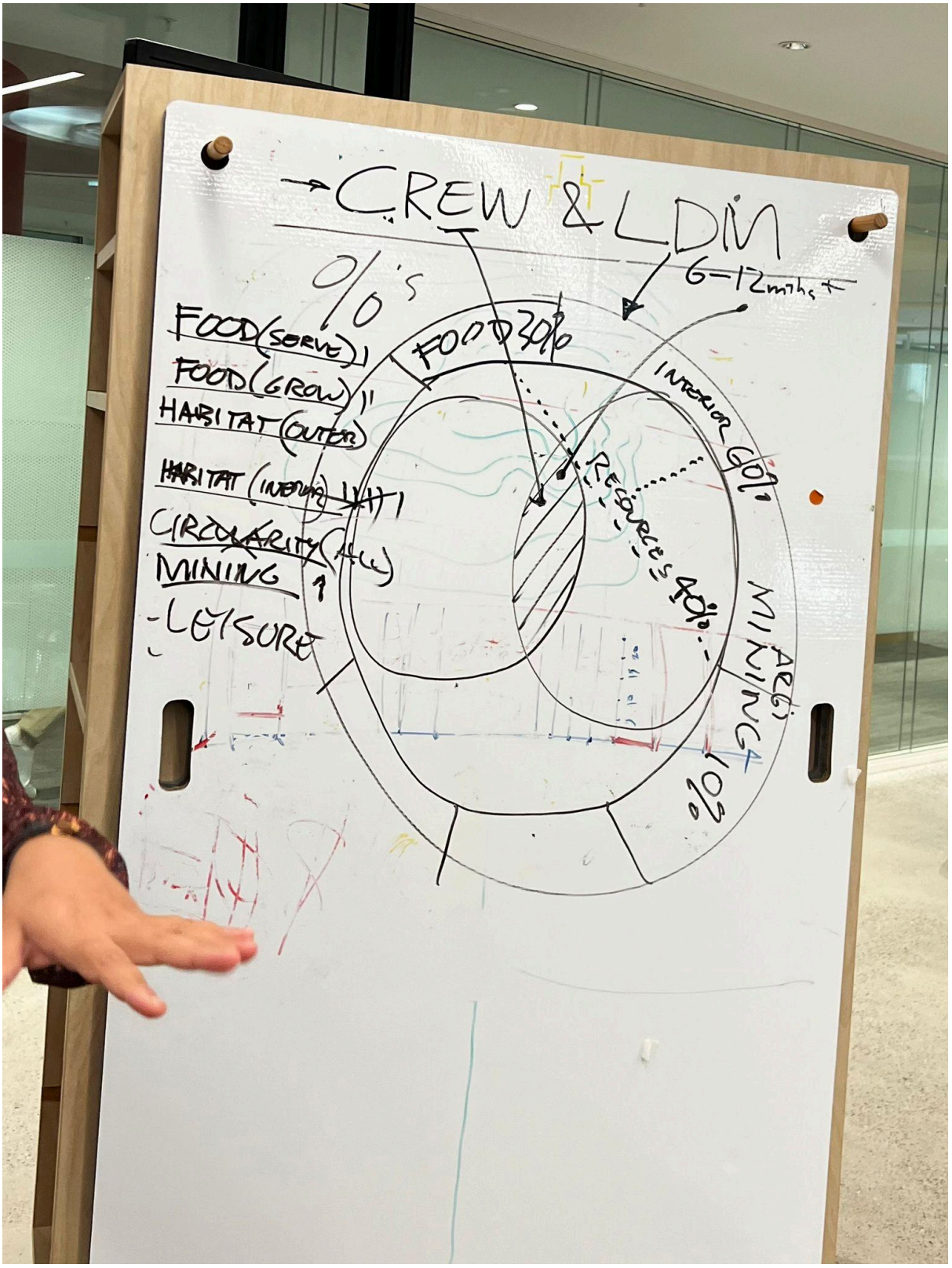
Duration: 12 months

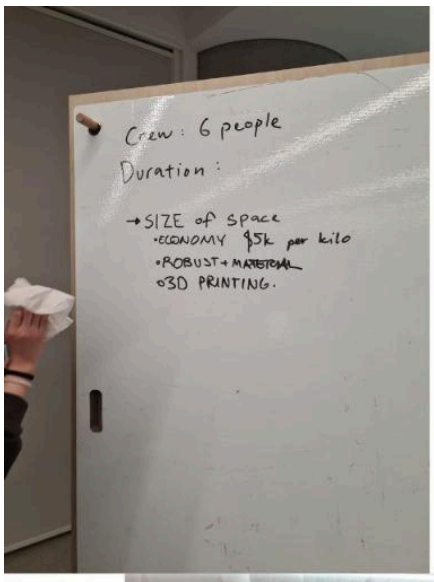
Surface mobility:
(mode of transport)



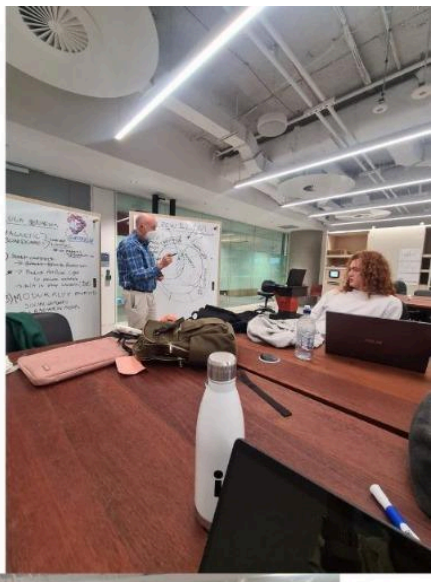
Size of spacecraft: Interior Diameter: 6.6 - 6.25

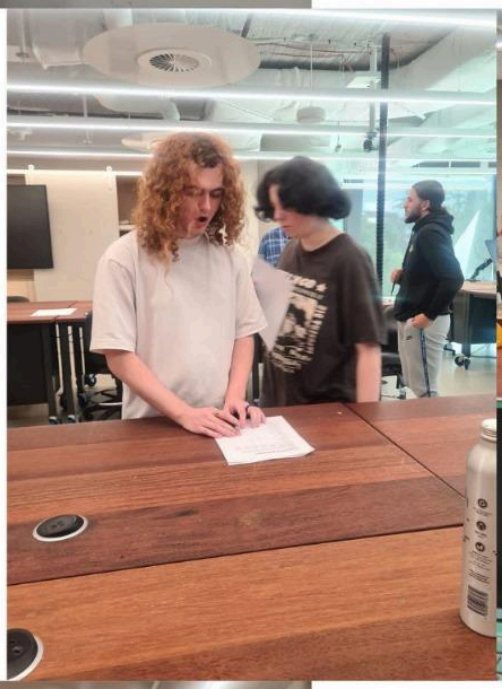
Purpose / Goals: Vacation - Tour?

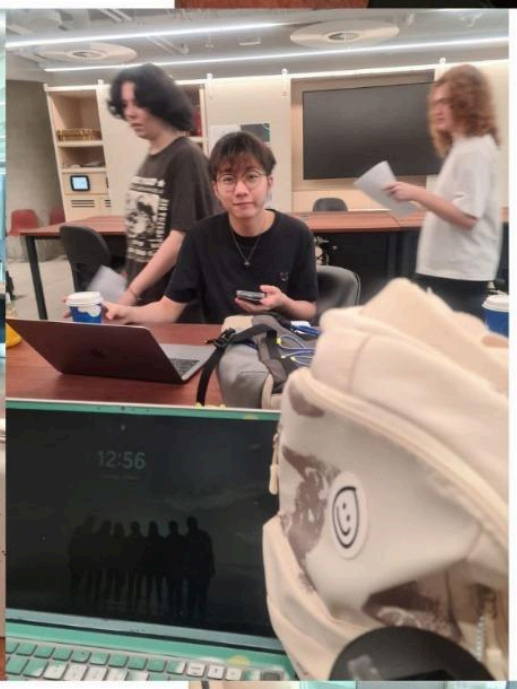

CREW & LDM
6-12months +
0's
FOOD(SERVE)
FOOD(GROW)
HABITAT (OUTER)
HABITAT (INNER)
CIRCULARITY
MINING
-LEISURE
FOOD 30%
INTERIOR 60%
RESOURCES 40%
MINING 10%

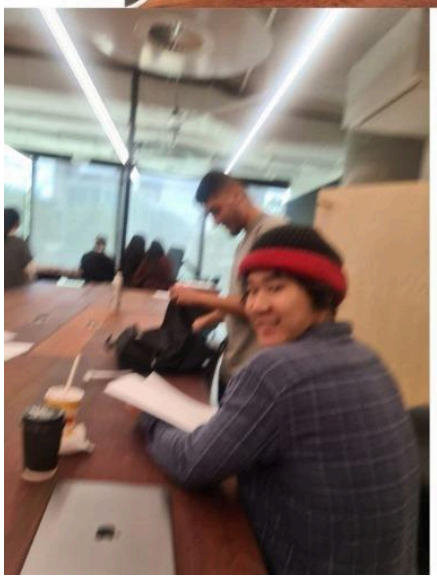

Crew : 6 people
Duration :
→SIZE of space
•ECONOMY $5k per kilo
•ROBUST + MATERIAL
•3D PRINTING.

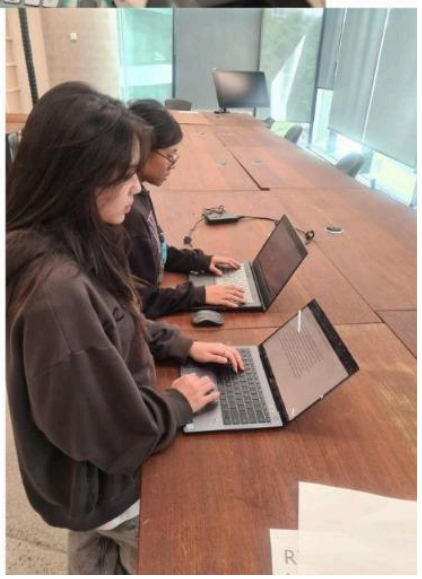
Week 1



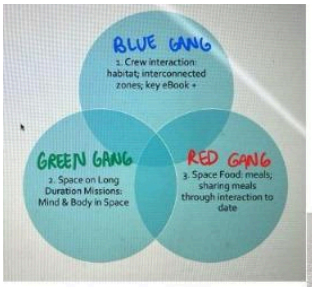


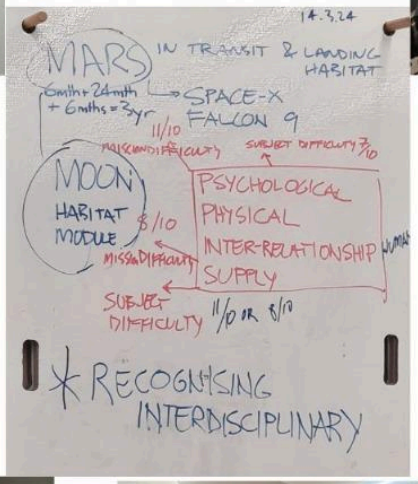

12:56





Week 2


BLUE GANG
1. Crew interaction: habitat; interconnected zones; key eBook +
GREEN GANG
2. Space on Long Duration Missions: Mind & Body in Space
RED GANG
3. Space Food: meals; sharing meals through interaction to date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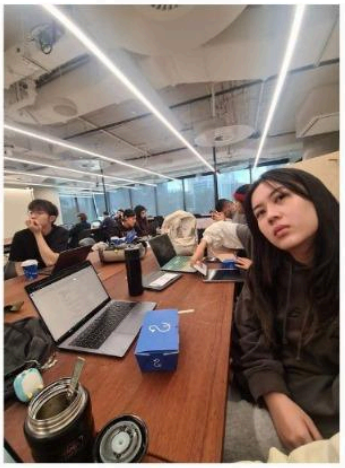
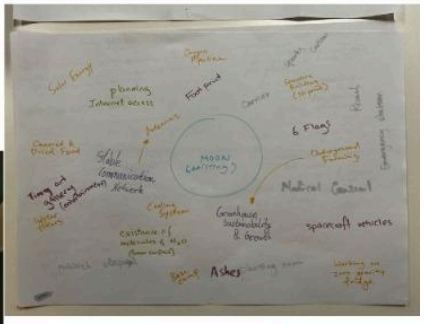
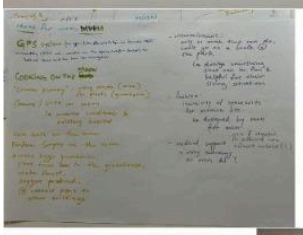
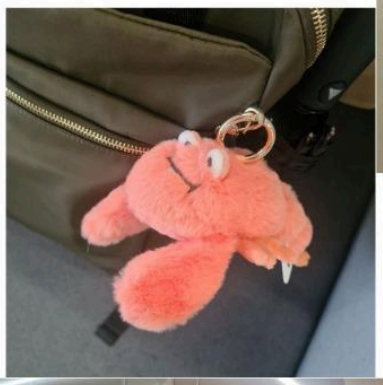
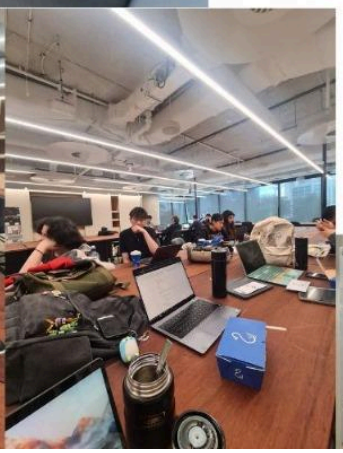
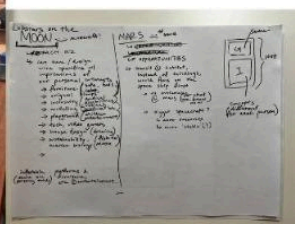






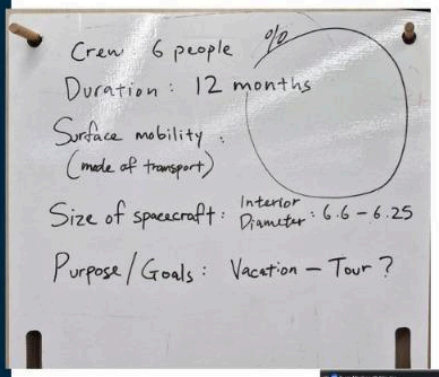




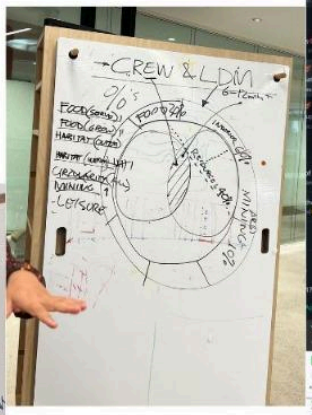


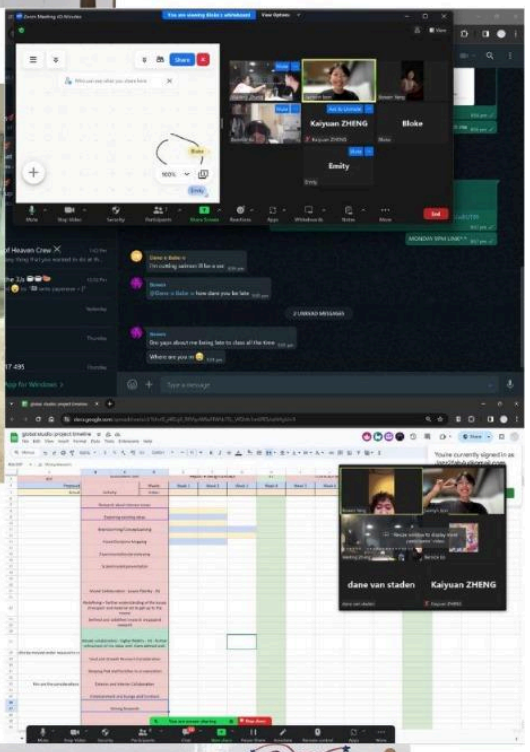
Week 3

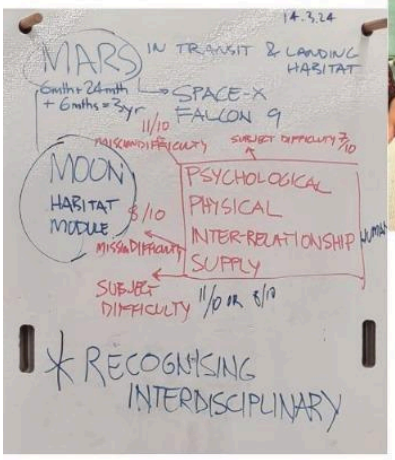

Generated By DALL·E 3
LOBSTAR


Crew 6 people
Duration : 12 months
Surface mobility :
(mode of transport)
Size of spacecraft : Interior Diameter : 6.6 – 6.25
Purpose / Goals : Vacation – Tour ?

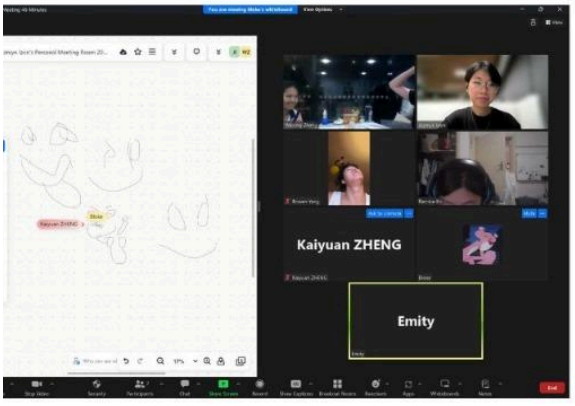

Generated By DALL·E 3

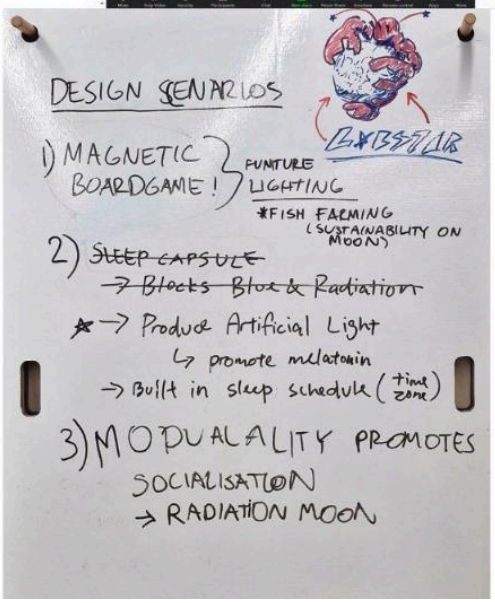

CREW & LDM


Kaiyuan ZHENG
Bloke
Emity

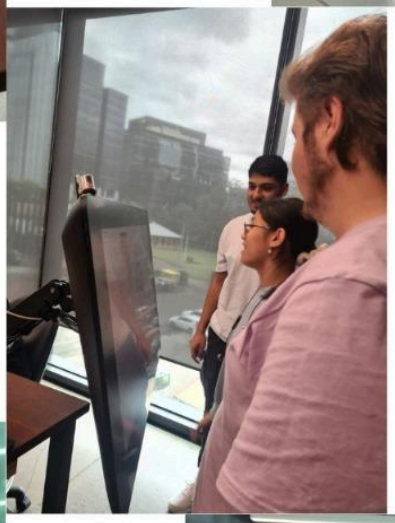

14.3.24
MARS
IN TRANSIT & LANDING HABITAT
SPACE-X FALCON 9
MOON
HABITAT MODULE
PSYCHOLOGICAL
PHYSICAL
INTER-RELATIONSHIP
SUPPLY
* RECOGNISING INTERDISCIPLINARY

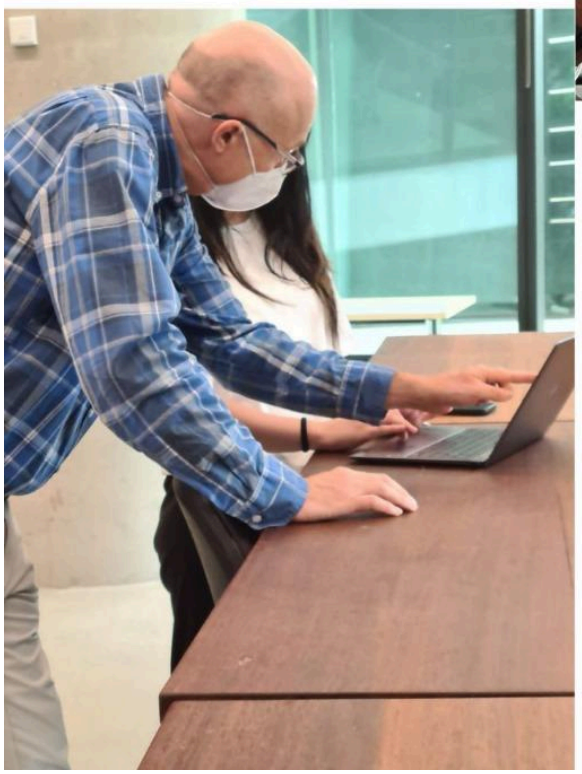
dane van staden
Kaiyuan ZHENG

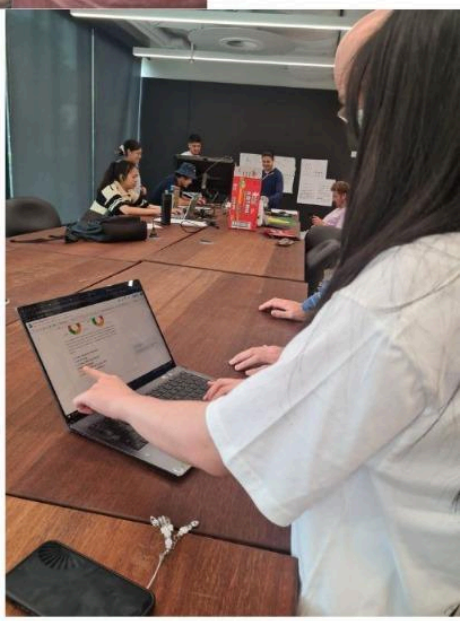

Kaiyuan ZHENG
Emity

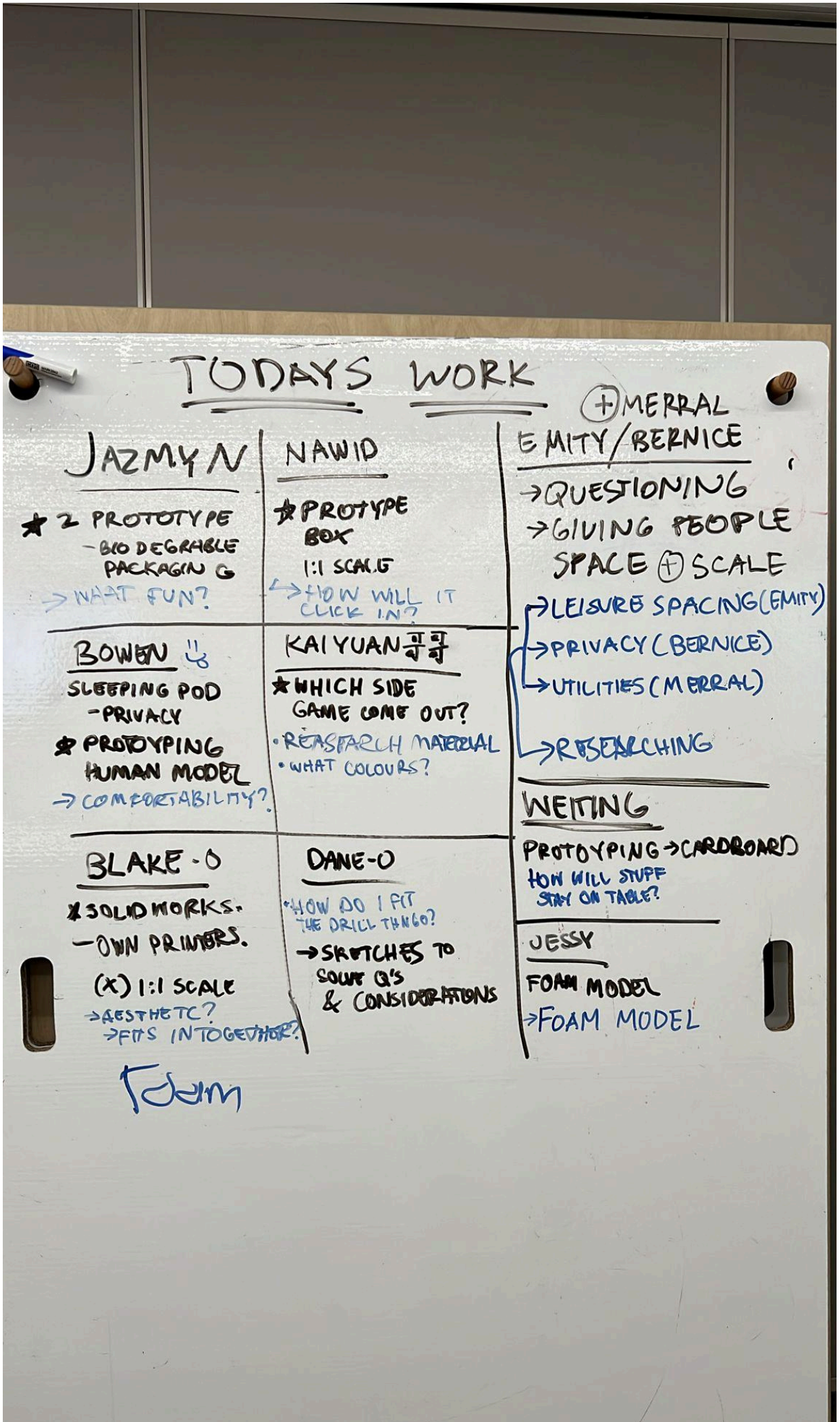

DESIGN SCENARIOS
1) MAGNETIC BOARDGAME!
FUNTURE LIGHTING
*FISH FARMING (SUSTAINABILITY ON MOON)
2) SLEEP CAPSULE
→ Blocks Blue & Radiation
→ Produce Artificial Light
↳ promote melatonin
→ Built in sleep schedule (time zone)
3) MODUALITY PROMOTES SOCIALISATION
→ RADIATION MOON

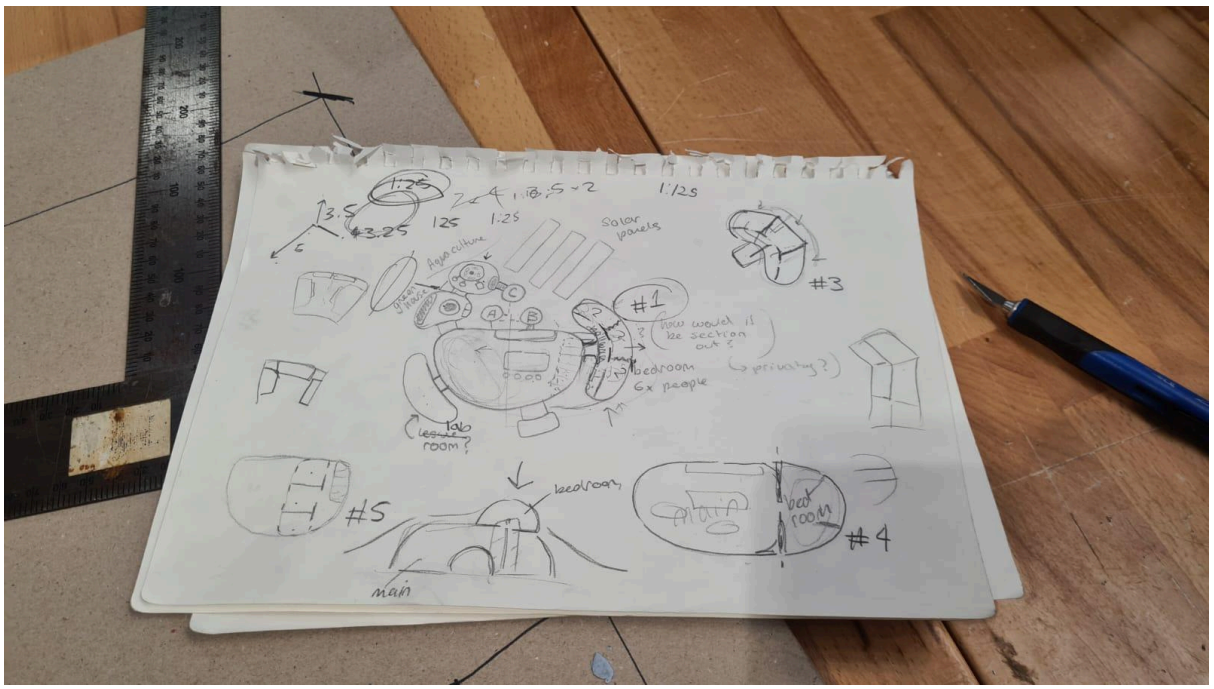
Week 4

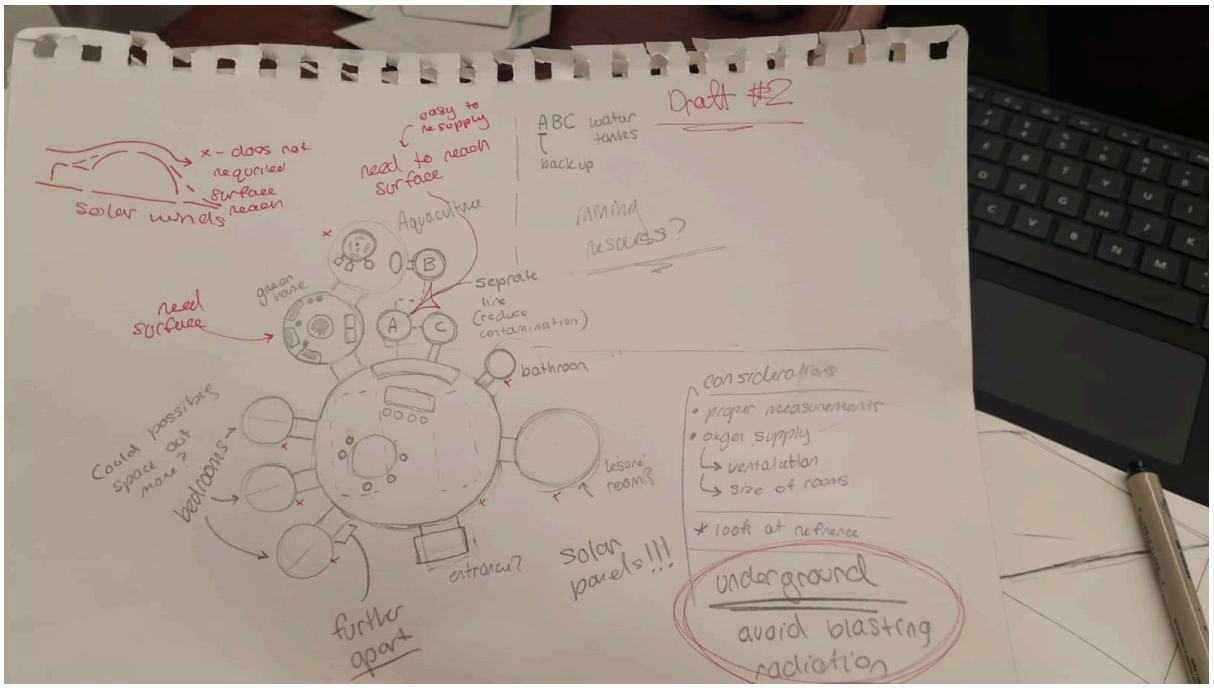


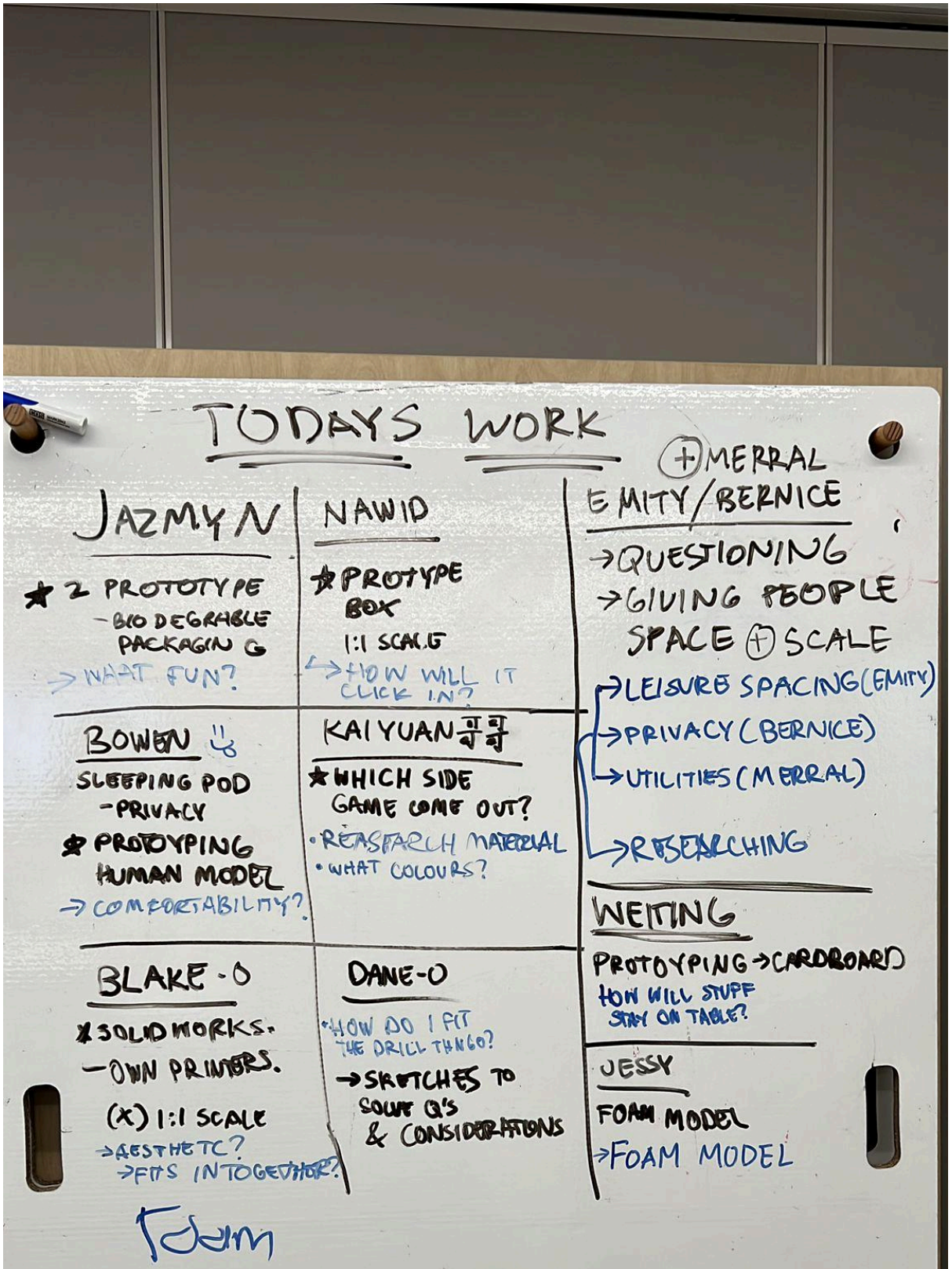





TODAYS WORK
JAZMYN
★ 2 PROTOTYPE
- BIODEGRADABLE PACKAGING
→ WHAT FUN?
NAWID
★ PROTYPE BOX
1:1 SCALE
→ HOW WILL IT CLICK IN?
BOWEN
SLEEPING POD
- PRIVACY
★ PROTOYPING HUMAN MODEL
→ COMFORTABILITY?
KAIYUAN
★ WHICH SIDE GAME COME OUT?
• REASEARCH MATERIAL
• WHAT COLOURS?
BLAKE-O
★ SOLIDWORKS.
- OWN PRINTERS.
(X) 1:1 SCALE
→ AESTHETIC?
→ FITS INTOGETHER?
DANE-O
• HOW DO I FIT THE DRILL THING?
→ SKETCHES TO SOLVE Q's & CONSIDERATIONS
+ MERRAL
EMITY/BERNICE
→ QUESTIONING
→ GIVING PEOPLE SPACE + SCALE
→ LEISURE SPACING (EMITY)
→ PRIVACY (BERNICE)
→ UTILITIES (MERRAL)
→ RESEARCHING
WEITING
PROTOYPING → CARDBOARD
HOW WILL STUFF STAY ON TABLE?
JESSY
FOAM MODEL
→ FOAM MODEL
Foam


1:25
3.5
3.25
1.25
Solar panels
Aquaculture
#1
#3
#4
#5
bedroom
6x people
lesson room?
main
bed room


Draft #2
easy to resupply
x - does not requiries surface reaach
solar panels
real to reach surface
ABC water tanks
back up
Aquaculture
mining resources?
green waste
separate line (reduce contamination)
need surface
bathroom
Could possibly space out more?
bedrooms?
lesson room?
entrance?
Solar panels!!!
further apart
considerations
• proper measurements
• oxgen supply
↳ ventalation
↳ size of rooms
* look at reference
underground
avoid blasting
radiation


TODAYS WORK
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★ 2 PROTOTYPE
- BIODEGRADABLE PACKAGING
→ WHAT FUN?
NAWID
★ PROTYPE BOX
1:1 SCALE
→ HOW WILL IT CLICK IN?
+ MERRAL
EMITY/BERNICE
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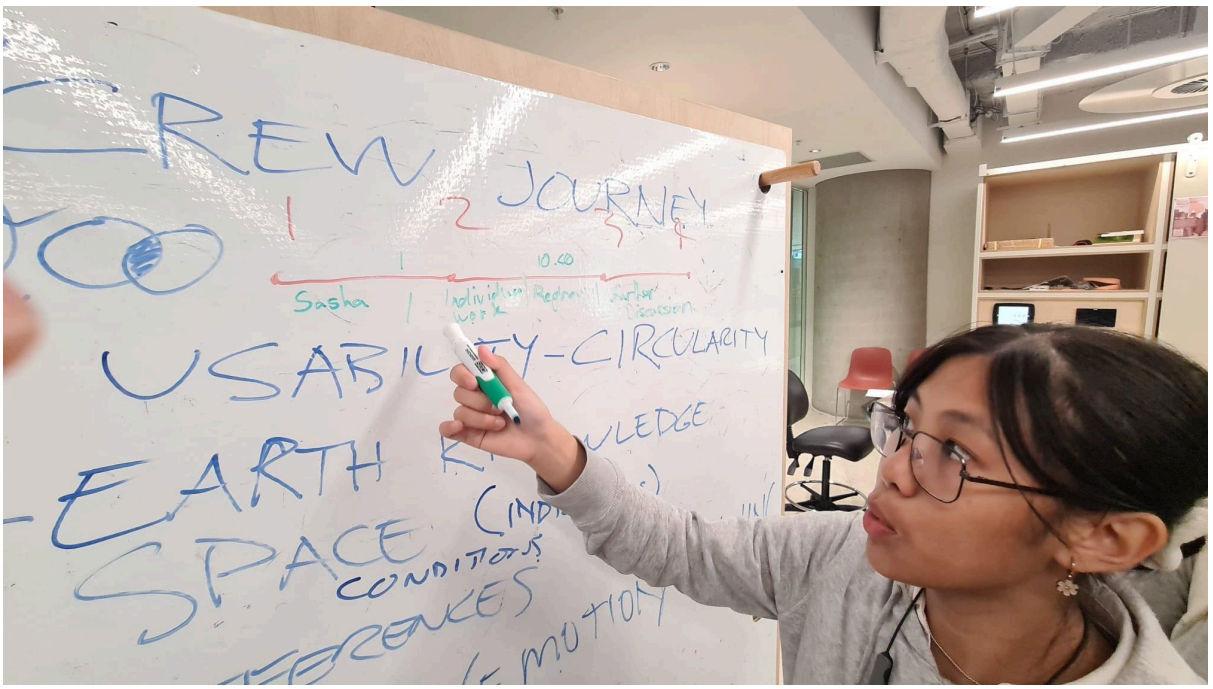
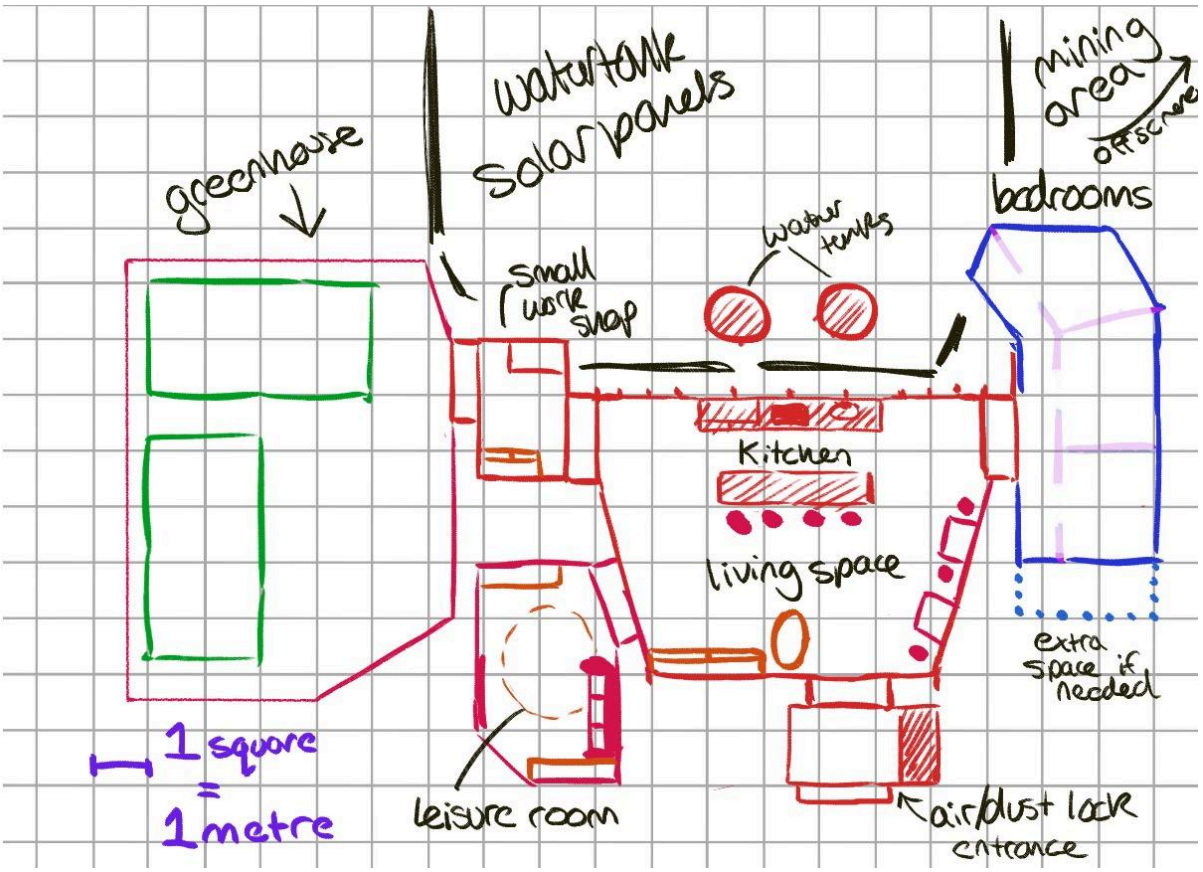
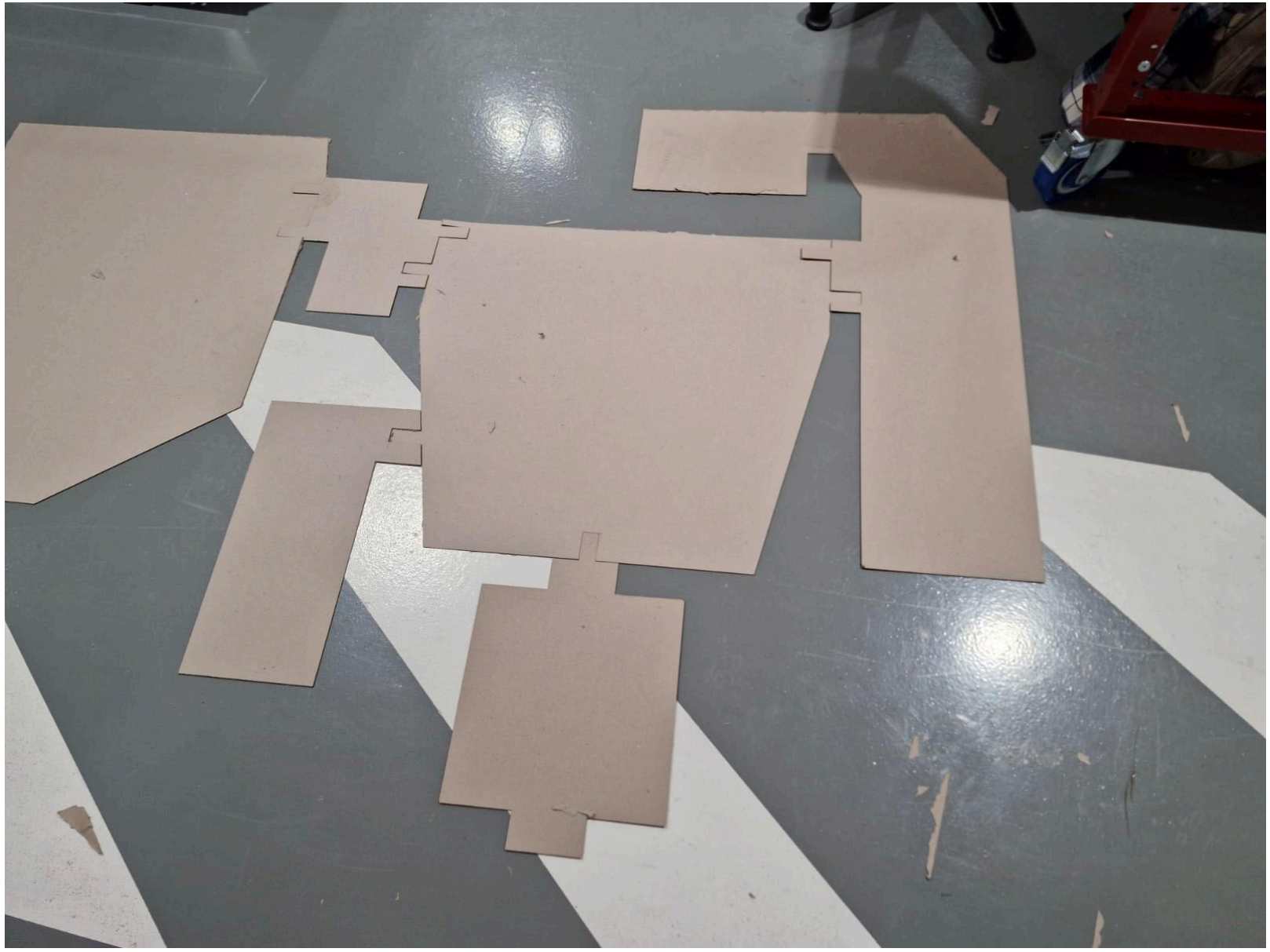
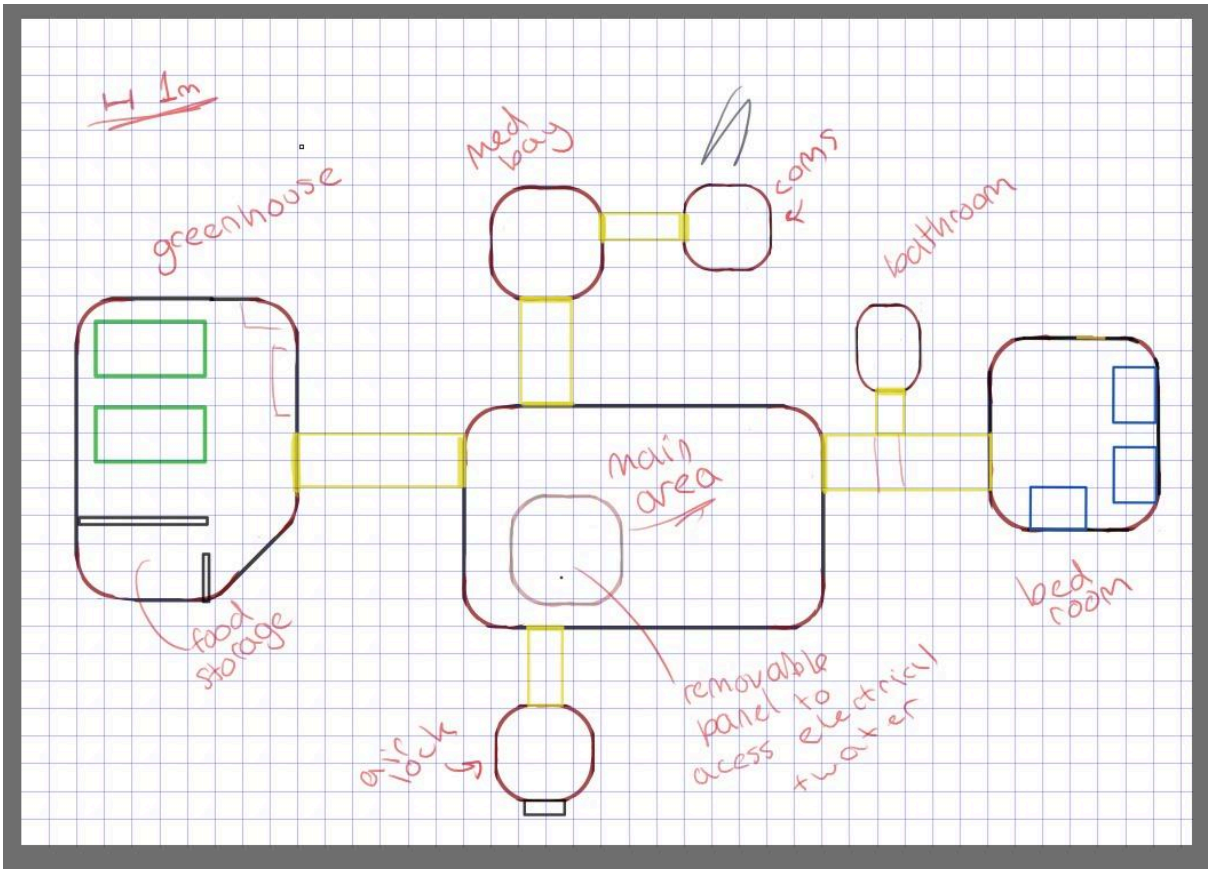
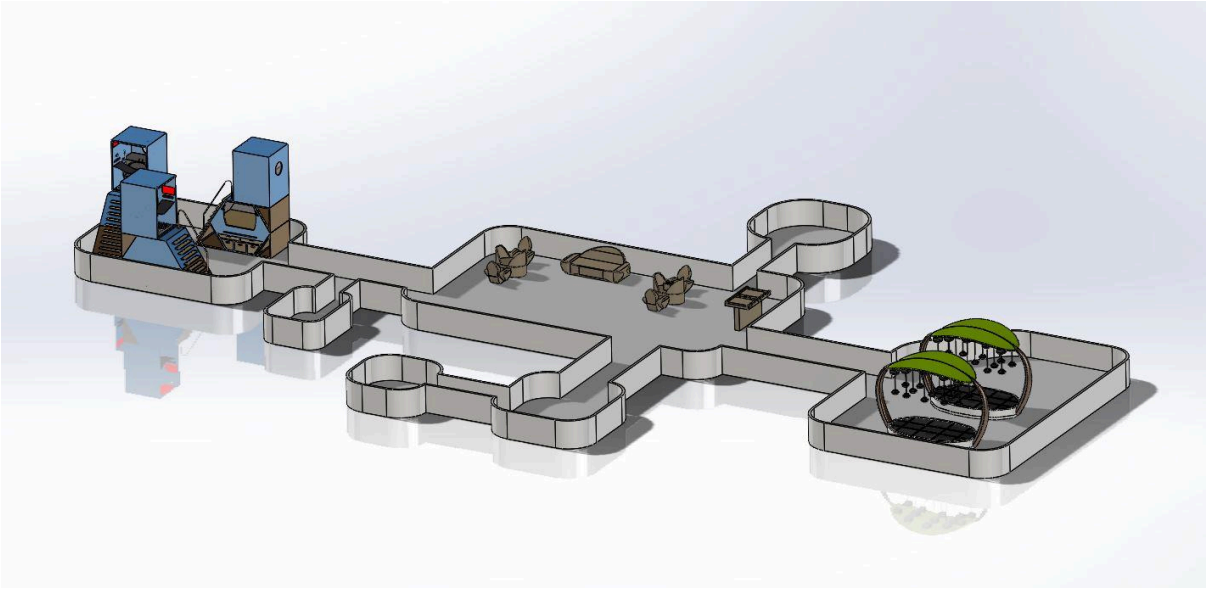
JESSY
FOAM MODEL
→ FOAM MODEL
Foam

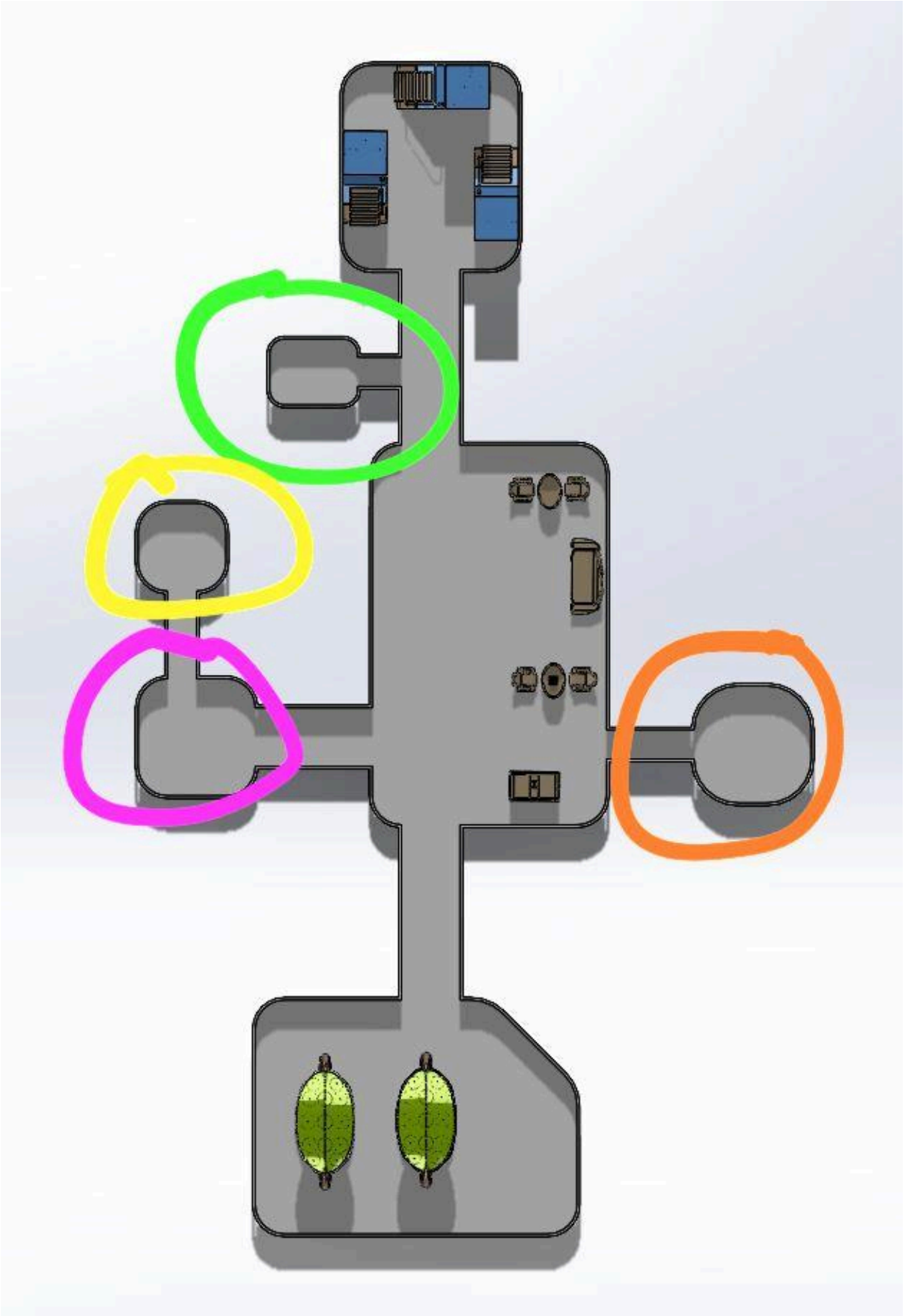

CREW
JOURNEY
Sasha
USABILITY-CIRCULARITY
EARTH
SPACE
CONDITIONS

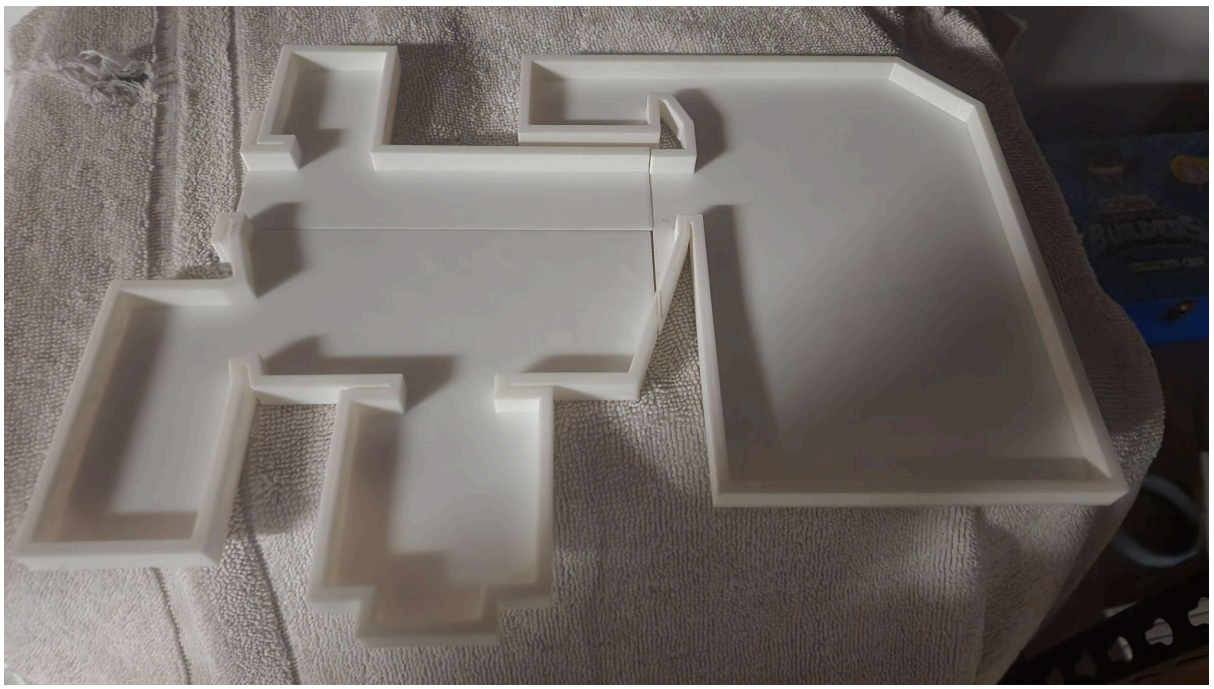

greenhouse
waterfank
solar panels
mining area
offscreen
bedrooms
water tanks
small work shop
Kitchen
living space
extra space if needed
1 square = 1 metre
leisure room
airlock entrance

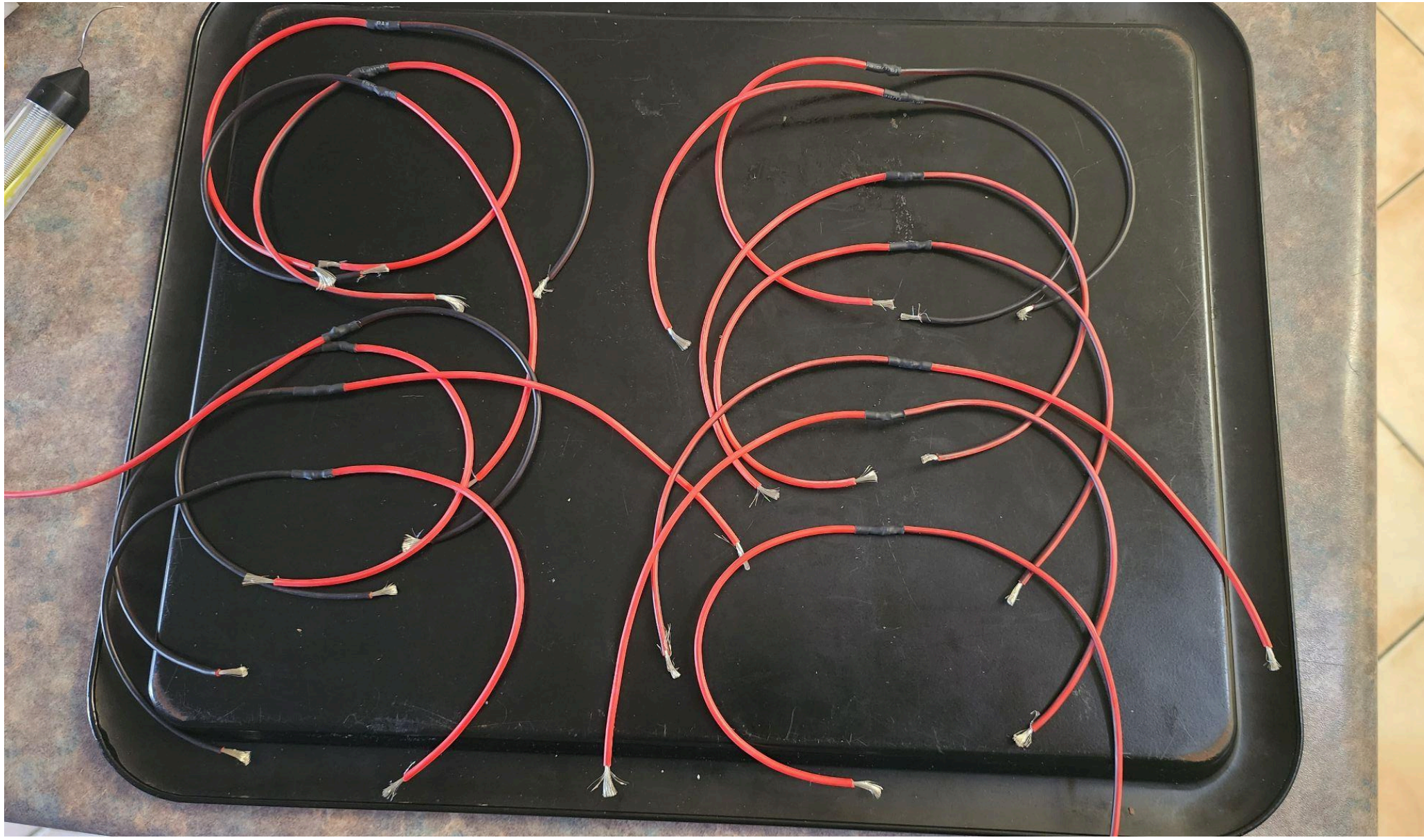


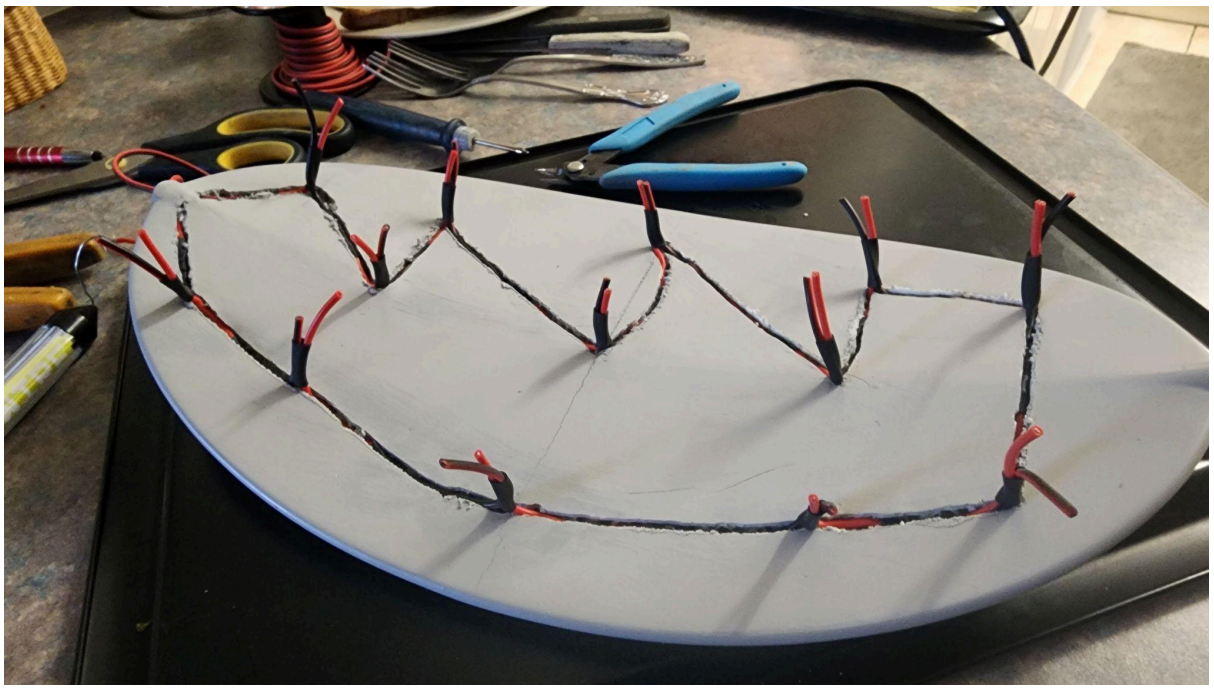

1m
greenhouse
Med bay
coms
bathroom
main area
food storage
bed room
airlock
removable panel to access electrical tweaker

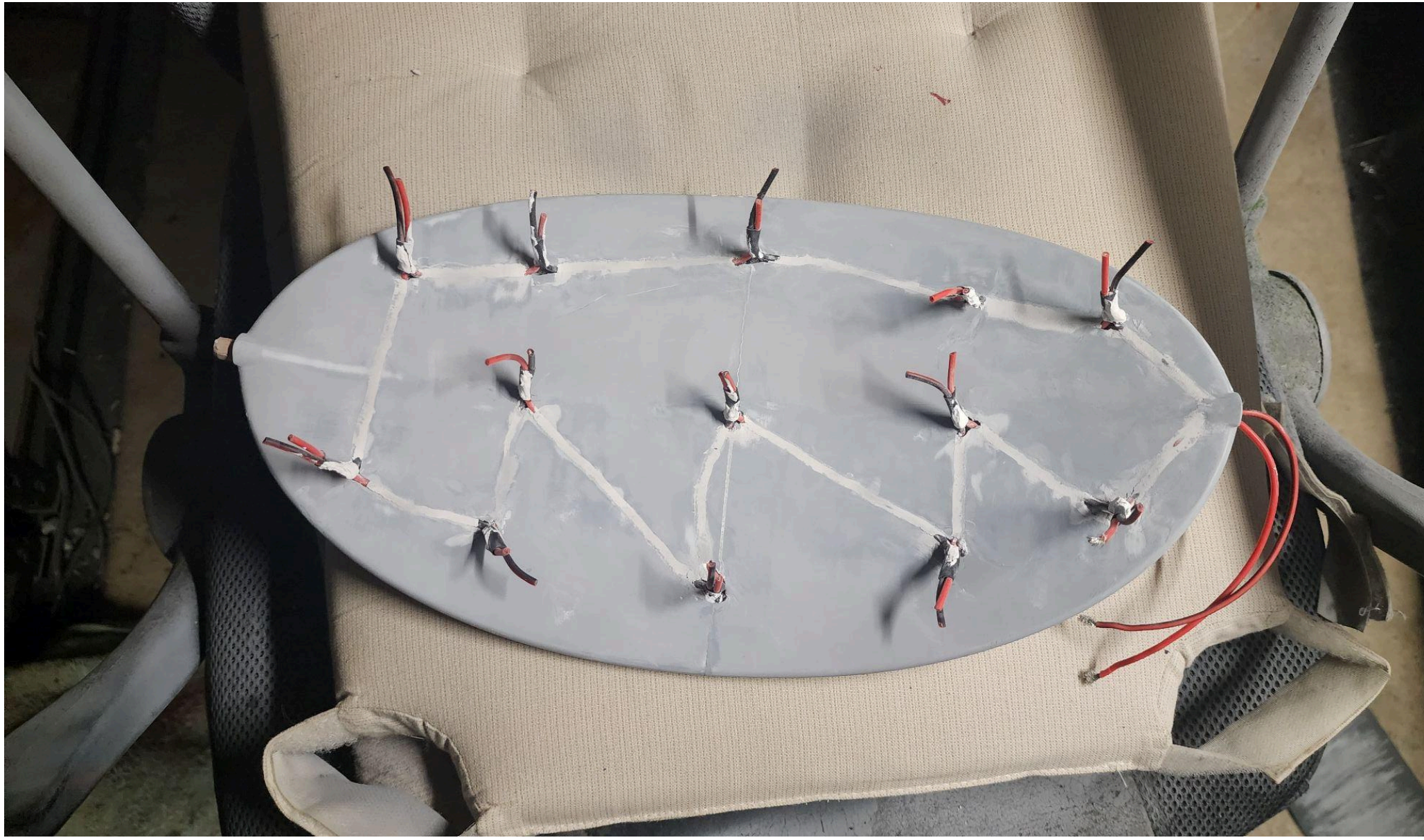


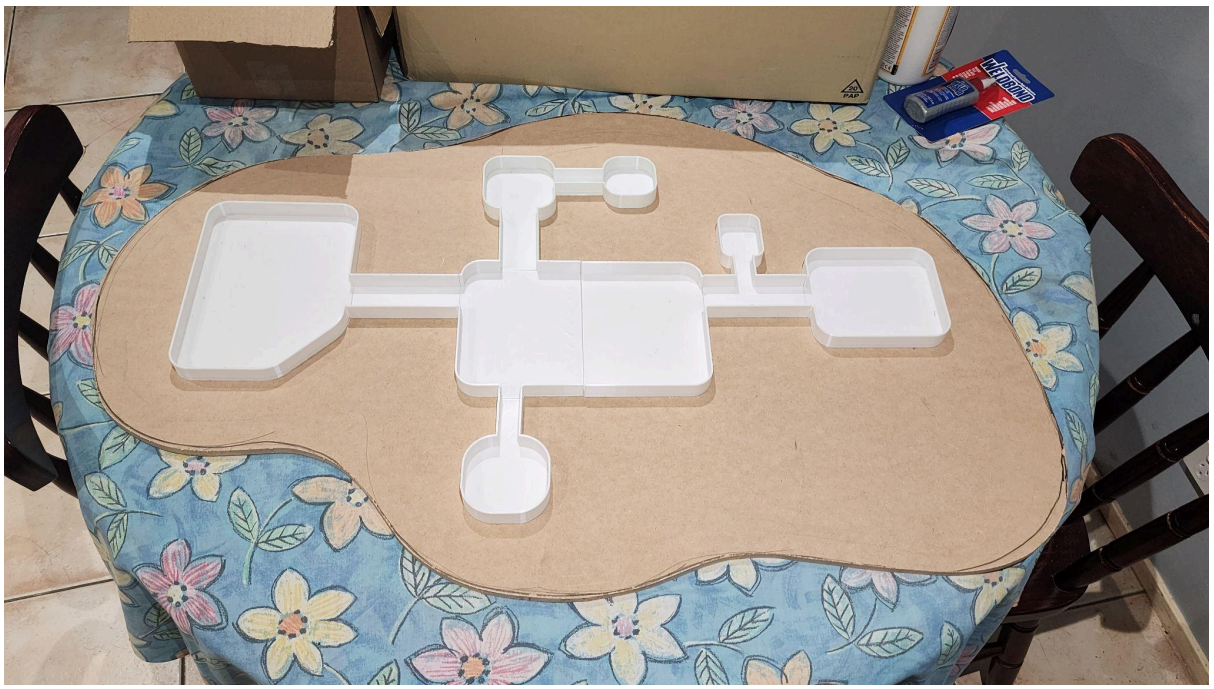











UHU