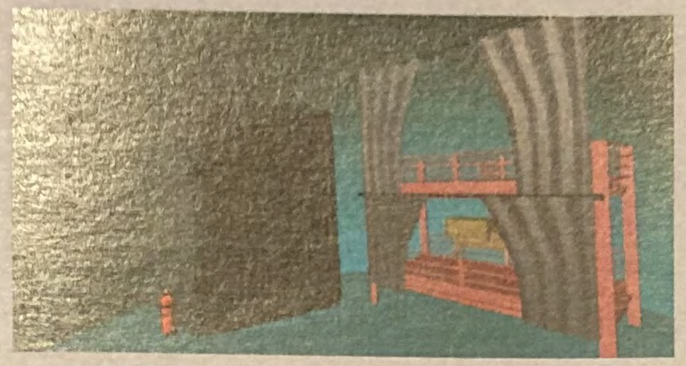
Our Design

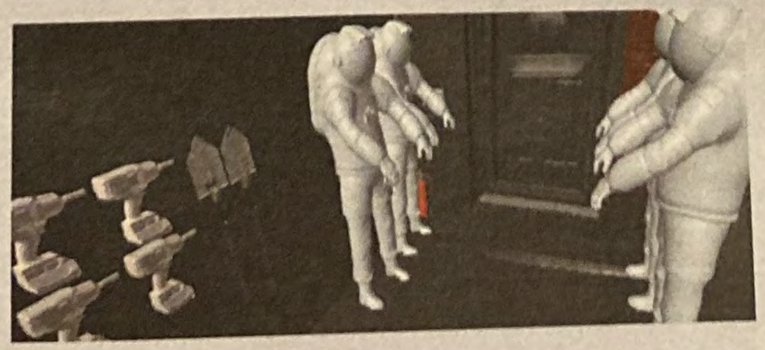
We have designed a lunar habitat that consists of one large main area with 2 stories, and 5 other smaller modules.

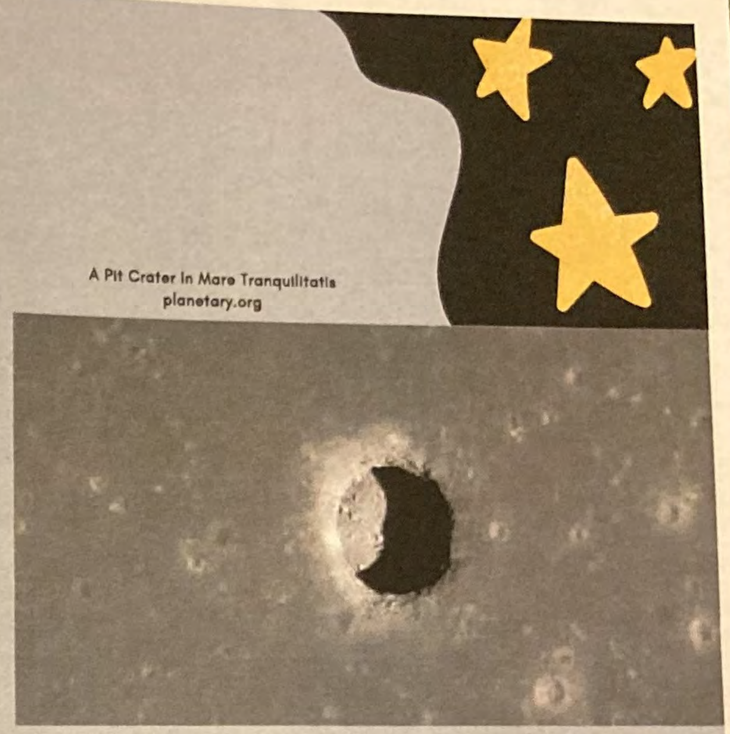
MCTC



Food Growing

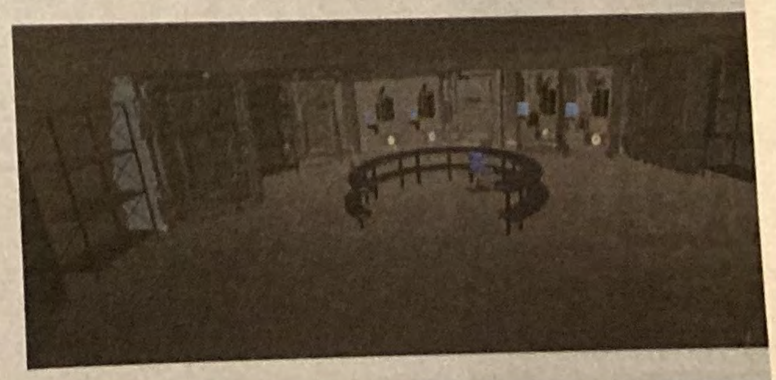
Growing food on the moon will not be easy. Lunar soil does not have the same properties as Earth soil. Lunar soil, also known as regolith, lacks carbon, oxygen, hydrogen, and nitrogen, all things plants need to grow. Instead of using regolith to grow food, we can use hydroponics. Hydroponics is the use of a water based nutrient instead of soil. This way of doing things can help grow food faster too. One of the downsides of using hydroponics is that it is extremely hard to grow bamboo that way.





A Pit Crater in Mare Tranquilitatis
planetary.org

The lunar pit crater, Mare Tranquilitatis, can be the place to hold our lunar habitat. Measuring 400 meters wide and 100 meters deep the shadow overhang and the surrounding regolith will provide a cost efficient cover from weather and multiple types of radiation. This pit crater may seem like a slightly unorthodox idea, but is one of the best places to live. The habitat can also go anywhere else on the moon's surface, including other pit craters but we chose this one just to serve as an example.



Making the Habitat more comforting

Nobody doubt's the fact that living in a lunar habitat will be psychologically hard, living in confinement without family members in a different environment will have an impact on astronauts. Therefore we decided to make our project more fun and comedic. We decided to put fun and comedic to an extreme when applied to our habitat. Though what we chose is not all that practical it serves as a constant reminder to those who view our VR habitat that much will be needed to keep the astronauts on the moon happy. So each room of our lunar habitat consists of a different movie theme. All the movie themes are meant to lighten the mood in an environment that can be all too serious. The movie themes are Barbie, Oppenheimer, Star Wars, Toy Story, Power Rangers, western, and Avengers.

Materials

When it comes to protecting against radiation, there are a few materials that are effective. Here are some key details about each:

- Iron: To shield from radiation, iron should be at least 20 cm thick. The thicker it is, the more effective it will be. However, it can oxidize if the air is moist. Iron is inexpensive and strong, but it is also heavy.
- Lead: This material requires 1.3 ft. thickness to block cosmic rays and is corrosion-resistant. It is commonly used in roofing and plumbing materials, but it is also heavy.
- Polyethylene: This plastic material needs to be at least 60 cm thick to block radiation. While it is not very strong, it is affordable.
- Concrete: Concrete needs to be 6.6 ft. thick to block cosmic radiation. It is durable and can withstand weathering. It is also affordable but can be heavy.

To protect from radiation and cosmic rays, we decided to place our habitat in a lunar pit crater. This will make it so we don't have to be concerned about the outer layer of the habitat itself, as the crater will do all the work for us!

VR LUNAR HABITAT

By: Noah, Adela, Annabelle, and Charlotte
From: Miami Valley Career Technology Center
Teacher: Mr. Ciprian

Our Vision

Our mission is to construct a safe and comfortable lunar habitat that can withstand the harsh cosmic circumstances and protect our astronauts from the dangers of radiation. The habitat must adhere to NASA's strict guidelines, be cost-effective, and easy to transport from Earth to the moon.

Group Members

- Eli Dickey
- Talon Vandehey
- Courtlyn Robertus
- Arnau Marquez-Torres

Main Dome

-Bath area, kitchen, work space, little lab, put or store things on the second level

Peripheral

-2 sleeping quarters 15’ each, with personal stuff, storage.

-20’ is going to be for the green-house and its going to have a living room where to rest.

Airlock

-The airlock is 16’ wide and 12’ deep

-We planed to have two outer suits you can get from the inside, and 2 more inside.

-This will prevent moon dust from entering the lunar habitat, even if we add a small platform on the outside to remove the dust.

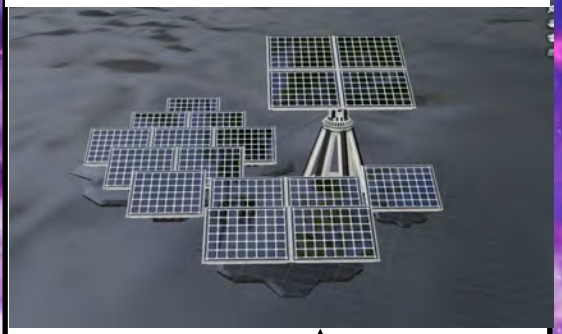
Quarters

-We have beds that can fold when

not in use

-These beds will be useful to save space when not in use and double as a double decker bed

Images



Satellites used to generate power

Growing dome

-We plan to have a 2 layer area for plants. Our ground floor will have a circular design to fit to the outside. The middle will have a resting area

Storage dome

-Our storage will work as a normal storage but our shelves will be unique

-We will have shelves that will be able to fold and store when not in use

-These shelves can be made out of bamboo if needed

-A certain bamboo has great carrying capacity without breaking

Deck

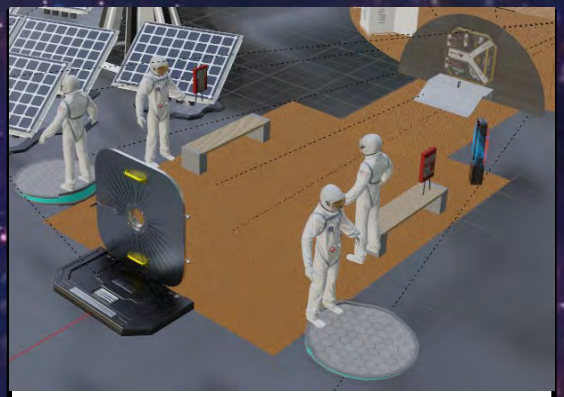
-The deck area will have slots in it where dust will fall off and wont be able to get in the airlock.

-no dust will be able to enter the lunar habitat

-On the outside of the lunar habitat we will have the four space suits.

Workout Equipment

-treadmill, resistive exercise device and a cycle ergometer

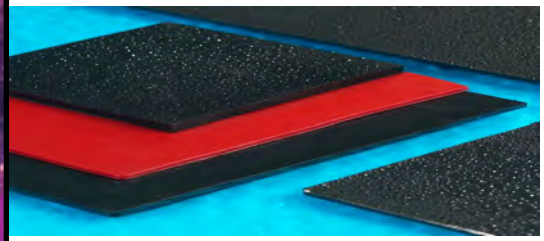


-Image of the space suit outside of the airlock

-Sorbothane

A material used to reduce vibration from workout machines like treadmills

https://www.sorbothane.com/



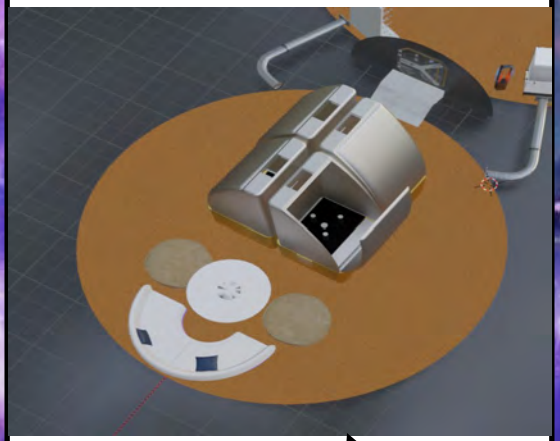
-Electrical system

RPS or radioisotope power system with thermocouples

-Ventilation

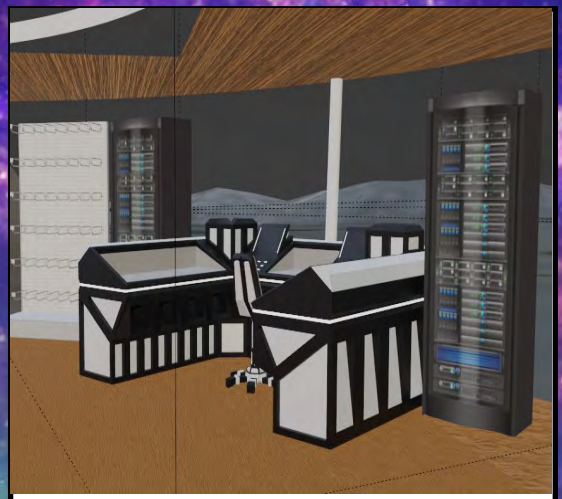
Pipes for ventilation connected between each module to circulate temperature and a way to close the pipes if a dome becomes compromised.

-The bed design able to have a privacy curtain

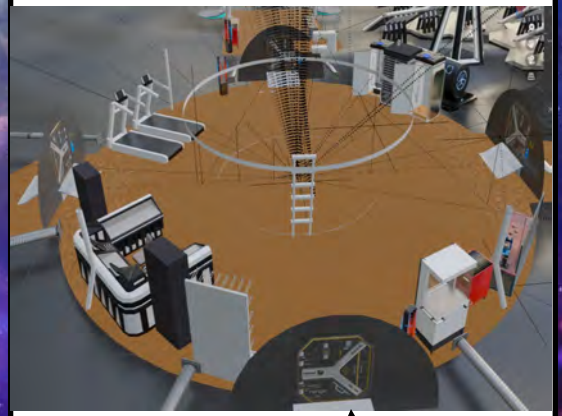


-Bamboo module and ventilation

-The ECLSS and Airlock door



-The control center of the dome



Layout of the main middle dome

-Sewing machine

Used to repair space suits(Not permanent)