2020-2021 City Model Slideshow

School/Organization: **Cinnaminson Middle School**

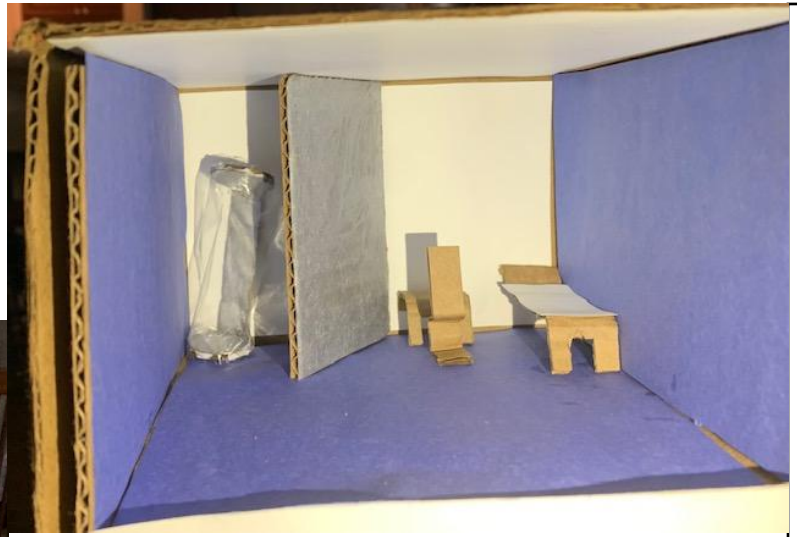
Educator Name: **Garwood Bacon**

Future City Team Name: **Galilei**

Section I

CITY DESIGN

Residential Zone



The majority of the colonists live in the residential terraces that have been carved into areas of pre existing lava tubes. The design was inspired by Disney World's Contemporary Resort. Engineers used borreing equipment to carve out the lava tubes to spec. Individual modular housing was 3-D printed on site using cement made out of lunar regolith. Shown in the model are two levels of housing with one cutaway apartment, a moving people mover and a section of a park. In the room cutaway a bed desk, chair and vacuum tube shower are shown.
The scale is 1 in=2.5 ft

Commercial Zone 1

Residents all work in commercial or industrial zoned sectors. In our city Galilei, we want to make sure that everyone feels comfortable. We try to give them the feeling of Earth; but on the moon. This is aided by the artificial parks found in the lava tubes. We have outdoor markets and many different types of stores. The residents have many different opportunities in general services and stores.

Scale: 1 inch= 10 feet

Commercial Zone 2

This model represents a place where colonists can go and pick up their food. However, before picking your things up, you have to order at a kiosk. The whole concept of this model is to represent a fast and easy way to get your groceries and anything else you might need. As you can see, the bottom level (which would be underground) is where the food and supplies are packaged beforehand. There would be multiple of these located around the colony, making it would be convenient for the colonists.

The scale is one inch equals two feet.

Industrial Zone

Workers involved in polar mining occupations live at those respective industrial outposts located near the mining operation on or near the polar caps.

Titanium is harvested by breaking down the regolith and the dust overall can be used as a base in bricks and cement like materials. The new cement was used in building both residential and commercial buildings and the metals were used in manufacturing various needed equipment.

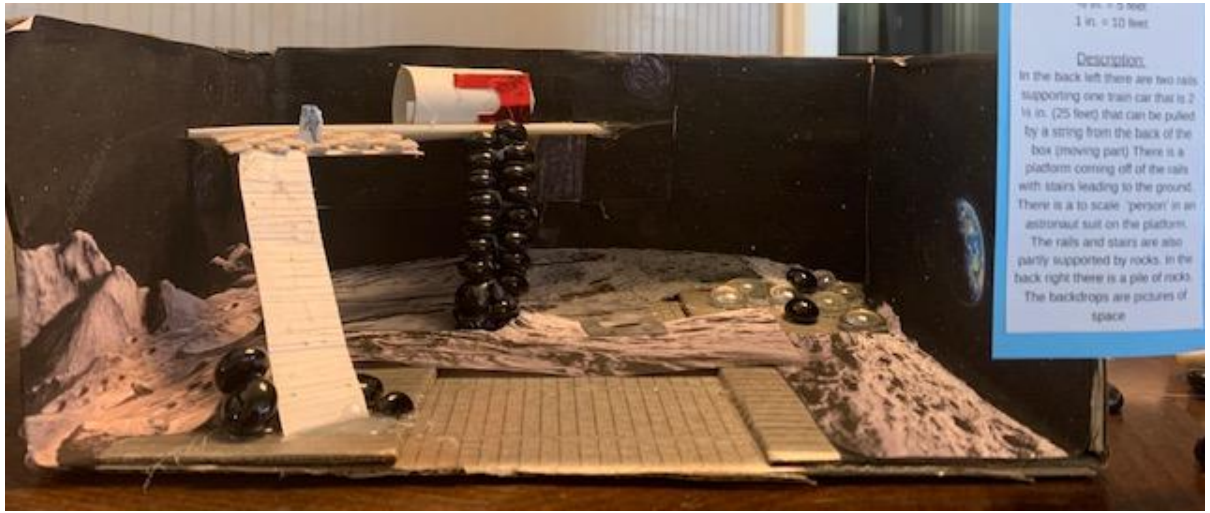
You seea dome to the back right, that represents the area where the regolith would be delivered, to then be made into titanium. The red and black structures you see are the outposts were the miners,the people who overlook the mining live. Lastly all the white structures are housing units, that where 95% of this colony lives through them.

SACALE: 1in=.5 miles

Infrastructure Example 1: Energy & Food Production

The entire facility is run off of a solar farm with a nuclear backup underground. Huge hydro/aquaponic gardens provide sustainable vegetables and proteins. We use this on the moon because it is a very reliable source of energy; due to the sun always being there.
Scale : 1 in=25 feet

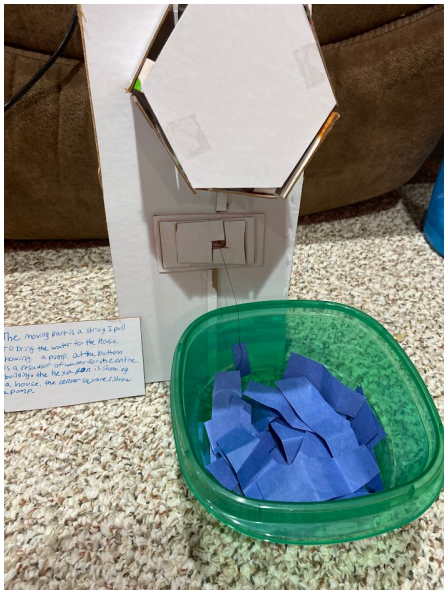
Infrastructure Example 2: Transportation



This model represents the infrastructure used for transportation on the lunar surface. There is a ramp supporting columns built from lunar regolith that was manufactured into usable concrete; which leads up to platform to board the railcar.

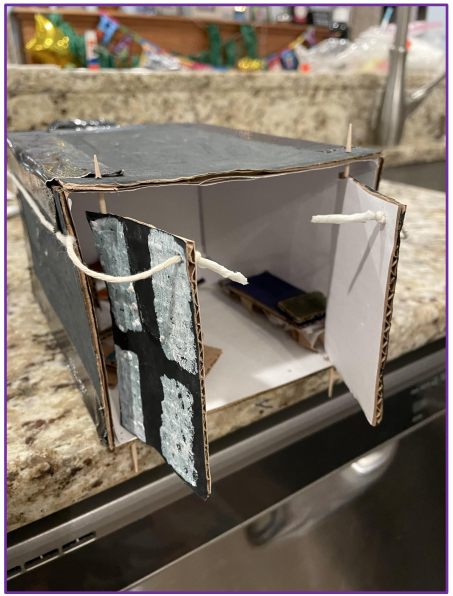
A problem that we may have to face is the low-gravity of the moon. A normal railcar could easily fly away and leave travelers and passengers stranded.
Scale model is 1 inch=10 feet

City Services Example: Water Utility



This shows how the houses get water from the ice mining machines. Under any of the buildings there is a big reservoir of water. There is a pump under the buildings that pushes all the water to the houses.

City Services Example 2: Healthcare



Healthcare (doctor's office)

The doctor's office/building plays an important role in the lunar colony because with all the dangerous hazards on the moon, there needs to be monthly checkups with the doctors to make sure everyone is safe.

Scale: 1 in=2 ft

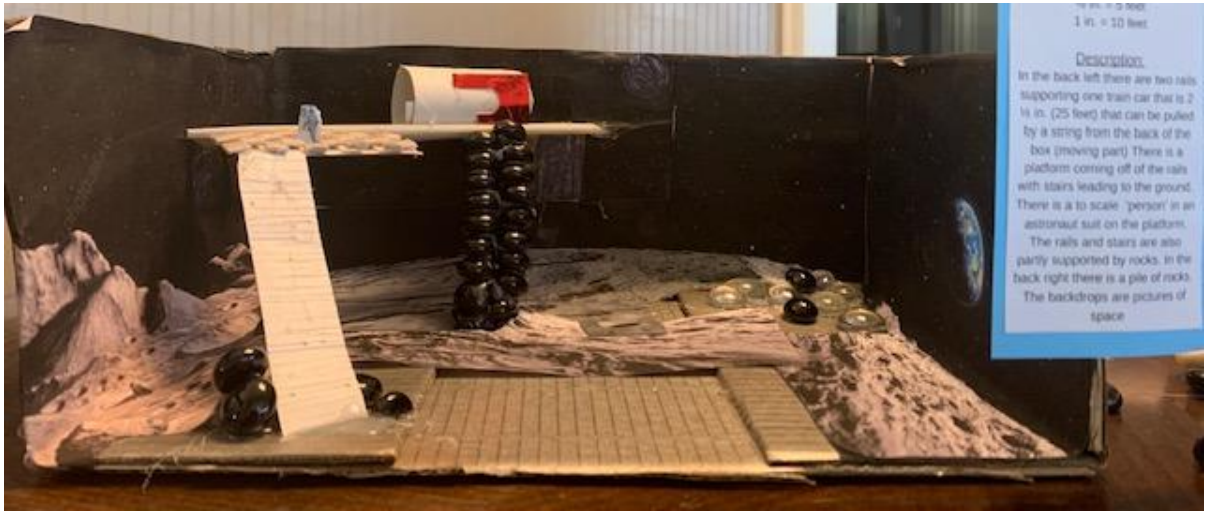
Transportation Example 1: Hyperpod

The transportation system shown here is called a Hyperpod.

The Hyperpod in the image is used for above and below ground transportation on the Moon. Hyperpods are made out of recycled material mixed with Lunar regolith. The Hyperpod has eight wheels making it able to drive to a launchpad, then from there the Hyperpod is attached to a titanium cable which helps pull the Hyperpod to its location. The cable combined with booster is how Hyperpods can transport people from one place to another.

Scale- 1in:50 ft

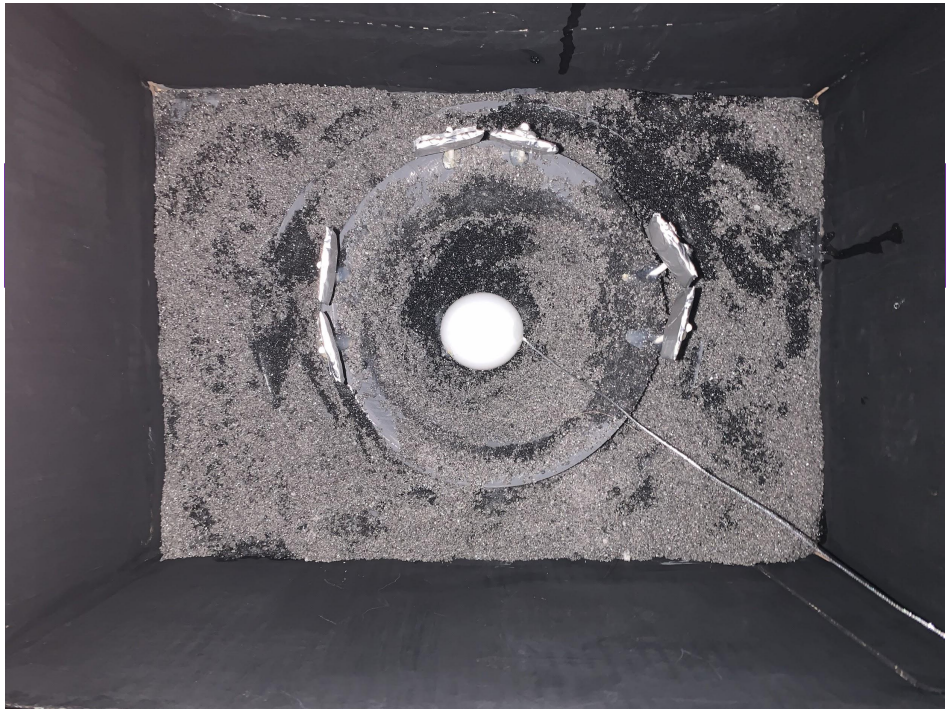
Transportation Example 2: Railcar



The transportation system shown is a suspended railcar used to travel between outposts and possibly other colonies.

Everything was made with recycled materials. The railcar could be used inside or outside the lunar base.
1 in = 10 feet

Living on the Moon (Resource #1) Ice



The moon resource that is shown below is Thermal Mining. It is important for the judges to know that this resource is very important to our future city, since Thermal Mining is used to be able to harvest glaciers; using heat in order to create drinkable water. Overall, Thermal Mining is a detrimental resource to our colony since water is a need for our residents. The scale model of the image is 1,000 feet=1 inch.

Living on the Moon (Resource #2)
Lunar Regolith

Lunar Dust is swept up and sent to a factory inside the industrial section of the city. There the components are broken down through a process using electrostatic charges; which separates lunar dust from space suits. They use this in the factory to separate the resources in the dust as well. Oxygen and titanium are separated from the dust. After this process in the factory, the dust is used for building bricks. Oxygen is used mainly for rocket fuel, but is also used for breathing air. Titanium is used for other building materials and tools.

Section II

BUILD IT: QUALITY, SCALE, AND MATERIALS

Innovative Material & Use Example 1: Glasses lenses

I used old glasses lenses to replicate mirrors that would be used in the thermal mining process for Ice Water on the Moon.

Innovative Material & Use Example 2

The innovative material used in this example is the use of reused concrete. This representation of lunar regolith was created by using glue all over the floor and then throwing powder concrete onto it. This concrete was reused from another project.

Innovative Material & Use Example 3

I used a plastic bottle as a container to hold waste from industrial and residential areas. The container is located a bit far from the city to prevent the waste from contaminating resources. Sewage and waste pipes from the other areas of the city all flow to this storage container. Eventually, it starts to fill up over time. Finally, the container is emptied and incinerated in the lunar core.

Scale: 1 in = 2ft

Example of Scale

Scale used in model: ½ in = 5 feet or 1 in = 10 ft

This is a structure of transportation. More specifically; a platform for a railcar.

Real Measurements:
9 in Length x 6 in Wide x 5 in High

How large it would be realistically:
90 ft x 60 ft x 50 ft

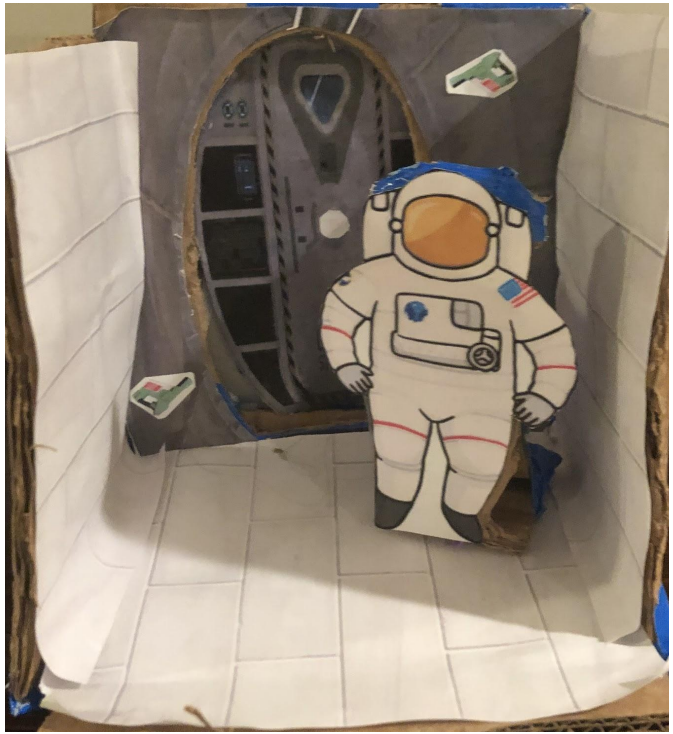
Moving Part

URL link to team’s moving part video: Moving Part Video

Section III

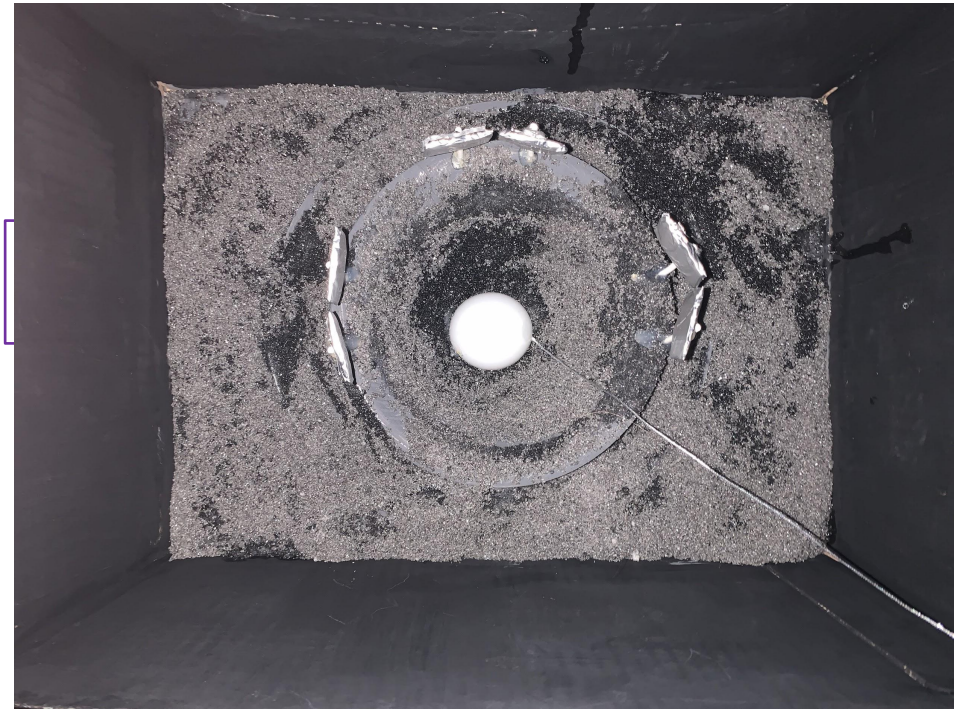
JUDGE ASSESSMENT OF MODEL

Futuristic Technology Example 1:



Lunar dust can be invasive, “Lunar regolith is a very dangerous substance made of a fine gray soil with a density of about 1.5 g/cm3, but the regolith also includes breccia and rock fragments from the local bedrock.” When colonists enter the colony, they go through an airlock. To remove the lunar regolith an electrostatic cleaning system was chosen. It works through high voltage running in between a screen electrode and an aluminum foil placed on the space suit creating electrostatic force to pull up to 82% of the dust off of and out of the spacesuit.
Scale- 1”=1’
I used a cardboard box for the structure and pictures to provide color and detail.

Futuristic Technology Example 2: Thermal Mining



Thermal mining is the use of the sun's rays bouncing off mirrors to mine ice water off the moon. The mining sites will typically be in place where sunlight is very abundant. The sun’s rays will hit the mirrors at the top of the crater, which will then bounce down into the crater. Finally, the rays will begin burning the ground to eventually reach a source of ice.