



2021-2022 City Model Slideshow

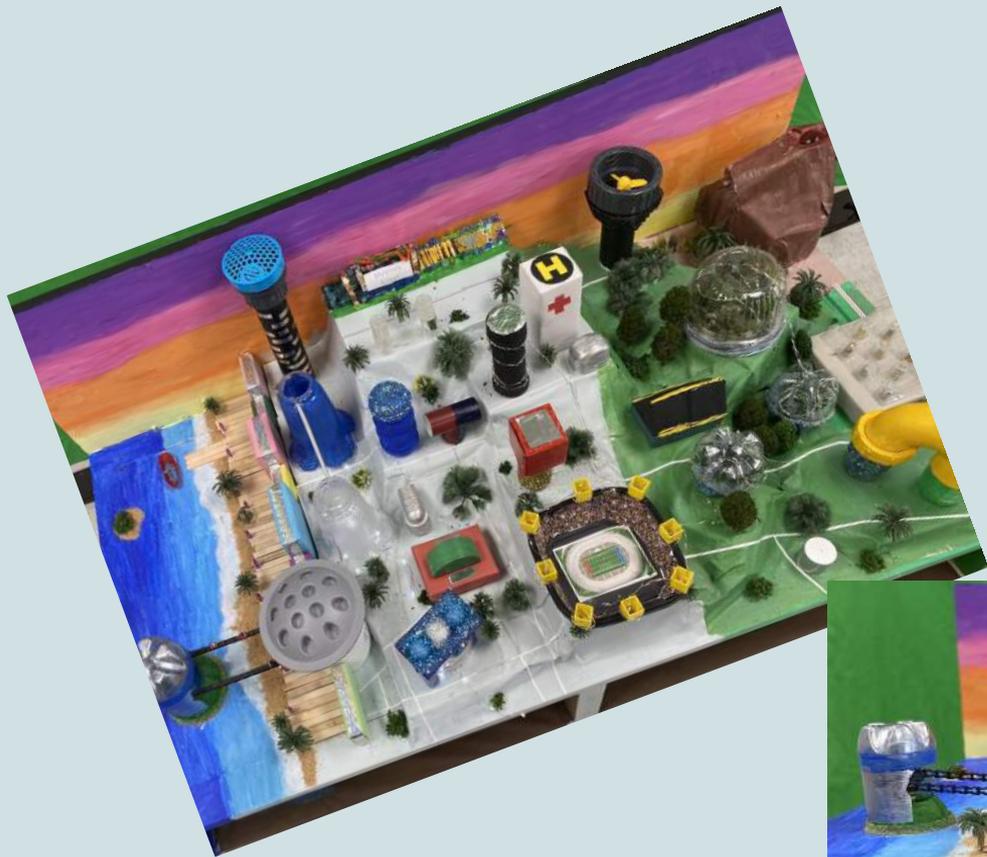
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Future City Team Name: **Ma'ema'e City**

A vibrant tropical beach scene. In the foreground, a large, leaning palm tree with a thick trunk and lush green fronds dominates the left side, casting a shadow on the light-colored sand. The beach curves along the edge of a clear, turquoise ocean. Gentle waves with white foam wash onto the shore. In the distance, the horizon is marked by a few small islands and a clear, bright blue sky with a few wispy clouds. The overall atmosphere is serene and idyllic.

Section I
CITY DESIGN



Residential Zone



Ma'ema'e serves as a home for 800,000 residents. In Ma'ema'e, the homes, along with the urban agriculture are built vertically to save space. This way of farming serves as a healthy and reliable way for obtaining food. All of the building are interconnected so that trash can be filtered, recycled, and reused. Along the boardwalk, there are always chances for the sea level to rise. Therefore, the houses were also built vertically to stay above the rising sea. All high rise buildings in the city were built using construction materials that are composed of recycled products that came from The Great Pacific Garbage Patch, to eliminate the wasting of natural resources.

Commercial Zone



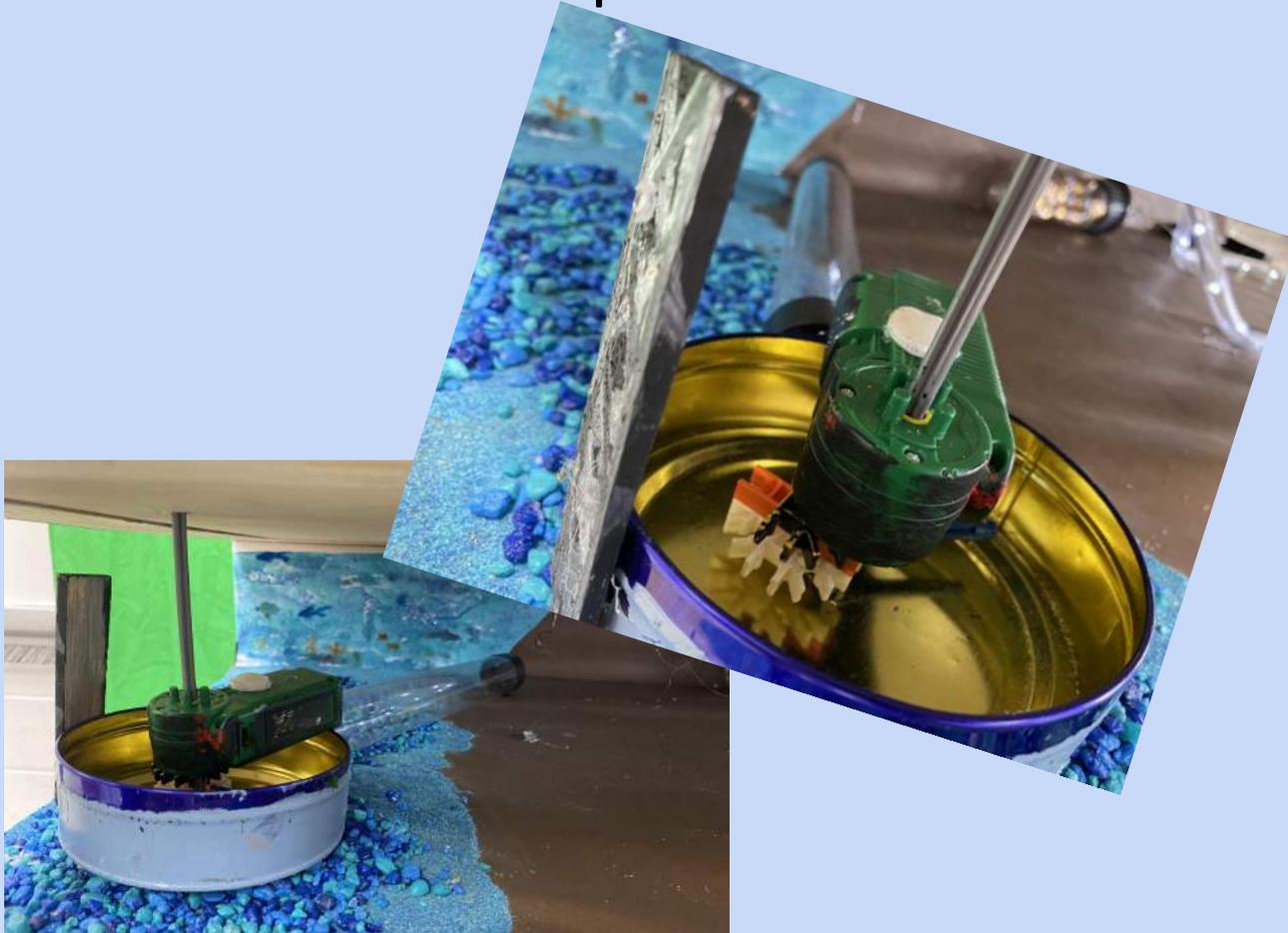
The Commercial Zone of Ma'ema'e centers mostly around its main source of income - tourism. The beautiful beaches boast many water-based activities for travelers including snorkeling, scuba diving, and surfing. The boardwalk lining the beach has many shops and restaurants with wonderful views to generate income. In addition, Ma'ema'e has a modern sports multi-plex with a retractable roof for those indoor activities like basketball, or for when the weather is unsatisfactory. The stadium saves space and material by having floors that are in pieces that can be interchanged over the turf for their main sport, football .

Industrial Zone



One of our most important structures is our 4th generation fusion reactor, not only because it powers the city, but it is also self-sustaining. The fusion power plant combines two hydrogen atoms into one helium atom. This process releases energy because the one helium atom has less mass than the two hydrogen ones. In earlier generations, it was difficult to get enough heat to cause the fusion reaction to work, but we use geothermal heat to help us along. In our city, we recycle our nuclear waste by extracting usable elements from it, and using those elements to power the whole plant.

Infrastructure Example 1



Here, a tidal turbine is shown. These turbines produce wind energy above the sea with any ocean wind, and they also create hydroelectricity deeper in the ocean. In our city, hydroelectricity is a very abundant type of power, as Ma'ema'e is surrounded by water. Since we are steering away from fossil fuels, we had to find alternative types of power and energy, and hydroelectric power, along with some other waste-free power types are very efficient in helping run our city.

Infrastructure Example 2



Keeping our city waste free is an important part of the culture of Ma'ema'e City. The piping infrastructure of our city is part of our circular economy. It is connected to all buildings or structures. These pipes lead to an underground sewage facility which filters out solids to be repurposed. An example of the repurposing is using recycled plastics, even from generations past, in our building materials and road pavements. The organic waste is used as fertilizer for urban agriculture. The plant also filters for toxic chemicals that can be used in the fusion power plant. The sewage facility also makes sure that the processing of trash and recycling of materials goes smoothly.

City Services Example 1



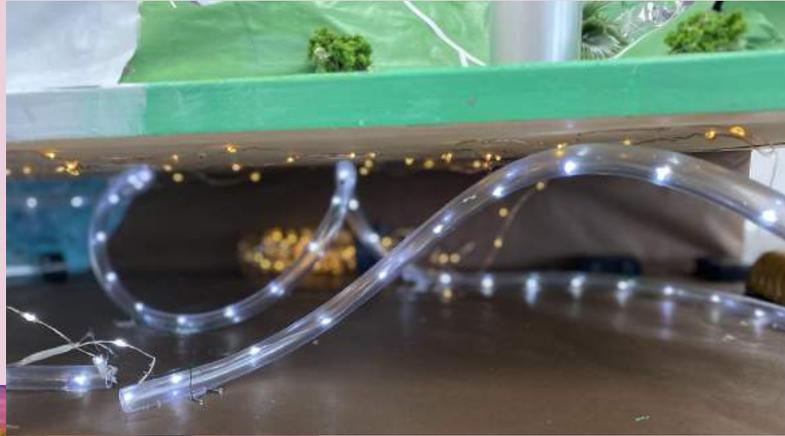
Our education system has gone through a lot of change, but once all was said and done, our education system has become one of the most successful in the world. The schools use the internal triangular building structure to increase safety due to our changeable weather conditions. The virtual portions help students not miss out due to weather or health. Starting at 5th grade, we let our students have much freedom to choose what they learn, and how they learn it. This freedom to choose keeps students engaged, and success rate higher than ever.

City Services Example 2



The Ma'ema'e Police Department helps keep our city waste-free by using electrical cars and hydro-powered boats, eliminating harmful emissions such as those from gas-powered vehicles. Our Fire Department also uses similar vehicles and both departments' cars and trucks travel on roads made from recycled plastic. The Fire Department also implements a technology that purifies ocean water and a biodegradable fire-retardant spray to protect buildings and residents from fire hazards.

Transportation Example 1



Pictured is our Hyperloop mass transit system. This system runs on solar and electrical energy, reducing harmful gas emissions. In addition, the Hyperloop is faster and safer than air travel and reduces the number of accidents at dangerous crossroads. Our citizens can get to where they need to go quickly. Ma'ema'e City's multi-modes of transportation not only include the Hyperloop, but also self-driving vehicles which also cut down on accidents. All of these vehicles were designed by mechanical and electrical engineers. The infrastructure of our roads made from recycled materials were built by civil engineers.

Transportation Example 2

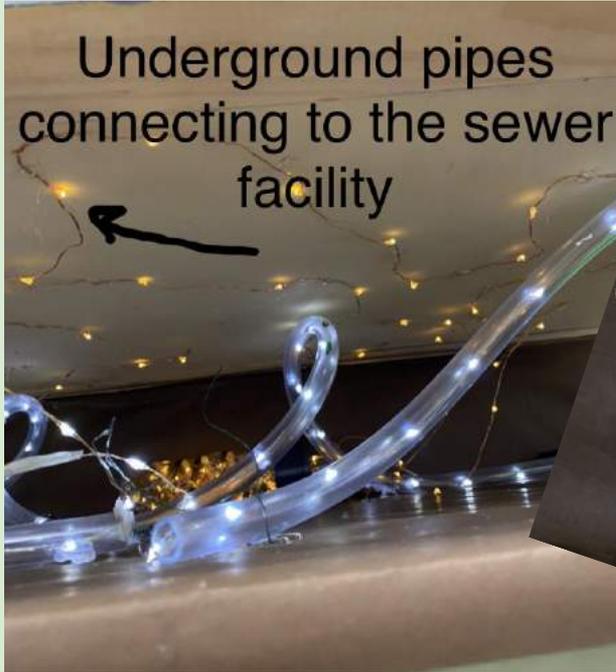


Being a part of the Hawaiian island chain, our residents often travel to neighboring islands, big and small. A common form of transportation for them is hydro-powered boats. These boats use the currents in the water to generate hydro-electricity to keep the boats running.

In addition to the boats, the cars, trucks, and buses that are used in the city are powered by renewable energy sources and electric powered to prevent pollution.

One such way they are powered is with solar panels, harnessing energy from the sun to recharge their batteries.

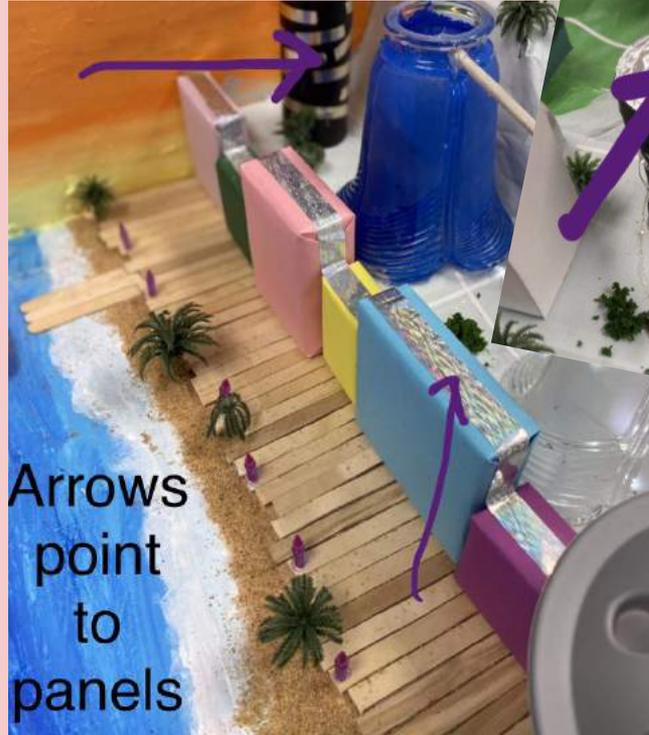
Principles of a Circular Economy in Action - Example 1



One of Ma'ema'e's important services is the piping infrastructure. Sewage from residential, commercial, and industrial zones get filtered at an underground facility that repurposes solids. Any chemicals found are reused in our nuclear fusion facility.

Citizens of Ma'ema'e are very careful to not waste food and if any food *is* leftover, it is either donated to the less fortunate or converted into compost.

Principles of a Circular Economy in Action - Example 2



Solar panels are heavily used in Ma'ema'e. There are solar panels on every house, for the use of electricity. The solar panels were constructed from the use of recycled glass and plastics that were generated by the city's chemical engineers. This way, we can make sure that all of these resources are being reused in a good and beneficial way. Through the use of solar panels, there is the prevention of electrical waste in Ma'ema'e. It is very sunny on Ma'ema'e, in consequence of being on a tropical island. The sun's radiation provides more than enough heat and energy for the use of electricity through solar panels.

Principles of a Circular Economy in Action - Example 3



Millet farming is a large part of the economy of Ma'ema'e. Not only does it cut down on the production of greenhouse emissions, it is a tasty treat. In addition to being used as a rice replacement in diets, it is also used as edible packaging, reducing plastic waste.

The self-sustaining farms grow crops over fish enclosure to provide a sustainable food source for the fish, while the waste as well as bones from dead fish are used as fertilizer for the vegetation. It is a win, win!

A vibrant tropical beach scene. In the foreground, a large palm tree trunk leans from the left towards the center, casting a shadow on the white sand. The beach is wide and sandy, meeting the turquoise ocean at the water's edge. The water transitions from a light, shallow turquoise to a deeper blue as it extends to the horizon. The sky is a clear, bright blue with a few wispy clouds. In the distance, a small island or headland is visible on the right. The overall atmosphere is bright and sunny.

Section II
BUILD IT:
QUALITY, SCALE, AND MATERIALS

Innovative Material & Use Example 1



One of our city's energy sources is geothermal energy. Located in Hawaii, Ma'ema'e has easy access to naturally heated geothermal reservoirs. These reservoirs can heat underground water supplies as well as rocks. This heat can be trapped and used as energy. To create our geothermal power plant, we used a combination of recycled items. First, the underground collection wells are represented with the insert of a box of Girl Scout Peanut Butter Patties. A red straw represents the hot water production well and the blue straw represents the cold water injection well. The plastic insert of a makeup box and a leftover gift box are combined on top as the above-ground generator facility.

Innovative Material & Use Example 2



Since tourism is one of our main sources of income, we have beachfront properties and hotels as well as many recreational water activities. Kayaking, snorkeling, scuba diving and sunbathing are some of the offerings, but we also have an observation tower out in the ocean where tourists can look for schools of dolphins, enjoy spectacular views of the island, and see beds of coral at the bottom since our water is so clear. To get out to this observation deck, people get on a sky ride from the hotel out to the tower. The hotel and skyride base are made of an orange juice container with the plastic base that held lipsticks.

Innovative Material & Use Example 3



The fusion power plant mentioned earlier in this presentation was made with 4 different reused materials. First, the two bases were once Gatorade flavor pods. One pod is filled with recycled glass pieces.

The other pod is filled with Orbeez, a toy for kids that are small pellets that absorb water and grow. Finally, the two pods are connected with a piece of pipe tubing that was donated a few years ago by a parent. The piece of tubing was a leftover piece from his plumbing business, and he donated it to us instead of throwing it out.

Example of Scale



Scale used in model (e.g., 1" = 10', or 1" = 22'):

We used the scale of 1" = 100'

Structure 1

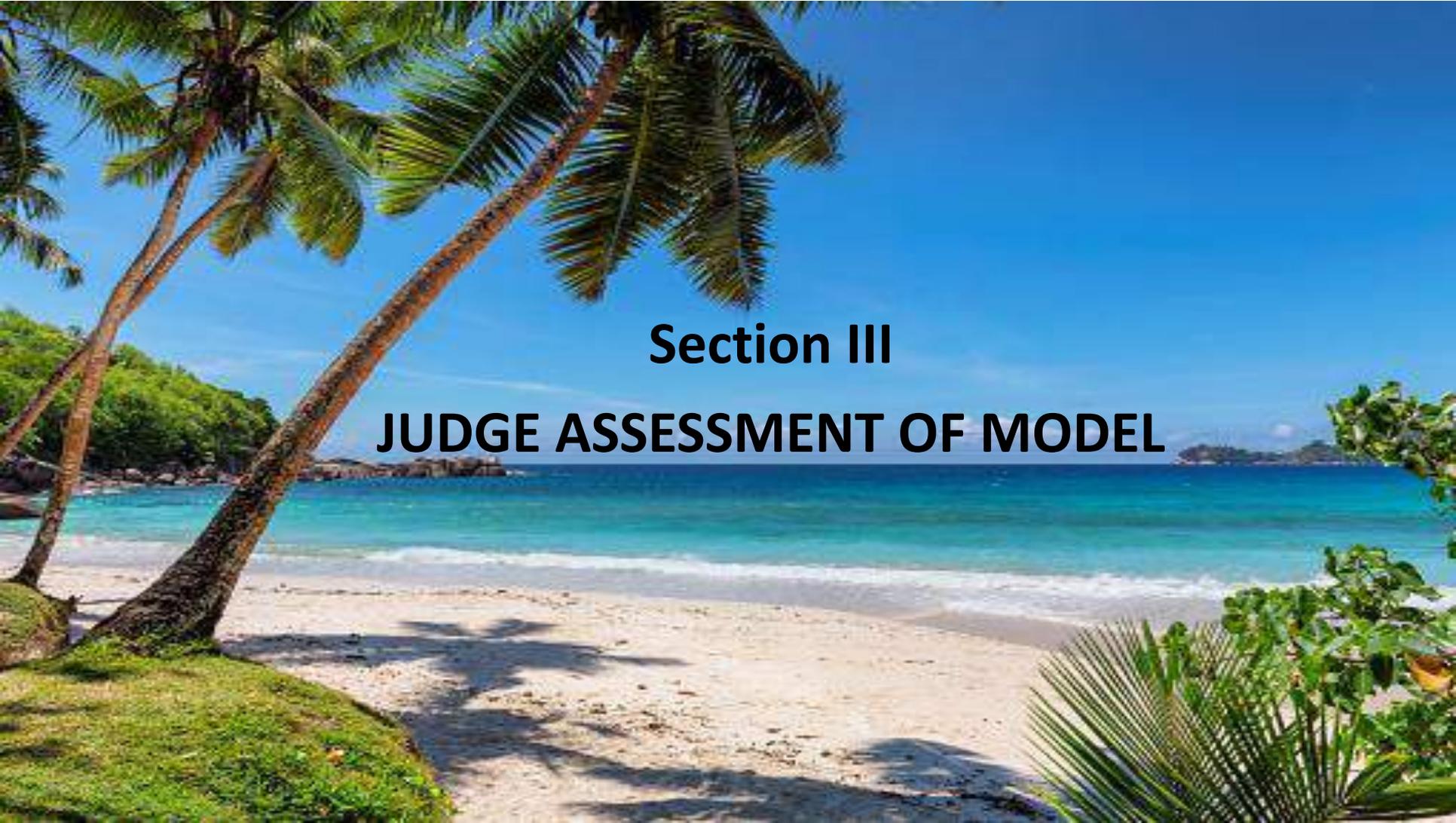
This is our fusion power plant, which measures 5.25 inches tall. In real life, that would make our structure 525 feet. The tallest currently in the world is 663 feet.

Structure 2

Also shown is our hospital, which measures 4.5 inches tall. In real life, that would make our hospital 450 feet tall. The tallest hospital now is in Houston and is 542 feet.

Moving Part

<https://youtu.be/m-RqdKvqGu4>

A tropical beach scene with palm trees, turquoise water, and a clear blue sky. The text is overlaid on the image.

Section III
JUDGE ASSESSMENT OF MODEL

Futuristic Technology Example 1



A main method of transportation throughout our city is the Hyperloop. In order to operate, our hyperloop subways are nearly vacuum sealed track with pods that are magnetically levitated. One hundred years ago, the top recorded speed was 633 mph. But, in the last 100 years, we have been able to reduce friction and streamline our designs using the engineering design process and can now achieve the originally theoretical speed of 760 mph. However, they do take a little while to pressurize and depressurize, and they need a fair amount of maintenance, but this is to ensure the best ride possible between the destinations.

Futuristic Technology Example 2



One of the largest waste of space in the world in terms of transportation are airplanes, specifically their long runways. While they are effective methods of transportation, the same results can be achieved with drones, which will be our new main method of aerial transportation. These drones can move at similar speeds to a plane, take up a fraction of the space, and can have other applications outside of transportation. For example, we can use drones for deliveries from online shopping, grocery deliveries, and surveillance.