Global Issues Champion Booklet

Competition: 2020 International Conference
Topic: Terraforming
Division: Senior
Affiliate: California
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Award: Senior Division First Place Individual

Step 1. Identify Challenges

Read the Future Scene carefully and generate ideas for challenges, concerns, and possible related problems. Choose the 8 most important challenges and write them in the space provided.

1.	If Ganymede citizens are exposed to high levels of UV radiation, then they might experience health issues such as increased risk of cancer. This may be a problem because future generations may continue to suffer from illnesses.
2.	If citizens of Ganymede have experienced vision loss and other effects of microgravity, then their health issues might impede them from staying physically healthy. This might be a problem because the people of Ganymede might not be able to fulfill their work duties and suffer from exhaustion.
3.	If the people of Ganymede have lost family and friends who died when the GanyShuttle flew too close to Jupiter, then they may have heightened feelings of anxiety and depression. This could 3 be a problem because the citizens may experience short-term and long-term mental health problems.
4.	If Blair Legrand's political agenda is mainly driven by his business interests and Ingalil Abboud's political agenda is mainly driven by the colonists' preferences, then the election of Blair Legrand might result in incomplete representation of the colonists' needs. This may be a problem because it could cause conflict and inequality between the government of Ganymede and colonists.
5.	If Ganymede is using nuclear fission technology transmitted through the underground ocean in order to generate heat, then there may be an increased risk of ecological damage on Ganymede. This may be a problem because it could lead to instability of the environment of Ganymede.

6.	If Blair Legrand is proposing a new line of hoverpods that use magnets with Ganymede's natural iron core, then the hoverpods could experience fluctuations in speed and functionality depending on the magnetic attraction to Ganymede's iron core. This could be a problem because it could decrease the efficiency of the hoverpods.
7.	If UV shields proposed by Blair Legrand are installed to decrease radiation rates, then crops grown on hydro-farms might die out due to lower UV radiation. This could be a problem because it could limit the citizens' access to basic needs such as food.
8.	If Ganymede First Party proposes maintaining the temperature of the atmosphere at 293 Kelvin, then the election of Blair Legrand could result in the majority of the residents' preferences not being represented. This may be a problem because the residents' quality of life might be decreased.

Step 2. Select an Underlying Problem

Using the challenges listed in Step 1, identify a problem of major importance to the Future Scene situation. Write your Underlying Problem making sure your question clearly explains the action that will be taken and the desired results/goal of that action.

Because terraforming efforts on Ganymede have endangered the health of colonists how might we minimize the negative impact of terraforming on the health of the citizens of Ganymede so that the safety of the citizens of Ganymede can be protected in the year 2045 and beyond in the topic of terraforming in Ganymede?

Step 3. Produce Solution Ideas

Generate solution ideas to the Underlying Problem in Step 2. Choose the 8 most effective solutions and write the elaborated ideas in the space provided.

1.	Ganymede Department of Energy will test and implement forms of alternative energy such as solar energy. The use of alternative energy will eventually be increased and incorporated into the energy infrastructure of Ganymede to help minimize the potential negative effects of nuclear energy on citizens. This solves the UP because it protects the health and safety of Ganymede citizens.
2.	Ganymede Health Services will work with the newly elected president to implement E-health services that alleviate loneliness. These E-health services will include smart wearable devices and AI chatbots that will interact with citizens of Ganymede, providing therapy to alleviate

	their anxiety and depression. This solves the UP because it boosts the health of Ganymede citizens affected by the loss of their family and friends.
3.	The Ganymede government will issue a new set of regulations for the use of nuclear fission-generated energy. These regulations will indicate the extent of nuclear energy generation, including its location relative to Ganymede communities. This solves the UP because it reduces the potential risk of harm of the nuclear fission-generated energy on Ganymede colonists.
4.	Ganymede Department of Human Health will launch a research program that will investigate countermeasures to the effects of microgravity on colonists. It will collect data on Ganymede citizens currently suffering from health issues and use this to implement measures such as virtual reality simulations to promote motor and sensory functions and exercise regimens. This will solve the UP because it will help to decrease the health issues that citizens of Ganymede are experiencing.
5.	Ganymede Center for Technology Services will implement new silica aerogel infrastructure over the Ganymede settlements. The aerogel will maintain the atmospheric temperature between 295 and 297 Kelvin preferred by Ganymede residents and limit sunlight penetrance. 5 The aerogel will be removed from hydro-farms to allow enough visible light needed for growth of plants. This solves the UP because it helps create favorable conditions that protect the safety of Ganymede residents.
6.	Ganymede Health Services will launch an educational program dedicated to teaching citizens how to maintain their health. The educational program will encourage citizens to wear protective patches preventing exposure to radiation and avoid UV radiation exposure. The program will also encourage exercise to maintain health. This solves the UP because it aids in boosting the health of Ganymede citizens.
7.	Ganymede Coalition of Scientists will collaborate with the government to use genetically engineered algae, bacteria, and plants to maintain favorable atmospheric conditions. These genetically engineered microbes will release gases to thicken the atmosphere in order to prevent excess UV radiation and regulate the temperature of the atmosphere. This solves the UP because it protects the health of Ganymede citizens.
8.	The Ganymede government will collaborate with businesses to form a government-private-public joint venture. This partnership will ensure that security and safety regulations for technologies such as the GanyShuttles and hoverpods are met. In addition, the partnership will regulate nuclear fission-generated energy and other forms of energy. This solves the UP because it protects the safety of Ganymede citizens.

Step 4. Select Criteria

Generate criteria to determine which solution idea does the best job of solving the Underlying Problem and/or addressing the Future Scene situation. Select the 5 most important criteria for measuring solution ideas and write them in the spaces provided.

1.	Which solution will minimize the negative impact of terraforming on the health of Ganymede 1 citizens the most?
2.	Which solution will protect the safety of the citizens of Ganymede the most?
3.	Because terraforming efforts have already endangered the health of colonists on Ganymede,which solution will take the least amount of time?
4.	Which solution will be the most accepted by the citizens of Ganymede?
5.	Which solution will benefit future generations of citizens on Ganymede in the most sustainable and long-lasting way?

Step 5. Apply Criteria

From the solution ideas written in Step 3, select the 8 ideas with the most potential to solve the Underlying Problem and list them on the grid. Use each criterion to rank the solutions on a scale from 1 (poorest) to 8 (best).

Solution Number	Solution Ideas	Criteria					Total
		1	2	3	4	5	
# 1	test and implement forms of alternative energy	3	3	4	1	4	15
# 2	implement E-health services that alleviate loneliness	1	2	5	4	1	13
# 3	virtual reality simulations to promote motor and sensory functions and exercise regimen	2	1	3	5	2	13
# 4	genetically engineered microbes	4	4	2	2	3	15
# 5	new silica aerogel infrastructure	5	5	1	3	5	19

STEP 6. Develop an Action Plan

Development of Action Plan

Develop your top-scoring solution idea into an Action Plan. Thoroughly explain how the Underlying Problem is solved, how the plan will be implemented, and how the Future Scene will be affected.

Ganymede Center for Technology Services will implement new silica aerogel infrastructure over the Ganymede settlements. The aerogel will warm the settlements enough to maintain the atmospheric temperature between 295 and 297 Kelvin preferred by Ganymede residents. It will also limit UV radiation penetrance while allowing visible light to pass through for plants to complete photosynthesis, ensuring sufficient food for the colonists.

Initially, a prototype for the aerogel will be developed for each of the six settlements to enclose residential and commercial areas. In addition, the aerogel's properties will be specifically designed and adapted to Ganymede atmospheric conditions. Next, a six-month trial period will be allocated to test the aerogel in a small section of one of the Ganymede settlements, and changes in atmospheric conditions will be monitored. Once the effectiveness of the aerogel is determined, it will be implemented on a larger scale in the settlements.

The aerogel will be effective in minimizing the negative impact of UV radiation and temperature fluctuations on Ganymede citizens and their future generations. It will also maintain citizens' health in a sustainable and long-lasting way, affecting future generations to come. While the aerogel development may take more time to implement, the positive effects on the health and safety of the colonists will overcome the amount of time required. In addition, while the Ganymede First party may not initially support the development of the aerogel as Blair Legrand proposed the installation of UV shields, the Ganymede First party will eventually agree with the aerogel once they see the positive effects on the health of citizens.

This solves the UP because it helps create favorable conditions that protect the safety of Ganymede residents. The aerogel will provide a sustainable way to maintain and boost citizens' health.