Project round idea:

Terraforming/ Space colonies: The group must present an idea of how to make a planet of choice or moon of choice a habitable place for humans to start a space colony in the far future. It can even be an extrasolar planet if it is suggested to be capable of sustaining life.

The teams must present a feasible plan to convert the planet's atmosphere to become suitable for humans to breathe, or build a space colony that is capable of sustaining human life by harnessing resources from the current environment. The presentation format would be in the form of an exhibition about the proposed plan. Teams are allowed to use any media, be it a power point show, a trailer, a poster, an artwork, a model, a computer simulation, or any combination thereof of this non-exhaustive list to convey this effectively across to the judges and organisers.

- Some potential topics that most would tackle:
- Terraforming Mars (or even Venus but that is more challenging) and changing the climate to become more habitable
- Colonising Titan due to its presence of an atmosphere rich in fuel resources (methane)
- Drilling into Europa, Enceladus, etc. (Moons with underwater oceans) and creating an underwater city
- Terraforming extrasolar planets within the habitable zone

The grading rubrics will have two main components, Content and Organisation.

Content

Content + Q&A (48 Marks)			
Content component	Good! (5-6)	Ok (3-4)	Ugly (1-2, 0 if hopeless)
The destination of choice and the rationale for choosing the destination	Reasonable destination, strong and convincing rationale and evidence that "This is our 2nd home"	Might have loopholes or lack of data/ evidence that might compromise on the feasibility aspect	Wrong choice of location (e.g. gas giant, black hole, too far, etc), or really poor rationale
The various phases of the plan, from initiation to sustenance of the human space colony	Visionary, well-planned for the short and long term, takes into account support and expansion	Might have a few issues that are unaddressed but overall still a good attempt	Lack of planning, lack of consideration for the long run, suicide mission
A sound plan on how to manage air, food, water, energy, waste materials, etc	Very sustainable colony, contingency plans to generate, mine or produce alternative resources	Might not be sustainable in long run or over reliant on support from Earth, but good attempt	No sustainability, inefficient resource management, eventual doom in long run
Technological	Cites technology that	Might rely heavily on	Either:

advancements that makes the mission feasible in one millennium's time	are probable and realistic with current and upcoming technology	speculative science (e.g. advanced robotics, force fields), but still feasible to some extent	A. Retro, obsolete technology B. Unrealistic, pseudo-scientific technology
The science behind your methodology and technology if applicable	Accurate and sound scientific arguments for as rationale	Mostly accurate scientific information with a few gross errors	Inaccurate scientific information or severe lack of scientific foundation
Contingency plans in cases of foreseen emergencies and how to resolve them	Able to recognise highly potential threats in the plan and find reasonable, ethical solutions	Would be good--- but the threat might be unrealistic, or the solutions are unreasonable/ unethical	Unable to recognise threats and issues to the plan, and unable to find reasonable, ethical solutions
Q&A component	Good! (9-12)	Ok (5-8)	Ugly (0-4)
React to emergencies that are unforeseen and come up with a contingency plan	Reacts quickly to the new threat and capable of applying critical thinking to deal with the scenario	Takes a long time to find a good solution/ unable to find the optimal, but still found a reasonable solution	Unable to deal with a new problem or apply critical thinking to salvage the situation

Side note: try to keep Q&A limited to the scope of the project to assess the group's knowledge of their content, as well as their reaction to the given disaster. The team should be given time to discuss and present the solution.

Presentation

Presentation (42 marks)			
Presentation component	Good! (10-14)	Ok (5-9)	Ugly (0-4)
Vocal delivery and communication skills	Team is fluent at speaking and effective at communicating scientific knowledge about their exhibition. Good posture, body language, flair and style when talking/ presenting	Team is relatively fluent at speaking and communication. They might stutter, panic or contradict themselves occasionally, but at least makes an effort to speak out and talk as opposed to keeping quiet when faced with queries	Team is very quiet and unwilling to speak, and consistently rely on their posters, media, etc. for information. Heavy signs of team members being overly nervous or unprepared to talk about the presentation even when prompted
Visual aids, graphs, posters, figures, props, etc.	Media employed is spectacular and sophisticated. Effective at delivering information and	Exhibition has its mix of flaws and strengths. Effort has been put into preparing the media but is not reflected well	Poor use of set-up, unprofessional/ 'last minute' work, contains misleading or inaccurate information;

	presenting their ideas across, with eye-catching designs and accurate information	in the exhibition itself	crude looking and dull even upon close inspection
Group Dynamics	Good! (6-7)	Ok (3-5)	Ugly (0-2)
Teamwork	Members operate in shifts, every person did something, effective communication and co-operation, good allocation of workload	One or two members are not part of the team effort, some lack of communication or arguments between team members	The team is a one-boy/girl show; lack of communication and co-operation between team members
Effort and consistency	Enthusiastic and hardworking in holding the entire exhibition throughout the duration	Enthusiastic and hardworking only at the start or towards the end, or lukewarm effort throughout	Lack of effort and consistency to conduct the entire exhibition

NB: If only one team member is able to present on Day 2 (with valid reason), the grades given to the Group Dynamics Component will purely depend on Effort and Consistency

Bonus marks (10 marks)			
Bonus component	Good! (4-5)	Ok (2-3)	Ugly (0-1)
Innovation and creativity	The team presents a unique solution or a unique approach to a pre-existing idea, without compromising content	Some aspects are unoriginal or innovative, but are reasonably acceptable. Excessive paraphrasing. Might cost them on content if they are unable to account for it	Blatant plagiarism from science fiction or visionary articles about terraforming and space colonisation, OR from another team. Likely to cost them on the overall score as well
Surprise/ wow/ captivating factor	The team's exhibition booth is inherently eye-catching and attention grabbing, and keeps people interested to find out more	The booth might not sustain or generate interest well, but a good attempt at doing so is made	The exhibition booth lacks gimmicks and proper publicity to generate or sustain interest in the passer-by

Examples of what we can ask or throw as (un) foreseen emergencies:

Probable problems: (Not arranged in levels of difficulty to answer, but separated based on nature of matter. Try to avoid asking some of the more obscure questions unless they are able to explain

everything by far and you need to gauge how well they can think. Those marked with ### have strong connections with astronomy in my opinion)

- ### Spaceship loses direction due to errors of the navigation system
- Outbreak of illness aboard the spaceship
- Fuel leakage/ power outage aboard the spaceship
- ### Collision with asteroids and other space objects
- Crash-landing on the surface of the new planet/ moon
- Sudden death of crops or failure of ecosystem aboard the aircraft
- Rebellions, riots, anarchy, etc. aboard the spaceship
- Loss of communication with Earth and the rest of Humanity

- Construction of first settlement delayed
- Segregation, faction forming, political problems on new settlement
- Socio-Economic problems, such as employment, price of goods/ services, unequal resource allocation on the new settlement
- ### Potential environmental hazards on the new settlement (e.g. storms, acid rain, strong ocean currents, droughts, radiation, toxic gases/ chemicals in raw atmosphere)
- Rescue or retreat plan should the planet/ moon turn out to be incapable of sustaining life despite efforts in terraforming or adapting to it
- ### Alternative plan or destination should rescue or retreat become an impossible option

Improbable but interesting problems: (in increasing levels of difficulty)

- Encounter with docile, harmless alien life forms (e.g. plants, plankton, tube worms)
- Encounter with potentially territorial or deadly alien life forms (e.g. large deep-sea creatures, potentially harmful micro-organisms or viruses)
- Encounter with intelligent and sentient alien life forms but without advanced technology
- Encounter with an advanced alien civilisation, docile or hostile