

# CBI A3 Planet Y Narrative

## Mission - Establishing a Community Healthcare Unit on Planet Y

Arrival on Planet Y marks a cosmic milestone, the birth of the first pioneer settlement at the edge of humanity's reach. 1000 brave souls have crossed the cosmic ocean to become the vanguard of a new world. This is a quest of curiosity and fundamental experimentation, expanding human knowledge and challenging our beliefs as a society.

You have touched down on Kepler-452B, a world with challenging weather patterns that alternate between dry and wet seasons. At this moment, you find yourself in the dry phase. The northern and southern hemispheres experience a precarious balance, with average temperatures hovering around 20°C, yet capable of plummeting to 0°C or rising to heights of 40°C. Close to your rocky landing site, a vast water body glistens under alien skies, this is important as your freshwater supplies in your ship are limited to a tank of 500m<sup>3</sup>.

The lake seems to be receiving a continuous water supply from up in the mountains, and there is water leaving the lake through rivers. The lake seems to be on a little plateau at the foot of the mountain, cascades to its end are creating rivers that lead to other lakes on the planet. The lake that you landed next to was measured by the computer on board as you landed. The banana-shaped lake measures a length of 70km, and a depth of around 200m, at its widest point, the lake stretches for 40km, with temperatures averaging 20°C. Even though there is this body of water, there is no vegetation that you can see. Primitive organisms too small for the eye to see, were also recorded by the measurement instruments on board.

Additionally, your ship is supplied with an agricultural unit, capable of delivering 2000kcal/day/person, for the whole crew of 1000 people for the time you will remain there. The 1000 of you can sleep and eat inside the ship for the time being. You can assume that the spaceship will not need additional energy for the duration of your mission.

Your team has been tasked with a crucial and cosmic responsibility: the creation and stewardship of your settlement's healthcare center. Within the limited confines of your interstellar payload, you possess only essential medical equipment and basic pharmaceuticals. Advanced technology, such as X-rays or MRIs, is far beyond your reach here. Still, you are equipped to conduct minor surgical procedures and address the common ailments that may befall your crew as they adjust to this extraterrestrial world.

Your mission to create a healthcare center will be broken into 5 x sub-missions. You can count on 100 people to work under each of your sub-missions, who have volunteered to each of the tasks, meaning you can assume they are either qualified or interested in what they have to do. You can assume the age distribution of Switzerland, with the minimum age of 19 and maximum

of 64. 50% of the crew can be then distributed between the sub-teams that need more human power.

As you are aware, the next ship of volunteers will join you in 15 years, relieving you of your duties and taking over your first settlement. To ensure continuity, half of you will then be able to return back to Planet Earth and the other half will remain and merge with the next crew of settlers, to continue what you started.



Fig.1 Landscape on Planet Y

As cosmic pioneers, your challenge is not merely to respond to emergencies but to cultivate the overall well-being of your community. As you don't have advanced medical equipment, your focus should be on prevention rather than in the treatment of accidents and illnesses. You must design a healthcare system from the ground up—one that can withstand the rigors of Kepler-452B's environment. This involves strategizing infrastructure, ensuring sustainable power and water supplies, and thoughtfully allocating roles and responsibilities among your crew. Together, you must prioritize care, build resilience, and forge a path for the survival of humanity in this distant world.

### Materials available upon landing:

- 500 solar panels of 1.5 m<sup>2</sup>, with an efficiency of 20%.
- 5 stainless steel water tanks with a capacity of 10'000 L each.
- 10 water pumps with an operation voltage of DC10-30V, rated current of 3.6A, max. Flow of 2400L/H, and max. head 8M.
- 1 3D printer capable of producing different types of structures of large dimensions (max. 10m<sup>3</sup>), located inside the spaceship.
- 40 tonnes of aluminium.
- 50m<sup>3</sup> of insulating material.
- 100m<sup>3</sup> of concrete.
- 100 first aid kits with standard medicine and sterilization packs.
- 1 Power inverter of 20kW.

An unmanned cargo ship is coming your way in a month from now, capable of carrying 5000kg worth of supplies. You need to send a request to ground control containing which materials you need to be prepared for the healthcare unit.

## Kepler-452B Characteristics

- **Star:** Orbiting a G2V star.
- **Mass and Radius:** 4.33 times Earth's mass, 1.63 times Earth's radius, gravity on the surface  $16 \text{ m/s}^2$
- **Temperature and Radiant Flux:**  $T_{\text{eq}} = 262 \text{ K}$ , radiant flux = 1.11 times Earth ( $1510 \text{ W/m}^2 \text{ TOA}$ ).
- **Year Length:** 384.8 Earth days.
- **Day Length:** Approximately 24 hours.
- **Atmosphere:** 21%  $\text{O}_2$ , 70%  $\text{N}_2$ , 8% Ar, 1% other gases. Atmosphere absorption 15%, similar to Earth.
- **Distance from Earth:** 1402 light years.

You are divided in the following sub-missions:

### 1. Patient journey and ethics

Consider how you are prioritizing patients' intake and care, how the journey of a patient is and what health constraints and hazards are present, especially related to the potential rationing of resources.

**Team: Rosa/Anoop/Janki/Niklas**

**Facilitator(s): Andreea & Lauren**

### 2. Health and wellbeing

Consider common diseases, accidents, nutrition, mental health, and general well-being. Consider who is more susceptible to what and how different needs from the roles of community interfere with these decisions.

**Team: Eugenia/Cori/Ralf**

**Facilitator(s): Kirstin**

### 3. Power supply construction

Plan and build a power supply system for the healthcare unit. Consider the energy needs of the other submissions, materials given, and seasonal changes on the planet.

**Team: Ann-Kathrin/Fatma/Nick/Carson**

**Facilitator(s): Ole**

### 4. Potabilization, hygiene and sanitation

Consider everyday hygiene and sanitation issues, and those specific to a healthcare unit based on the services and functions that are decided to be offered.

**Team: Claudia/Valerio/Nico/Surbhi**

**Facilitator(s): Catarina**

### **5. Healthcare unit construction**

Consider the planning, building and resources that need to input and output from the healthcare unit, based on the needs of community and geographical constraints including the position of the unit within the settlement.

**Team: Fabian/Shreeyya/Mark/Shannon**

**Facilitator(s): Christine & Aaron**

## **Process:**

All sub-teams will need to negotiate the water needs of the various functions and features of the healthcare unit, and generate different ideas for realising a healthcare unit for the settlement. You will be self-paced and self-directed over the week, with some suggesting progress milestones for the end of each day to help guide you. Coaching on demand can support you with suggestions for tools and frameworks if you get stuck, and quick estimations (net impact calculations) of relevant aspects (e.g. volume of water, power, frequency of procedure/treatment, etc.) should be used as part of your process.

- Design for the now, plan for the future
- Considering this society on the planet will be built in batches of 1000 people, what do you think the next crew arriving to Planet Y should focus on

## **Outcomes/Deliverables:**

Friday, you will at mission level, present one cohesive, final overall design for a healthcare unit. Consider how the various sub-mission topics have been integrated. It is important that you demonstrate how water is featured in all systems. You may choose your methods of how you will use physical prototyping to demonstrate what the systems are and how they work. Ensure that you use net impact calculations to indicate that your ideas are in the realms of possibility (not Harry Potter). You may choose how you use slides and/or video content to aid communicating your healthcare unit design. You should provide justification on your decisions, the assumptions you have made and any overarching principles that guided your design.

Your presentation will be to the CBI A<sup>3</sup> and IdeaSquare community, lasting 30 minutes with another 30 minutes for discussion and feedback.