Spectra II: Astronomy Module (Work in Progress)

Theme: Sci Fi

Time Period: Future - Year 2125

Setting:

In the year 2125, Earth stands on the brink of collapse. A failed temporal propulsion experiment — meant to shorten interstellar distances using relativistic field compression — has fractured spacetime near Jupiter. The disturbance disrupted solar radiation balance and gravitational stability, bringing erratic seasons and widespread famine to Earth.

To survive, humanity launches interstellar expeditions through the fractured zone — seeking habitable worlds, new resources, or a way to repair the damage.
However, once the explorers pass through the distortion field, communication with Earth becomes impossible. They can no longer send or receive messages backward through time.

Theme Overview

The Astronomy Module merges realistic space science with immersive storytelling.
Participants will experience the physical and emotional challenges of space exploration — communication delays, thermal hazards, and engineering limitations — all within the boundaries of real physics.
Each round represents a different stage of the crisis: the struggle to return home, and the effort on Earth to bring them back.

Module Structure

Round 1

Theme: Interstellar Navigation, Time Delay, and Human Endurance
Scientific Focus: Relativity, light-time communication, astrobiology, and mission coordination
Target: Reach Earth fastest by solving a series of space-science challenges.

Round Explanation

Participants play as the **crew of an interstellar expedition** returning from the far side of the spacetime fracture. Their ship is losing stability, fuel is running low, and time behaves irregularly — seconds stretch and collapse unpredictably.

The goal: reach Earth in the least possible "mission time."
To do so, they must progress through a sequence of scientific and logical challenges, each representing an obstacle along their journey — decoding transmissions, navigating unstable orbits, identifying habitable planets, and maintaining communication within the crew despite time distortion.

Spectra II: Astronomy Module (Work in Progress)

Experience Design

- The round is **physically active** — students move between stations or zones, each representing a stage in the journey home.
- Some zones may simulate **"time dilation"** — clocks run faster or slower, instructions are delayed, or teams must repeat tasks under changed time conditions to *feel* the distortion.
- Communication between team members can be **restricted or delayed** to simulate deep-space transmission lags.
- The **environment** (sound, lighting, and pacing) will immerse participants in the sensation of a collapsing spacetime field.

Challenges (Story-Linked, Will Be Refined with Team)

1. Decode the Distorted Signal
2. Handle Delayed Communications
3. Analyze Habitable Worlds
4. Plot the Fastest Return Path

Each completed challenge unlocks the next stage of the journey.
The team that reaches "home" fastest — balancing speed, accuracy, and scientific reasoning — wins the round.

The storyline and exact challenge list for this round will be collaboratively developed by the astronomy module team.

Round 2

Theme: Rocketry, Thermal Engineering, and Survival on Earth
Scientific Focus: Heat transfer, insulation, propulsion systems, and material optimization
Target: Design and test an efficient thermal protection system to keep rockets operational.

Round Explanation – What Happens

Back on Earth, famine spreads and launch facilities are failing.
The Interplanetary Science Council gathers engineers — the participants — to repair the last remaining launch vehicles that can reach the returning crew.

In this hands-on engineering round, teams must build and test a cooling or insulation mechanism that can protect a rocket's engine core under extreme thermal stress.
The heat source (a blow torch or heat gun) simulates atmospheric re-entry and launch stress.

Experience Design

- Teams receive identical materials (foil, cotton, gel packs, salt, water, cardboard, etc.) and must construct an optimized cooling system.
- The core (a metal bolt, ball, or capsule) is exposed to heat for a fixed time.

Spectra II: Astronomy Module (Work in Progress)

- Internal temperature is measured.
- Teams must balance weight, strength, and cooling efficiency — just like in real spacecraft engineering.

After testing, teams present short reasoning on why their system worked, referencing physics concepts like conduction, convection, radiation, and phase change.

Spectra II: Astronomy Module (Work in Progress)

Challenges: