NASA SPACE APPS CHALLENGE 2026

Space Mission Design Game

Design the spacecraft. Survive the flight. Learn why it worked.



What It Does



1. Select

Pick a mission scenario such as Lunar Ice Hunter or Mars Climate Orbiter.



2. Design

Choose orbit, power, comms and instruments while a live 3D model builds.



3. Launch

Pilot the craft in an arcade flight and survive solar flares and micro-meteoroids.



4. Debrief

Read why the mission succeeded or failed, then earn XP and leaderboard rank.

Live dashboard tracks mass, budget, power use and data rate throughout.

Benefits & Impact

Improve one metric, penalize another.

Abstract aerospace constraints become immediate, visual gameplay.



Theory meets practice

Bridges classroom learning and real mission operations.



Experiment, fail, iterate

Students build intuition for systems engineering by trying things.



Inspire the next generation

Teaches the teamwork and trade-offs behind real space exploration.

Tech Stack



Frontend

HTML5, CSS, vanilla JS. Canvas for mini-games, Three.js for the 3D builder.



Backend API

Python, FastAPI and SQLite for profiles, XP and the global leaderboard.



Physics Evaluator

Zero-dependency Java 17+ anti-cheat that recalculates the max possible score.



Deployment

Containerized with Docker for easy deployment and testing.

Creativity & Innovation

Arcade mini-games

Gameplay replaces menus and spreadsheets to keep learning engaging.



Asteroid defense



Docking timing



Signal sequence repeat

Cooperative team mode

Up to four players share one pool of spacecraft resources and must negotiate.

- Mission Lead
- Power Engineer
- Comms Engineer
- Science Lead

Design Factors



Accessible

Easy, Normal and Hard tiers plus a Sandbox mode with no constraints, so every skill level can experiment.



Fair

The frontend cannot alter scores. The Java evaluator verifies every submission before it is recorded.



Clear

Visual indicators over dense text. Meters turn red when limits are breached, teaching physics organically.

MISSION SUMMARY

Design. Launch. Learn.

Live 3D builder and dashboard, co-op play for four, and an anti-cheat verified leaderboard.

