

Exoplanet Habitability Council

The Scenario

The year is 4035, and humans have turned Earth inhabitable. But luckily for us we just found a wormhole (a theoretical construct which allows you to travel from one point in space to another without actually traversing the whole distance – just like Doraemon's "Any Where Door") near our moon which allows us to travel to a different galaxy such that we are now within reachable distance of five solar systems. You are a member of the Interstellar Habitability Assessment Council, tasked with evaluating which of five newly discovered exoplanets should receive priority for detailed study and potential contact missions.

The Candidate Planets

A. KEPLER-442C

- **Host star:** K-type orange dwarf, 0.61 solar masses
- **Planet details:** 1.34 Earth radii, 385-day orbit, receives 70% of Earth's stellar energy
- **Atmospheric hints:** Possible water vapor signatures detected
- **Special notes:** Host star shows a lot of flare activity

B. TRAPPIST-1f

- **Host star:** Ultra-cool red dwarf, 0.09 solar masses, very long-lived but flare-prone
- **Planet details:** 1.05 Earth radii, 9.2-day orbit, tidally locked
- **System context:** Part of a 7-planet system with highly complex gravitational interactions
- **Atmospheric modelling:** Could maintain liquid water on the "twilight zone"

C. HD 40307g

- **Host star:** K-type dwarf, 0.81 solar masses, metal-rich
- **Planet details:** Super-Earth, 2.3 Earth radii, 198-day orbit
- **Composition clues:** Likely rocky with possible thick atmosphere
- **Magnetic field:** Strong magnetic field detected via radio emissions

D. Proxima Centauri C

- **Host star:** Red dwarf, 0.12 solar masses, highly active with frequent flares
- **Planet details:** 1.17 Earth radii, 11.2-day orbit
- **Proximity advantage:** Only 4.24 light-years away
- **Challenges:** Large tidal waves due to complex gravitational interactions

E. To1-7L5b

- **Host star:** Late M-dwarf, 0.19 solar masses, relatively quiet
- **Planet details:** 1.55 Earth radii, 19.3-day orbit, in conservative habitable zone
- **Recent discovery:** Found by TESS mission, follow-up observations pending
- **Temperature modelling:** Could support liquid water with modest greenhouse effect

Deliverable

Submit your individual ranking with detailed justification for each planet.