



ExploreMars.Org presents:

THE 2025 MARS INNOVATION CHALLENGE

Overview:

Explore Mars, Inc. is thrilled to announce the 2024/2025 Mars Innovation Challenge, open to K-12 students (ages 5-18) worldwide. This challenge, which can be undertaken individually or in teams, centers on developing innovations that help humans thrive on Mars and emphasizes the alignment with the United Nations Sustainable Development Goals, that are vital for life on Mars and have significant relevance to Earth's sustainability.

The Mars Innovation Challenge invites students to engage in cutting-edge problem-solving related to future Mars exploration, with focus on three key areas:

- ▶ Martian Planetary Protection,
- ▶ Human Medicine & Genetic Modifications
- ▶ Martian Sample Return Integrity.

Participants should also incorporate exploration ethics and the 7 Generations Principle. This Native American principle urges us to consider the long-term impacts of our actions on future generations—specifically, how today's decisions will affect people living seven generations from now.

The challenge, in collaboration with Thrive Games and their blockchain game THRIVE ON MARS, encourages participants to be creative and practical, addressing real challenges for future Mars inhabitants. In combination with a \$1500 cash award, the winning innovation will be featured in the THRIVE ON MARS game, offering an exciting opportunity for young innovators to impact both space exploration and global sustainability!

Registration

The contest is open globally to students K-12 (age 5-18).

Participants/Teams will be grouped via the following Grade/Age Levels:

K-2 (age 5-8) 3-5 (age 9-11) 6-9 (age 12-15) 10-12 (age 16-18)

Students can register individually, or as a team, or teachers can register their entire class at:

<https://ExploreMars.Org/Mars-Innovation-Challenge/>

REGISTRATION AND SUBMISSIONS OPENS NOVEMBER 1, AND CLOSES FEBRUARY 28, 2024

Challenge flow, step by step

Step 1. Choose one specific challenge out of three challenge topics above. Choose a team name.

Step 2. Set your goals, assign team roles, come up with the list of questions. Driven by the questions, decide on the materials and equipment, find mentors and devise your project flow.

Step 3. Prepare your team's submission with three deliverables (below). Choose the name for your innovation solution.

Step 4. Submit your deliverables for your age/ challenge group, using the submission buttons on the site, along with the Media Consent and Intellectual property form included in the Welcome Kit (requires Google account for submission). If you are unable to sign up please contact mission-contorl@exploremars.org and we'll work with you to assist with your participation in the Mars Innovation Challenge.

Deliverables

- ▶ A pitch deck presenting their innovation, including a mission statement, problem definition, proposed solution, and potential impact, that includes your visual drawing, CAD, PhET simulations or prototype. (You do not have to build a working prototype, but can make it out of recycled materials, legos, Minecraft etc..) Make sure that your submission clearly represents your innovation for a person not familiar with the subject. Provide a legend for all symbols used in your infographic materials. Explain why you chose this particular representation/prototype. Cite all resources and reference material and list all participants names and mentor and teacher on Cover Page.

Word count requirement for different age groups:

1. **K-2** 150-200 words

2. **3-5** 250-400 words

3. **6-9** 500-750 words

4. **10-12** 1000-1200 words

- ▶ A working budget outlining resource usage (e.g., power, technology, human labor) to help students understand the financial and logistical elements involved in real-world space exploration. You may want to use Google docs, Excel, Power BI or other visualization software.
- ▶ A detailed ethical analysis with feedback loop visualization that considers the long-term effects of your proposal on both Mars and future human generations.

Please record a 2-5 minute video pitch of yourself/crew explaining how your Mars Innovation Solution works, how it will be implemented, and how it has positive repercussions for humans on Earth. Reflect on how your innovations could affect the future of Mars, Earth, and humanity. How can we ethically explore a new world while preserving its potential for future use and study? What responsibilities do we hold toward future generations of both Earth and Mars inhabitants? <https://www.firstpitch.com.au/how-to-pitch.html>

Make a list of unsolved questions (in pdf) that you and your team want to ask an expert on the given topic that arose during the work on the project. Focus on the unknown, don't be intimidated...ASK ANYTHING...this is how we learn and discover. Best submitted questions will be featured on the Mars Innovation Challenge podcast!

Introduction to Innovation Challenge 2024 Topics:

- ▶ Human Medicine & Genetic Modifications
- ▶ United Nations Sustainable Development Goal #3: Good Health and Wellbeing
- ▶ Martian Planetary Protection
- ▶ United Nations Sustainable Development Goal #15 Life on Land
- ▶ Martian Sample Integrity
- ▶ United Nations Sustainable Development Goal #12 Responsible Consumption and Production

Challenge 2024 Topics in detail:

1. Planetary Protection

Objective: Ensure that human exploration of Mars does not irreversibly impact its natural environment and further consider upon a Mars sample return how do we protect Earth from any microorganisms or unknown bacteria from Mars does not affect or impact the life and environment of Earth. Participants will explore ways to prevent contamination between Earth and Mars while allowing for scientific exploration.

Research Focus:

- Survival and potential evolution of Earth microorganisms in Martian conditions
- Development of efficient sterilization techniques for spacecraft and habitats
- Long-term effects of human activities on the Martian environment
- Cross-contamination prevention strategies between Earth and Mars
- Ethical considerations of altering Martian environments
- Legal frameworks for planetary protection in commercial space activities
- Balancing exploration with contamination prevention in international law

Deliverable: A comprehensive plan or prototype to mitigate contamination risks while advancing exploration goals.

2. Human Medicine & Genetic Modifications

Objective: Address the physiological challenges humans will face during extended stays on Mars, including how we can adapt the human body to Martian conditions.

Research Focus:

- Genetic modifications to enhance human resilience in low-gravity, non-terrestrial environments
- Ethical considerations in modifying human biology for space survival
- Mitigating the effects of radiation and isolation on long-term health
- Innovations in medical technologies for remote diagnostics and care
- Applicability of transhumanism approach for planetary exploration

Deliverable: A proposal outlining medical or genetic solutions to key challenges faced by humans on Mars, considering both the science and ethics of human modification.

3. Sample Integrity

Objective: Ensure that Mars samples brought back to Earth by NASA Mars Sample Return Program and other missions retain their scientific integrity while preventing any potential cross-contamination.

Research Focus:

- Development of containment technologies for Martian samples
- Preservation of sample purity and integrity in different environments (Earth, space, and Mars)
- Innovations in safe transport and storage of extraterrestrial materials
- Balancing scientific inquiry with planetary contamination prevention

Deliverable: A design or protocol for safe sample handling, transportation, and analysis that preserves sample integrity while balancing scientific inquiry with planetary contamination prevention.

Competition Rubric

- ▶ 40%: FEASIBILITY: How it will work, how it will help humans on Mars, and how well it adheres to, and furthers, the Sustainable Development Goals established by the United Nations to help benefit humans on Earth.
- ▶ 20%: CREATIVITY: of your Video Presentation Mars Innovation Solution
- ▶ 20%: QUALITY: of your written essay about your Mars Innovation.
- ▶ 20%: APPLICABILITY: of incorporating operational details, assembly processes, and addressing potential vulnerabilities in your design for the Thrive on Mars game.

Rules and Code of Conduct

Naming Your Innovation: Each submission should have a unique name and title.

- ▶ Originality: Entries must be original. Plagiarism or use of copyrighted material leads to disqualification.
- ▶ Appropriate Content: No inappropriate content. Submissions that violate this rule will be ineligible and will not be considered for judging.
- ▶ AI Usage Transparency: ExploreMars.Org, Thrive on Mars, and Janet's Planet acknowledge the significant role AI can play in innovation when used thoughtfully and ethically. Teams using AI must clearly state which AI tools they used and specify their application within their project.
- ▶ Reflective Briefing on AI Impact: Teams must also provide a detailed briefing that discusses their learning experiences from AI usage and how it influenced their project's development.
- ▶ Privacy and Safety: Do not include your full name, address, school name, phone number, or place of residence in your submission. This information should only be entered in the Media Consent Release filled out by your grown-up or guardian. Submissions will be reviewed for eligibility, compliance, privacy, and student safety prior to being displayed in the gallery.

In your written essay, please write the name of your innovation and include all references and every team member and mentor on the cover page.

AWARDS and RECOGNITION

AWARDS: All eligible teams will receive an Explore Mars Completion Certificate. In addition, Presentations/Art/Images/Essays will be shared on social media platforms including Explore Mars and Janet's Planet.

- ▶ Ten semifinalists will receive a group Zoom with Mars Subject Matter Experts, and the finalist from each category will win a one-on-one virtual session with a Mars Subject Matter Expert.
- ▶ The top five innovation challenge winners and ideas will have their videos played during the 2025 Humans to the Moon & Mars Summit (H2M² 2025).
- ▶ The overall (1st place) winner (individual/team) of the Mars Innovation Challenge will receive a cash award of \$1500 and an invitation for the student/team and one chaperone to present their winning Mars Innovation Challenge Solution in person at the 2025 Humans to the Moon & Mars Summit (H2M² 2025), May 28-29, 2025 at the National Academy of Sciences Building in Washington D.C. *(Admission fees for the winning student/team and one chaperone to the H2M² 2025 conference are waived, but any and all travel, accommodations, and other expenses to attend the conference are the responsibility of the winning student/team and chaperone.)*

All eligible participants are invited as guests (admission fees waived) of Explore Mars, Inc. to attend H2M² 2025!