



**Space
Center
Houston**

**Mission
Innovation
Challenge**

Competition Guide

Elementary School

2026-2027 Mission: Lunar Dust Defense

CHALLENGE OVERVIEW

NASA's Artemis missions are preparing astronauts to return to the Moon and build the skills, systems, and technologies needed for future exploration. As crews live and work near the lunar South Pole, they will rely on spacesuits, rovers, habitats, science tools, power systems, and other equipment to complete their mission safely.

One major challenge is lunar dust. Lunar dust is very fine, abrasive, and clingy. It can cling to spacesuits, scratch surfaces, block seals, cover solar panels, interfere with tools, and follow astronauts back toward living spaces. A small dust problem can quickly become a mission problem.

How might we prevent, remove, capture, or manage lunar dust so astronauts can safely live and work on the Moon?

In this Mission Innovation Challenge, students will research the lunar environment, identify a specific dust-related problem, and develop an innovative solution that supports future Artemis missions. Teams may focus on spacesuits, habitats, rovers, tools, science instruments, solar panels, crew health, or another mission system affected by lunar dust.

ELIGIBILITY

Who Can Enter:

Students in K–12 (public, charter, private, homeschool, and community-based programs are all welcome).

Entry Type

Individual or team entry.

Team size: 2–5 students.

Grade Divisions

K–5, 6–8, 9–12.

Entry Limits

One submission per student (either solo or on one team). One slide deck per team.

Original Work

Entries must be the team's **own original work**. Properly credit all sources and images used.

PRIZES

Top Innovators will receive two general admission tickets to Space Center Houston and a virtual chat with an astronaut. Top Innovators will be chosen from Individual and Group Submissions.

CHALLENGE TIMELINE

Mission Innovation Challenge runs as a semesterly challenge.

Milestone	Fall Semester Cycle	Spring Semester Cycle
Challenge Launch	September 3 rd , 2026	January 14 th , 2027
Submissions Due	November 5 th , 2026	March 18 th , 2027
Virtual Awards Ceremony	November 19 th , 2026	April 1 st , 2027

OBJECTIVE

Design and share an idea that helps astronauts prevent, remove, capture, or manage lunar dust during Artemis missions on the Moon.

Your project should:

- Explain the lunar dust problem and who will use your idea.
- Show how your idea protects astronauts, spacesuits, habitats, rovers, tools, science equipment, or power systems.
- Include a picture or drawing that shows how the idea works.
- Tell why your idea is important and how it helps the Artemis mission.

DELIVERABLES (ONE SLIDE DECK PER TEAM)

Acceptable presentation formats include:

- Microsoft PowerPoint
- Google Slides
- PDF (Word or Google Document)

Acceptable video formats include (video can be included in your presentation):

- MP4
- MOV
- AVI

Maximum Slide Deck Count: 8 slides

Required Sections (use these as slide titles)

1. TITLE & TEAM

- What is the name of your idea?
- Who is on your team?
- What grade and school are you from?

2. MISSION CONTEXT & USERS

- What problem are you solving?
- Where will this be used (space suit, habitat, rover, solar panel, tool, science instrument, or other Moon system)?
- Why is it important to solve this problem for Artemis astronauts?

3. CRITERIA & CONSTRAINTS

- What must your idea do to work well?
- How would you test your idea to see if it works? If your test did not work, how would you make your idea better and try again?
- How will you know your idea works? For example, does it keep dust away, remove dust, collect dust, protect equipment, save astronaut time, or help keep astronauts safe?
- What limits do you have (size, weight, power, safety, crew time, dust storage, Moon environment)?
- Which limit is the hardest to solve?

4. CONCEPT OVERVIEW & VISUAL — HOW IT WORKS

- How does your idea work, step by step?
- What makes it special or different?
- What materials or parts would it need?
- Include a drawing or diagram.

5. IMPACT & WHY THIS DESIGN

- How will this help astronauts or protect mission equipment?
- What trade-offs did you think about (e.g., smaller but slower)?
- If you had more time, how would you make it even better?

6. REFERENCES & CREDITS

- What sources helped you?
- Who created each image or drawing?
- Who helped you (teachers, parents, friends)?

Judging Criteria

Criteria	Description	Percentage
Mission Context & Users	- Clearly explains the lunar dust problem the team is solving. - Explains where the idea will be used, such as a spacesuit, habitat, rover, solar panel, tool, science instrument, or other Moon system. - Explains why solving this problem is important for Artemis astronauts.	20%
Criteria & Constraints	- Explains what the idea must do to work well. - Explains how the team would test the idea to see if it works. - Describes how the team would make the idea better and try again if the first test did not work. - Explains how the team will know the idea works, such as keeping dust away, removing dust, collecting dust, protecting equipment, saving astronaut time, or helping keep astronauts safe. - Identifies important limits, such as size, weight, power, safety, crew time, dust storage, and the Moon environment. - Identifies which limit is the hardest to solve.	20%
Concept Overview & Visual	- Clearly explains how the idea works step by step. - Explains what makes the idea special or different. - Identifies the materials or parts the idea would need. - Includes a clear drawing, diagram, or visual that helps judges understand the idea.	30%
Impact & Why This Design	- Explains how the idea will help astronauts or protect mission equipment. - Identifies at least one trade-off the team thought about, such as smaller but slower, safer but heavier, or easier to use but harder to build. - Explains how the team would make the idea even better if they had more time.	20%
References & Credits	- Identifies the sources that helped the team. - Credits images, drawings, or diagrams clearly. - Explains who helped the team, such as teachers, parents, or friends.	10%

KEY VOCABULARY

- **Lunar Dust:** Tiny pieces of Moon soil and rock that can stick to surfaces and damage equipment.
- **Regolith:** The loose dust, soil, and broken rock found on the surface of the Moon.
- **Artemis:** NASA missions that will help astronauts return to the Moon and prepare for future Mars exploration.
- **Habitat:** A place where astronauts live and work in space or on the Moon.
- **Spacesuit:** Special clothing and equipment that protects astronauts while they work outside a spacecraft or habitat.
- **Rover:** A vehicle astronauts or robots can use to travel on the Moon.
- **Criteria (Must-Haves):** What your idea must do to be a success.
- **Constraints (Limits):** Rules or limits like size, weight, power, safety, crew time, or the Moon environment.
- **Mass:** How heavy something is.
- **Volume:** How much space something takes up.
- **Power:** Energy needed to run a device.
- **Crew Time:** How much astronaut time it takes to use, clean, or fix something.
- **Maintainability:** How easy it is to keep something working.
- **Trade-Off:** Choosing one good thing even if it means another thing is not as good.
- **Mitigation:** A way to reduce a problem or make it safer.

Resources

The Moon and Lunar Dust

- <https://science.nasa.gov/moon/moon-dust/>
- <https://science.nasa.gov/biological-physical/earth-soil-vs-lunar-regolith-whats-the-difference/>
- <https://science.nasa.gov/moon/composition/>

Artemis Missions and NASA Technology

- <https://www.nasa.gov/humans-in-space/artemis/>
- <https://www.nasa.gov/centers-and-facilities/kennedy/nasa-technology-helps-guard-against-lunar-dust/>
- <https://science.nasa.gov/solar-system/moon/phenomena-nasa-astronauts-will-encounter-at-moons-south-pole/>