MARS PERSEVERANCE

Please note: This webinar is being recorded. We will begin at 8:30 a.m. PT

Mission to Mars Student Challenge

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Education Office

NASA Jet Propulsion Laboratory

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Let's Learn about Each Other

POLLS

What are the grade levels of the youth in your program?

- K-2
- 3-5
- 6-8
- 9-12

What kind of program are you running this spring/summer?

- In-person
- Virtual/At-home
- Both

What is your experience delivering STEM activities?

- I'm thinking about trying it
- I'm planning on this being my first time
- I've done it every now and then
- It's a regular part of our program
- I've done it for several years

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The Big Idea

Lead students in designing and building a mission to Mars with an education plan and resources from NASA. Then land with the Perseverance Mars rover on February 18!

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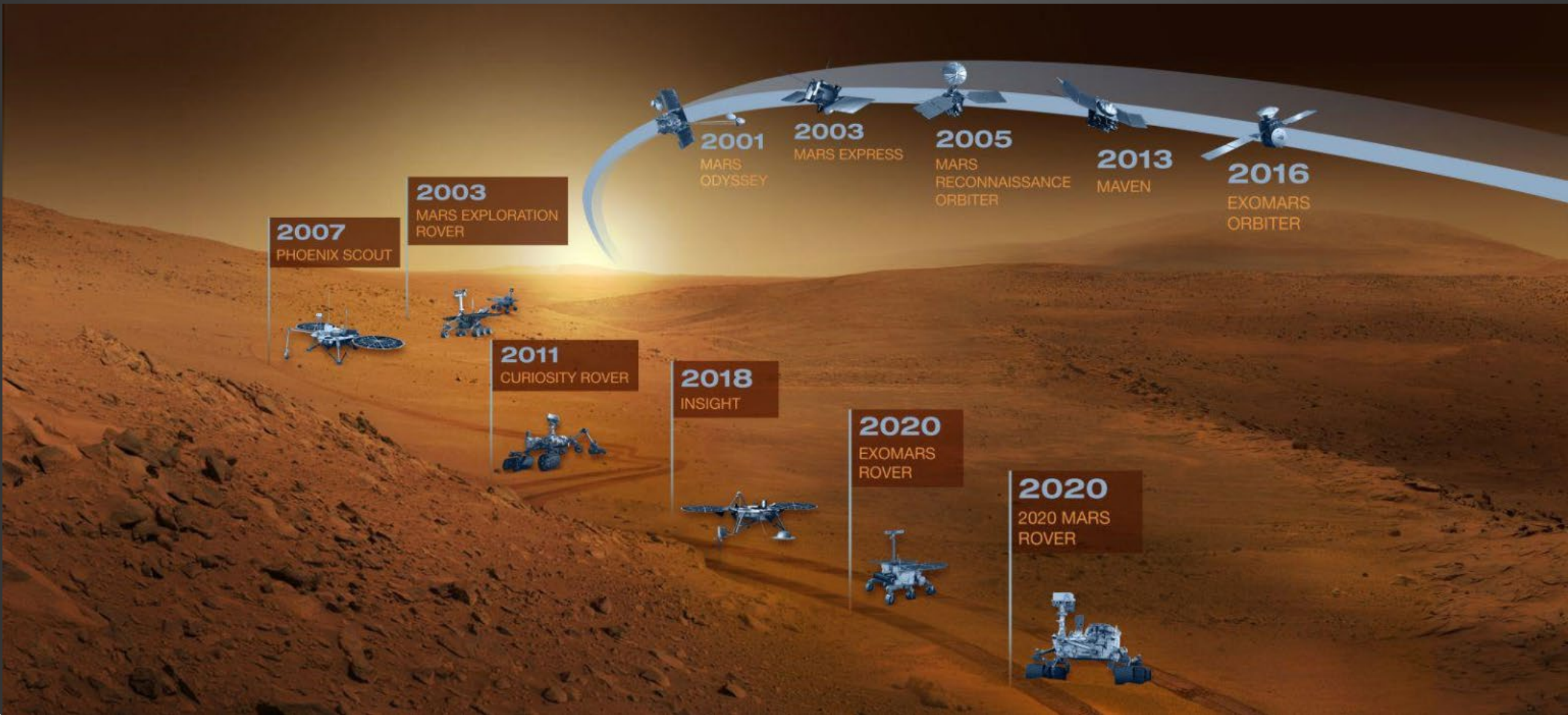
Goals

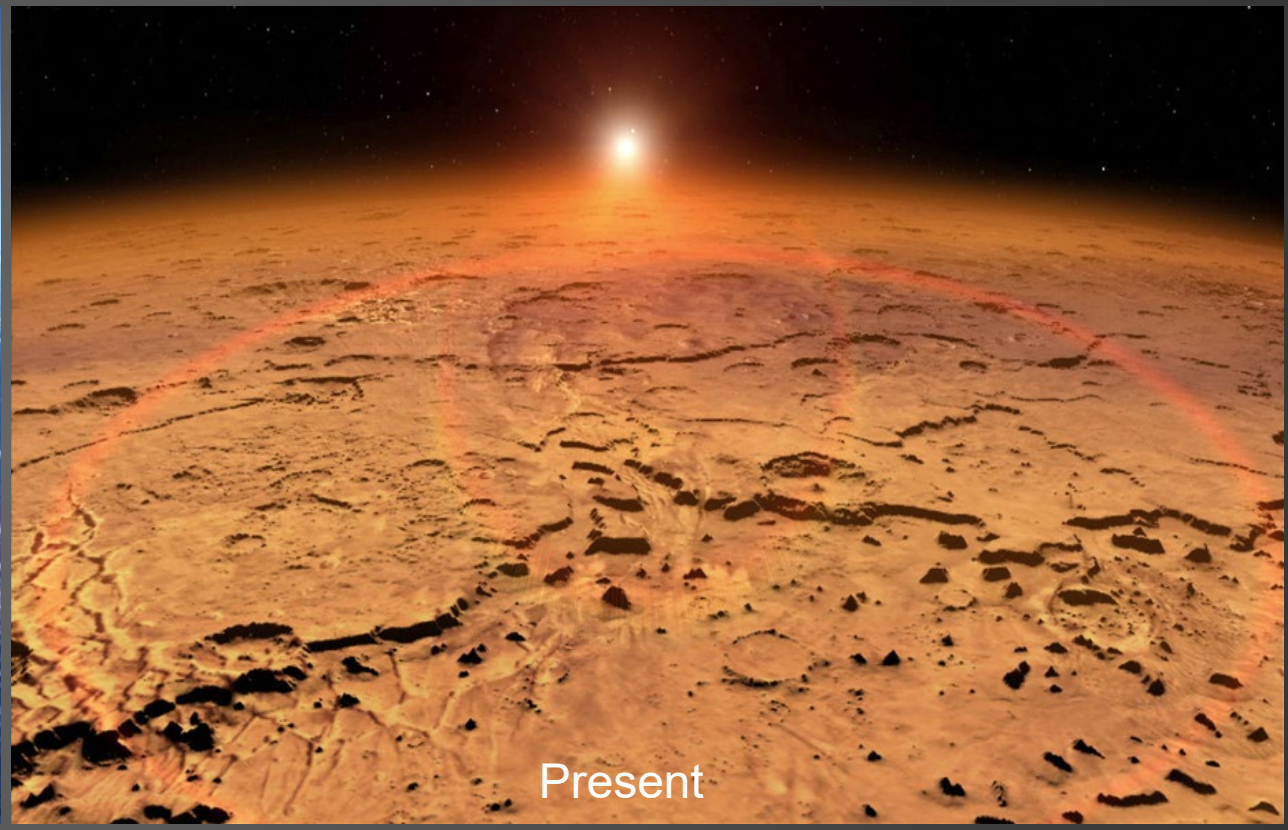
- Engage K-12 students in all 50 states
- Involve underserved communities
- Raise awareness of the ‘teachable moment’ of landing on Mars


Perseverance is Coming to Mars in 2021!

Past Mars missions have followed the water, building on each other's knowledge and discoveries.

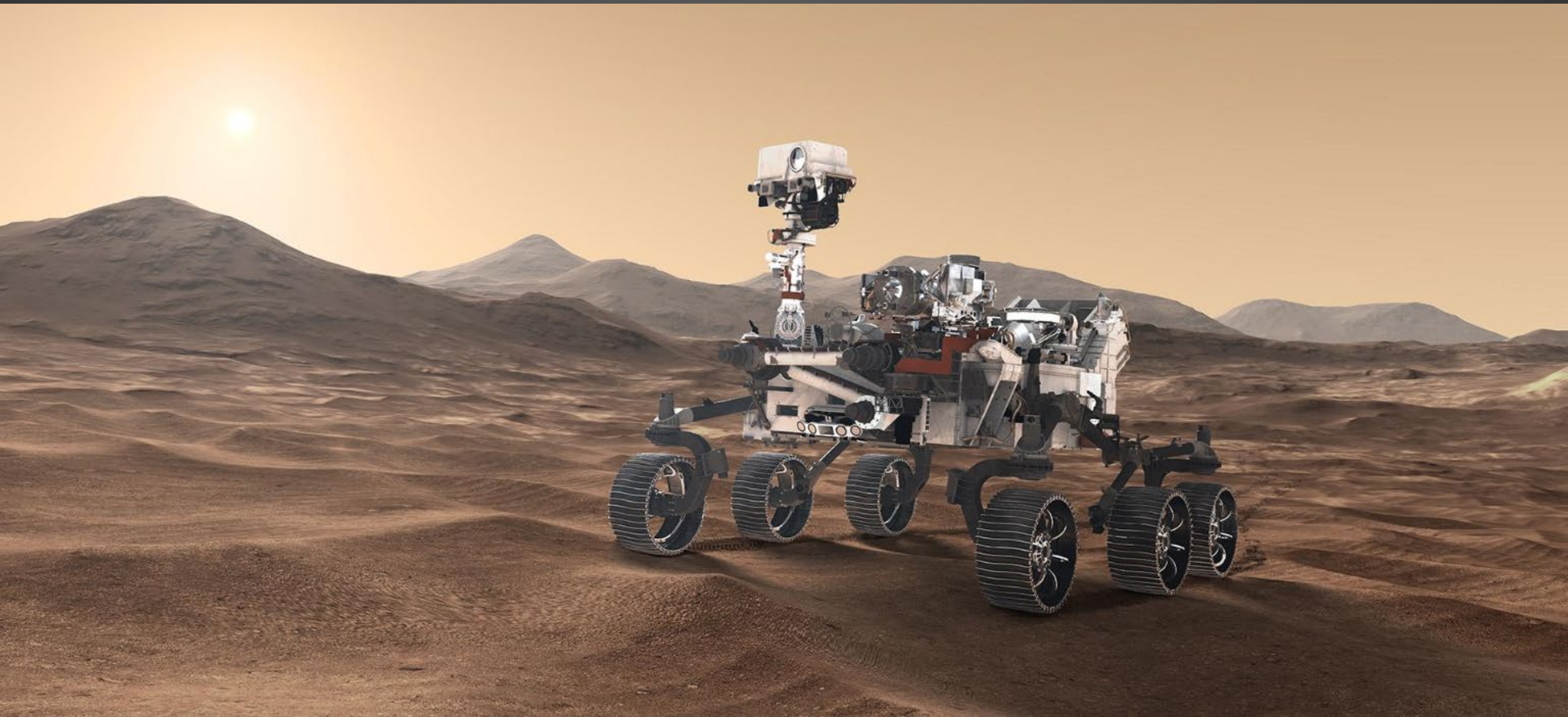


There's plenty of evidence that water flowed on Mars in the past.



We know that the planet was wet and habitable. Mars had all the basic building blocks of life, which still exist on the surface today.

We want to answer the question:
Did Mars ever have life?



This rover will look for rocks with the potential to teach us about the possibility of life on Mars.

It will pick the best samples and store them on the surface for potential future return.

Rock samples are key to teaching us about past life.

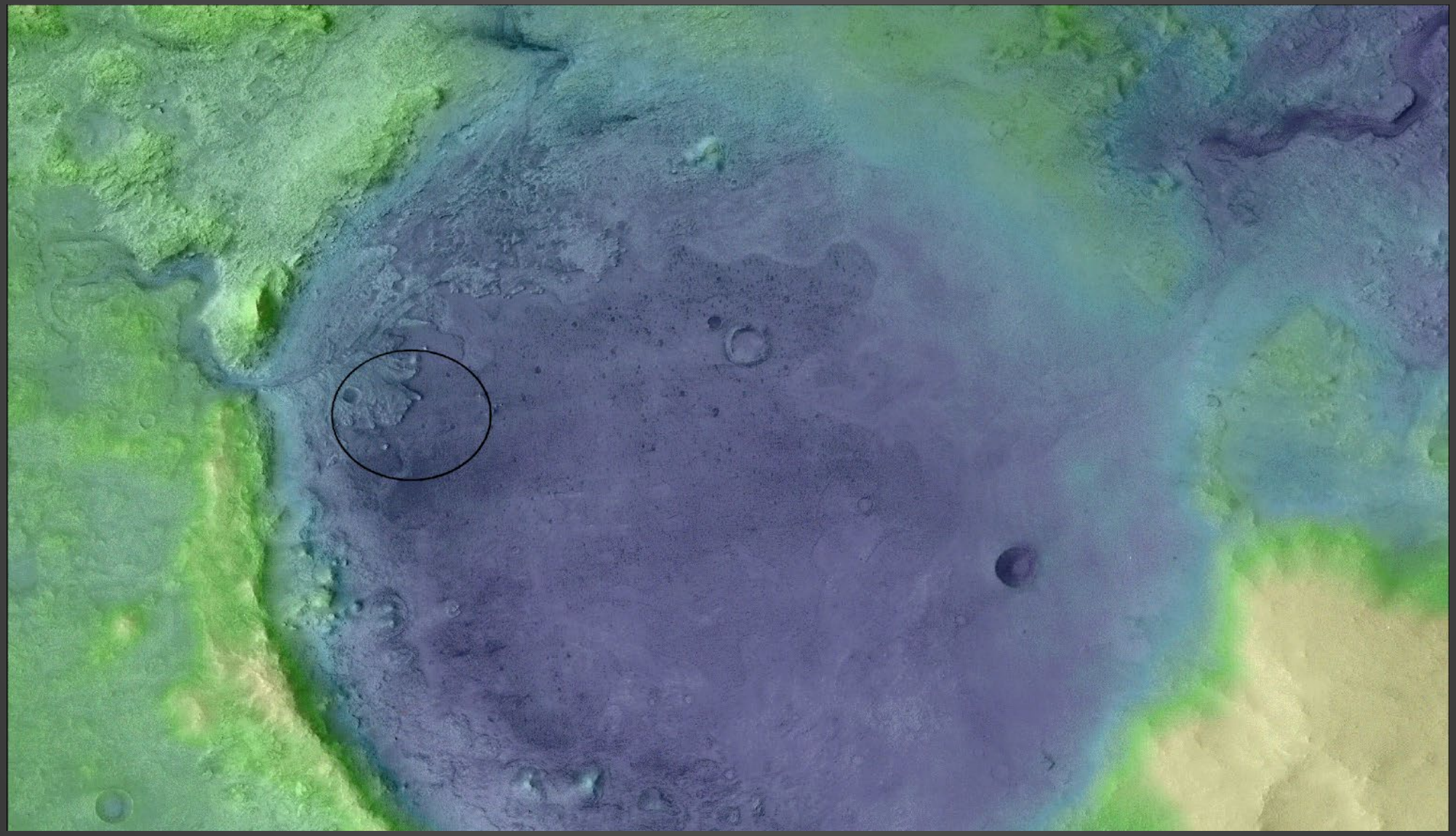
If we brought them back someday, we could find out what's really inside.

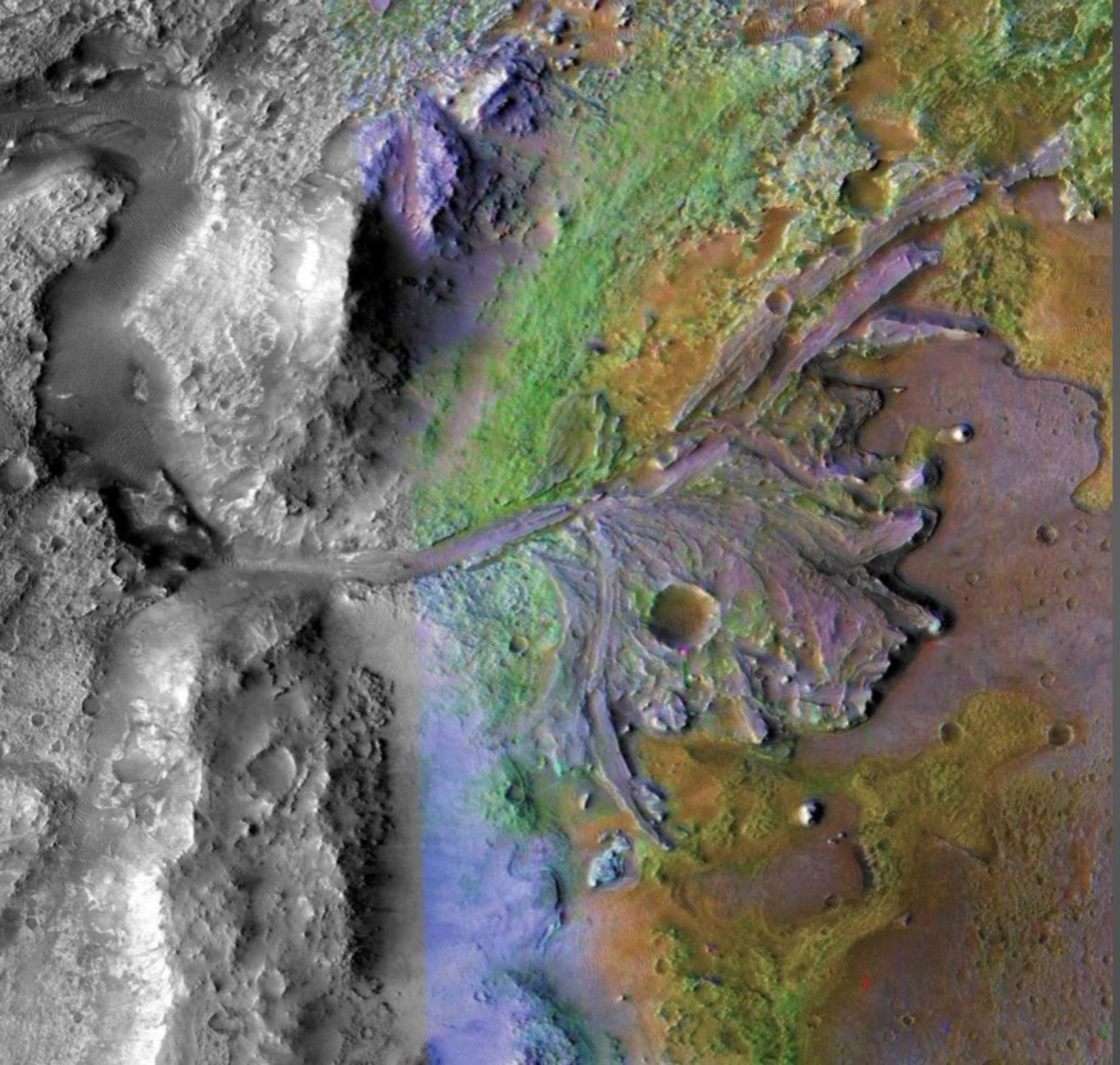
We would study them in great detail.

The Mars 2020 mission will look for “biosignatures.”

These are objects, substances, or patterns that only life-based processes can create.

Scientists from around the world selected Jezero Crater as the place to land and explore.





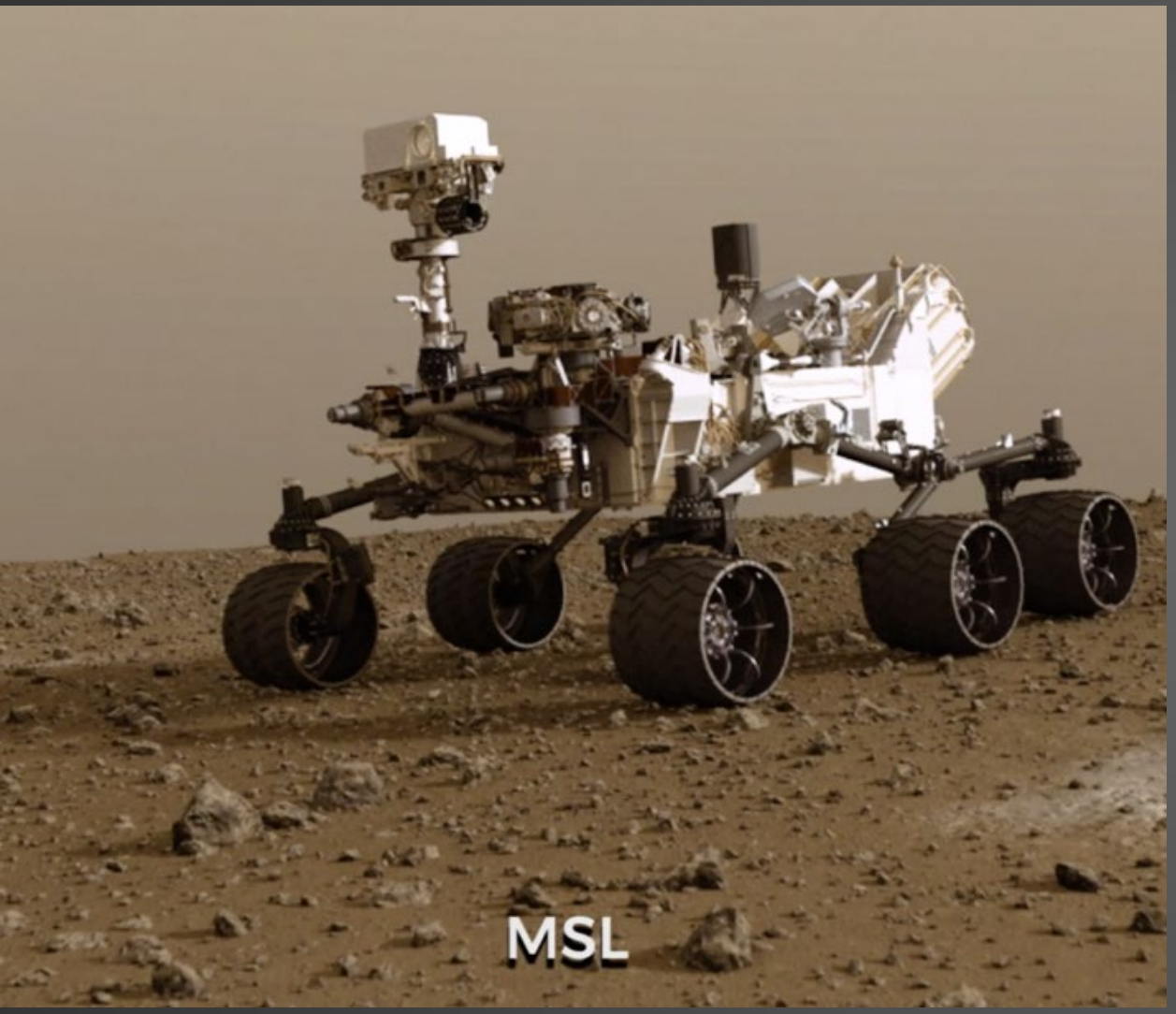
Jezero Crater is home to an an ancient delta.

There the rover can access rocks that are up to 3.6 billion years old!

Jezero has rocks and minerals that could only form in water. Some are commonly associated with life on Earth.

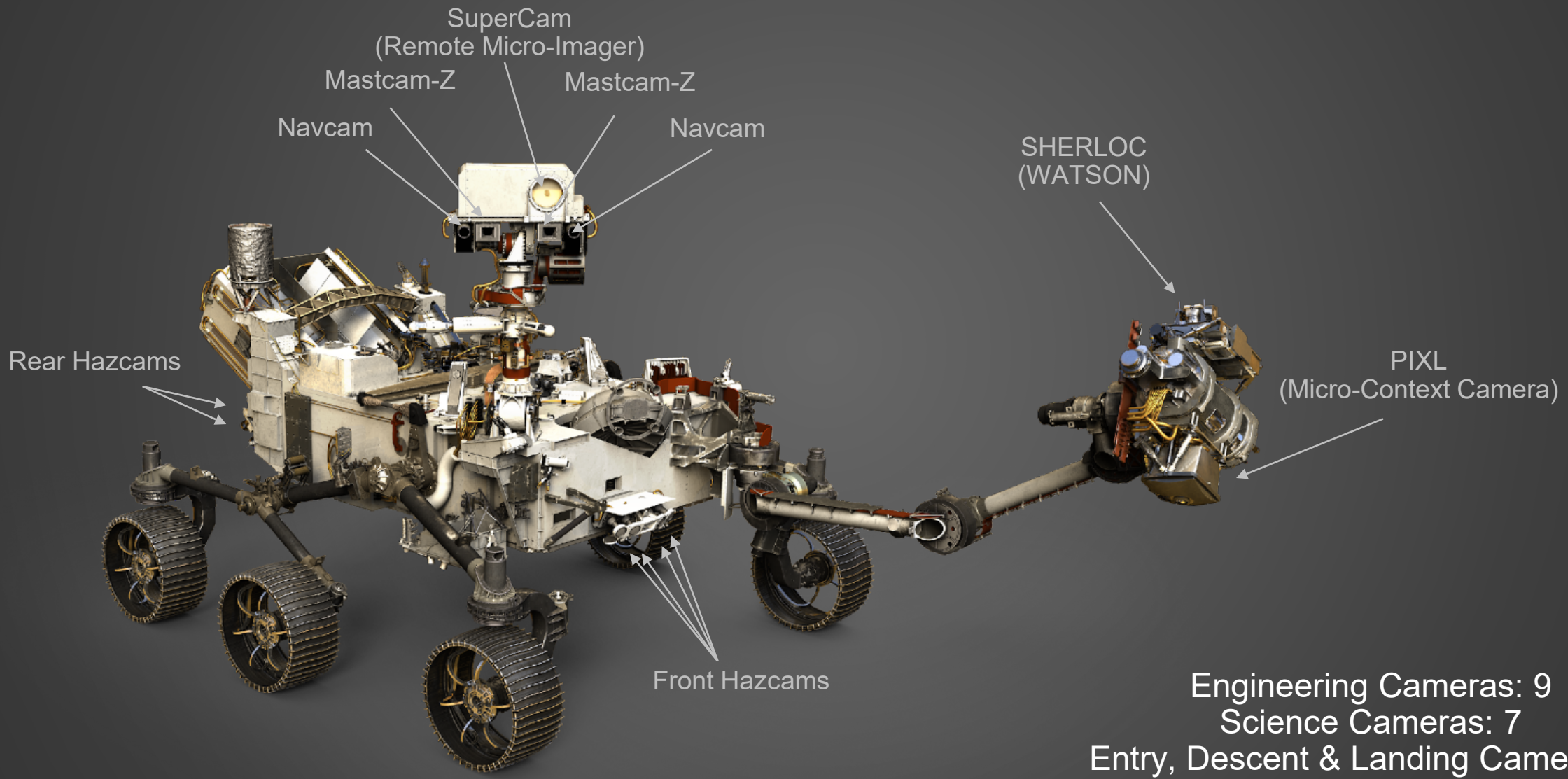
This makes it a great place to look for signs
of habitability, and of past life itself!

Perseverance will look a lot like Curiosity



but is equipped with a new set of cool tools.

The rover has 23 cameras!

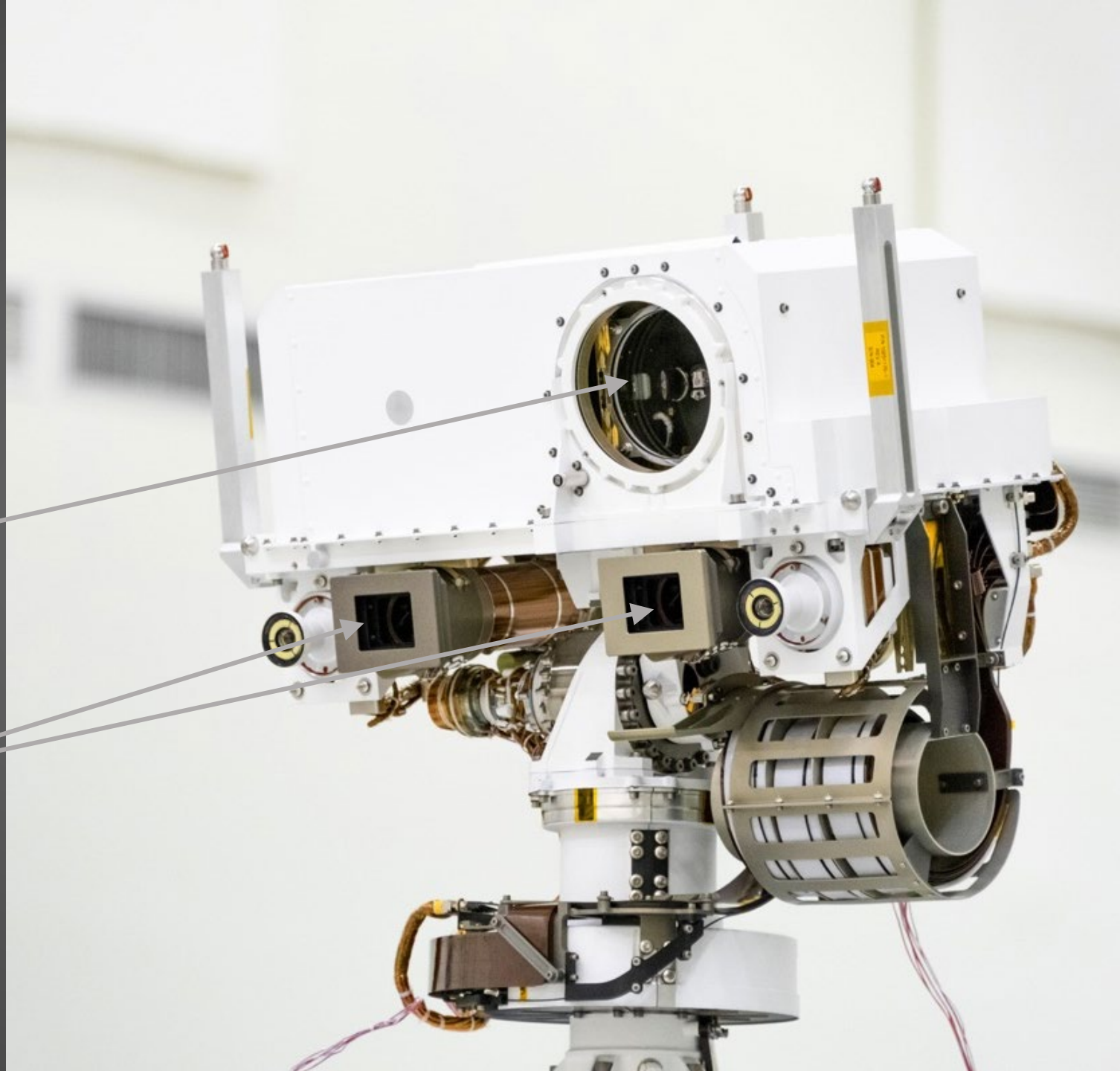


Engineering Cameras: 9
Science Cameras: 7
Entry, Descent & Landing Cameras: 7

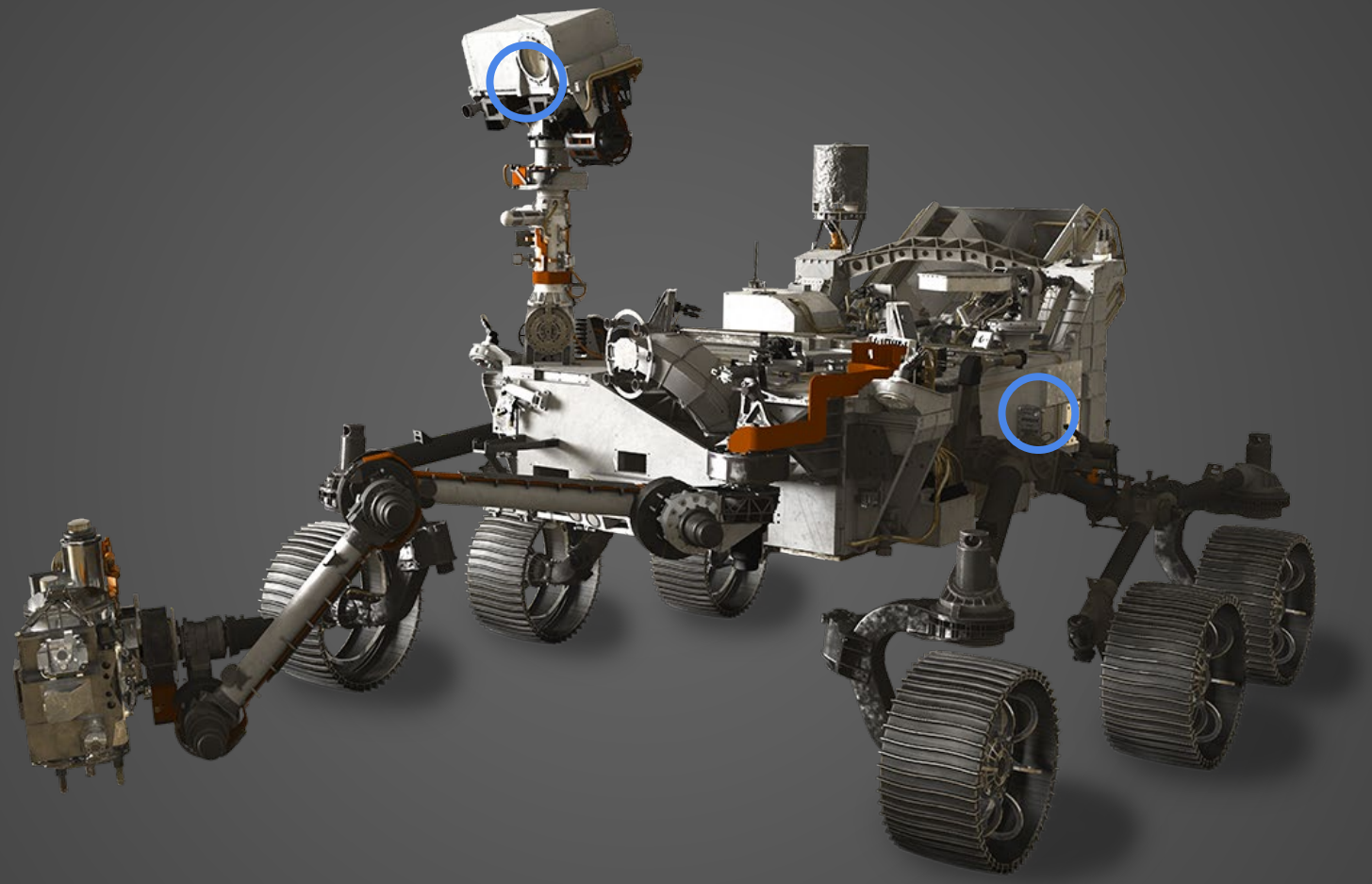
Science instruments study objects large and small, near and far.

SuperCam can fire a laser to check out rocks from a distance

Mastcam-Z forms a pair of rover eyes



Perseverance is a good listener.

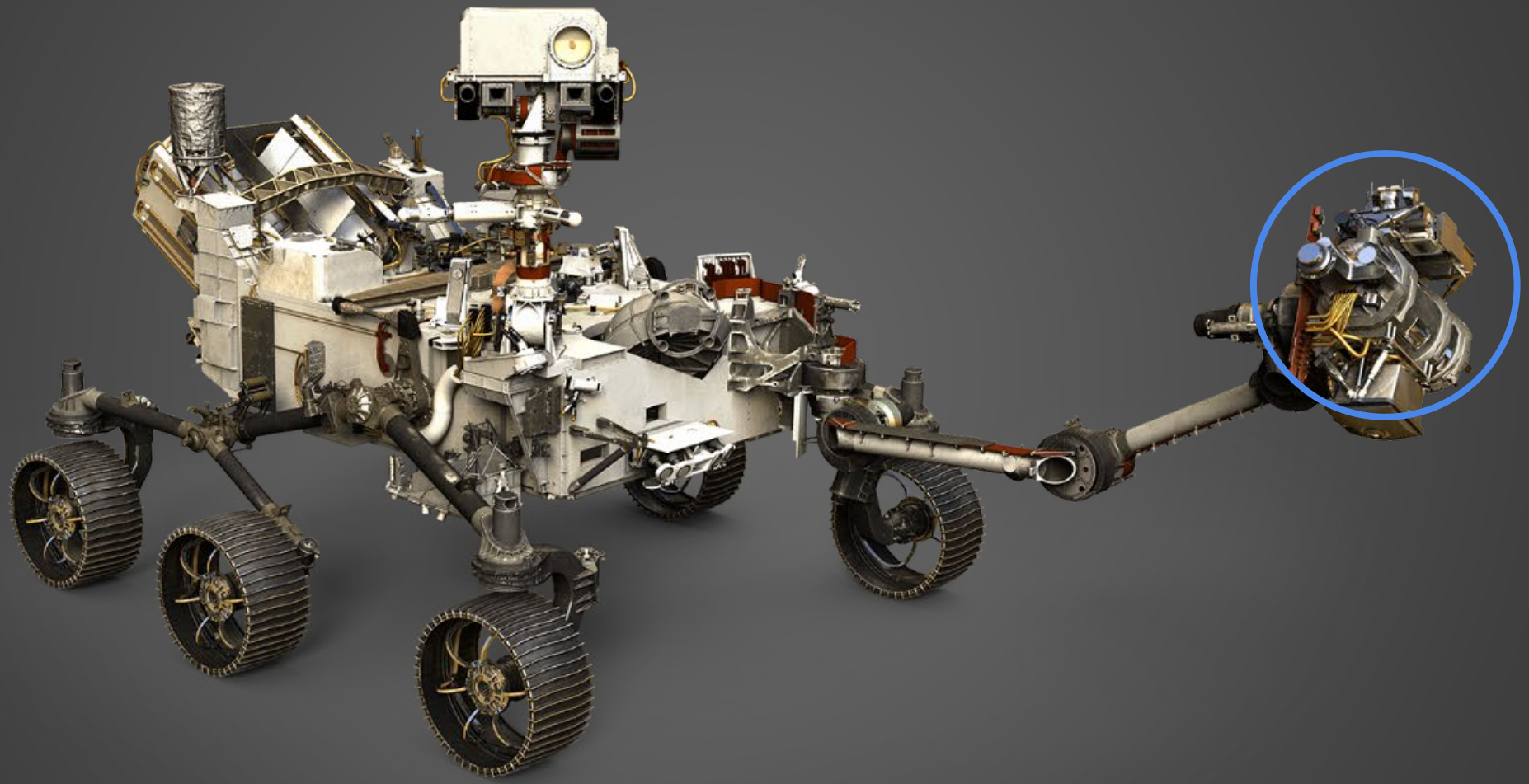


It will carry microphones
so we will finally hear the sounds of Mars!

It has a robotic arm to scoop, drill and study rocks.

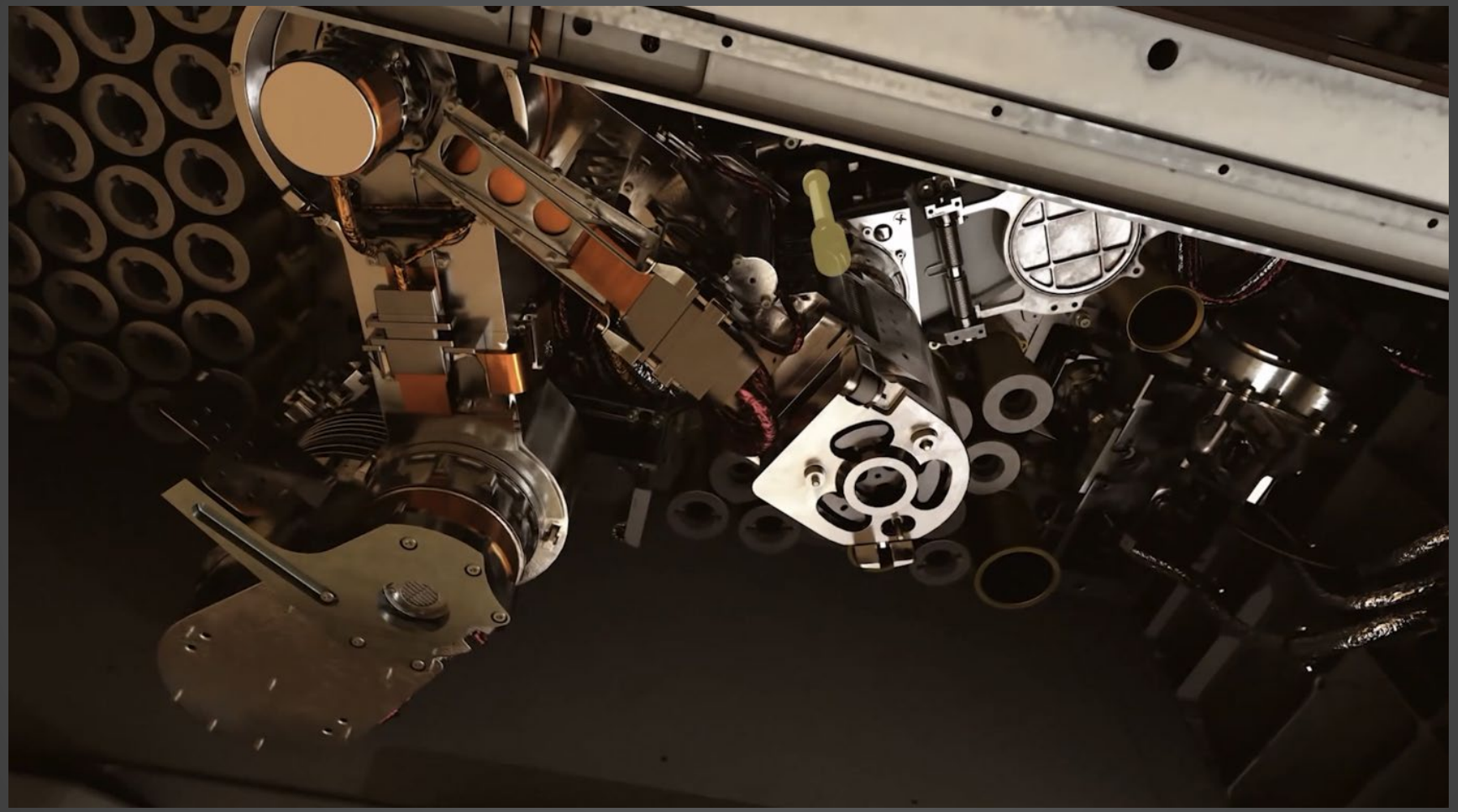
It tried out a bicep curl!

Like SuperCam, SHERLOC and PIXL are rock analyzers.



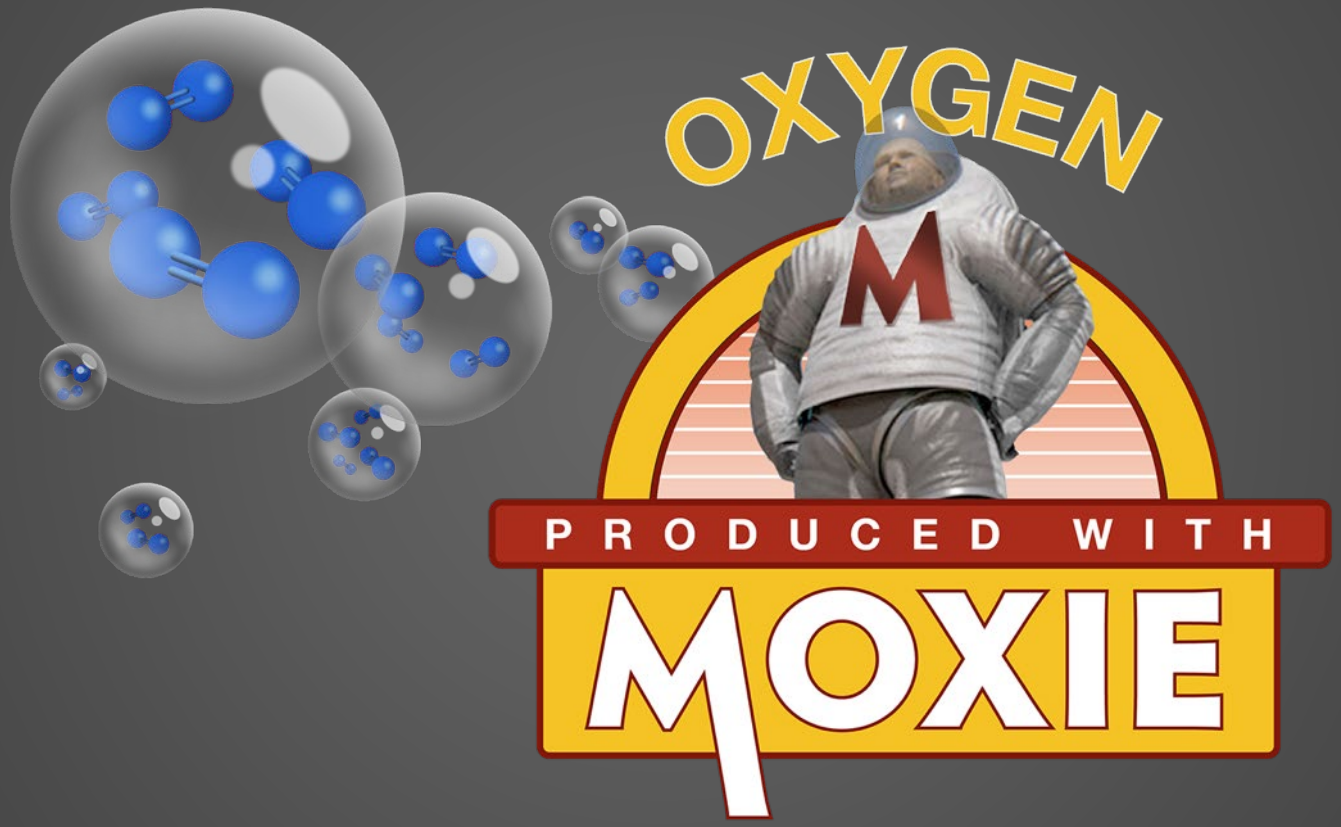
They can study and map areas as small as a fingernail in great detail to uncover the origins, history and structure of rocks.

In its belly, and at the core of the mission,
the rover carries a sample caching system.



It’s designed to help the rover collect and store
pristine Mars rock and soil samples on the planet’s surface.

The rover has a new tool to convert carbon dioxide in Mars' atmosphere to oxygen.



MOXIE is a test model that breathes like a tree!

Perseverance will carry a passenger, a small helicopter.

This technology demonstration could be the first robotic flight on Mars!

Mars 2020 is the next natural step in Mars exploration.

The mission will:

- Explore a diverse landing site
- Seek signs of ancient life
- Collect rock and soil samples for possible return to Earth
- Pave the way for human exploration

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STEM Enrichment Activities

Require:

- Enthusiasm
- Craft-y-ness
- Like to move
- Wanna learn something
- Off-the-shelf materials
- And as always: safety!

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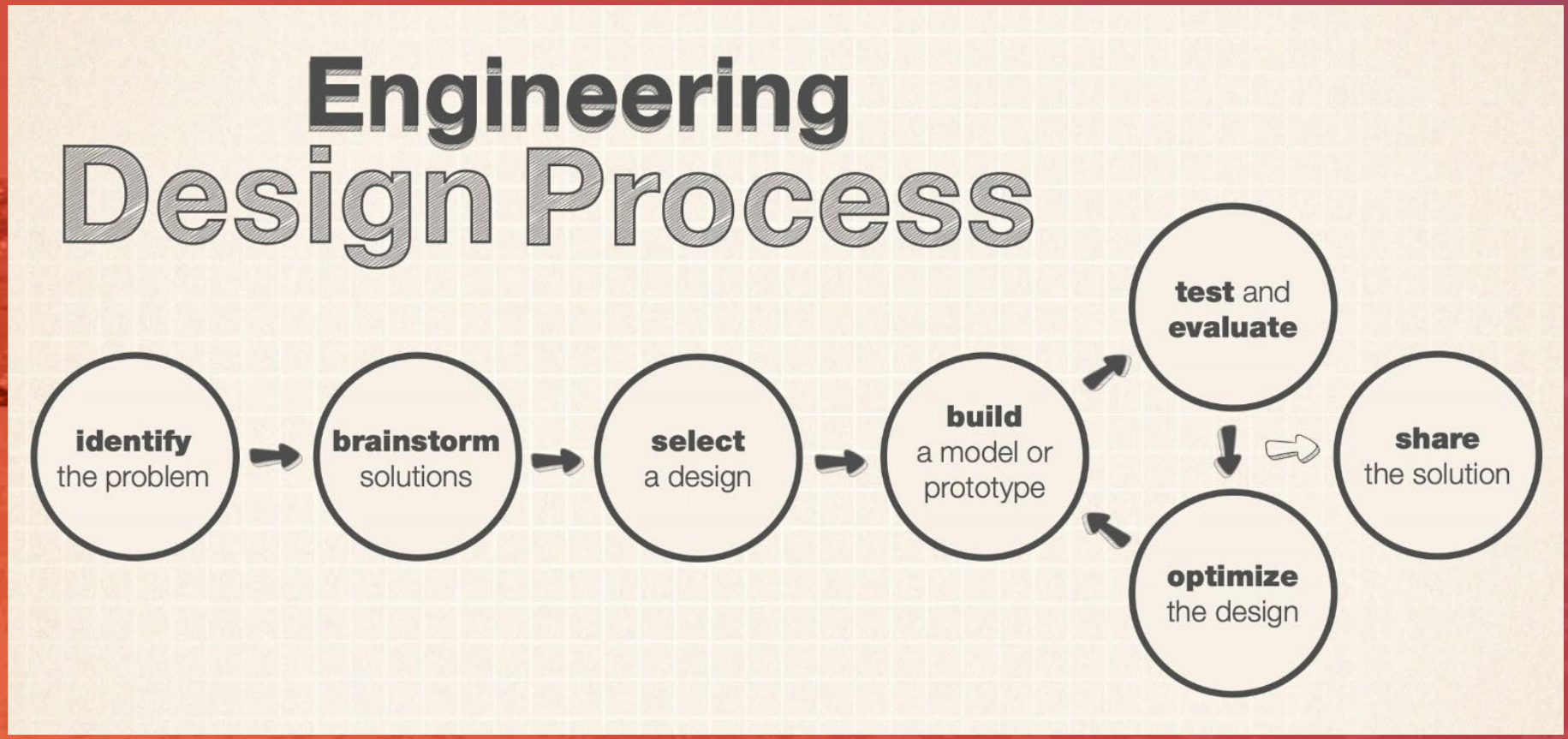
Engineering Design Process



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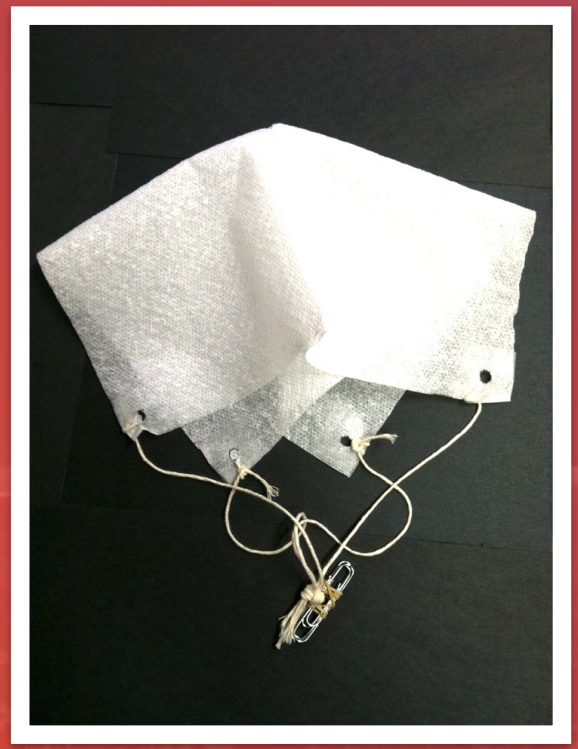
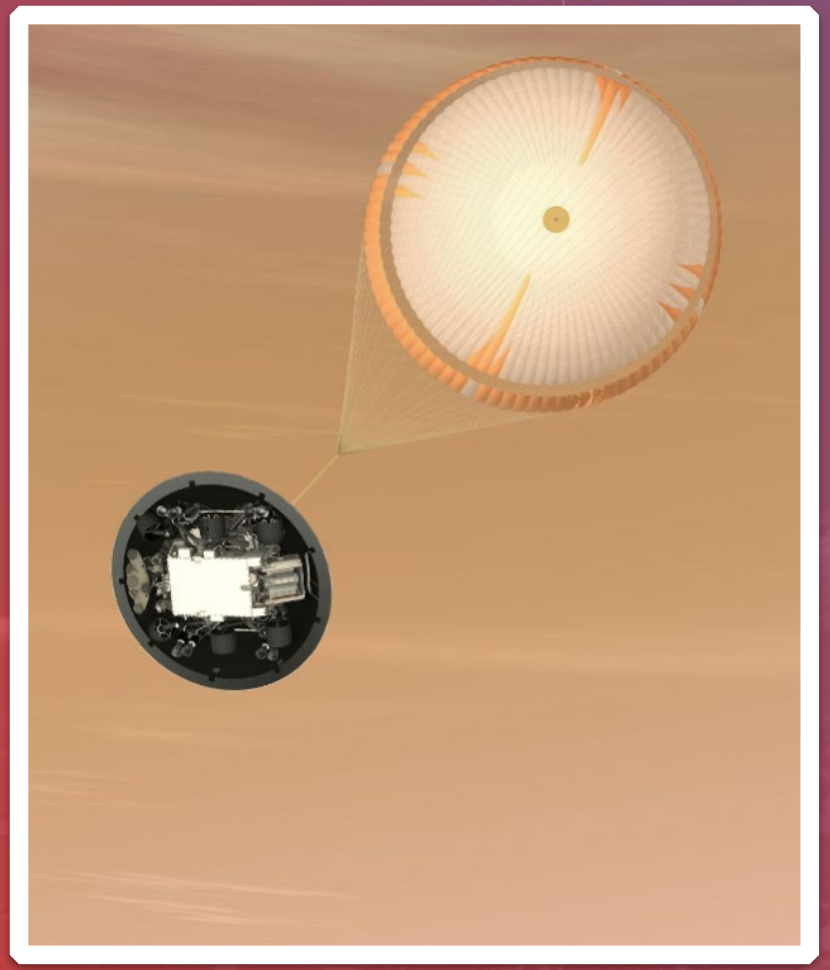
Parachute Design





- Tape or tie one end of string to corners of parachute
- Put rubber band around 3-4 paperclips; tie to end of all strings

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Underhanded Parachute Toss

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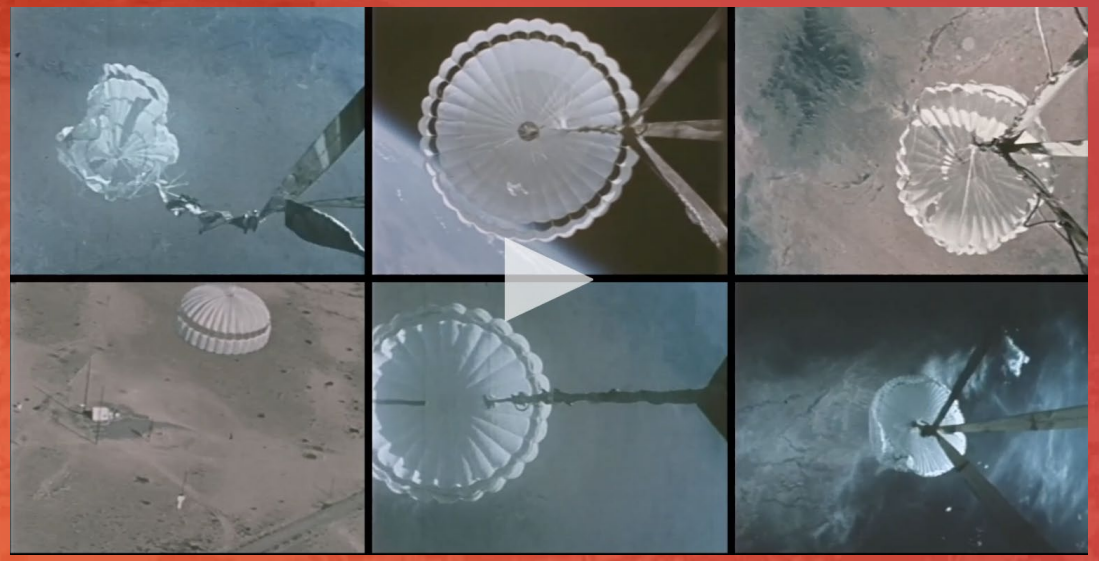
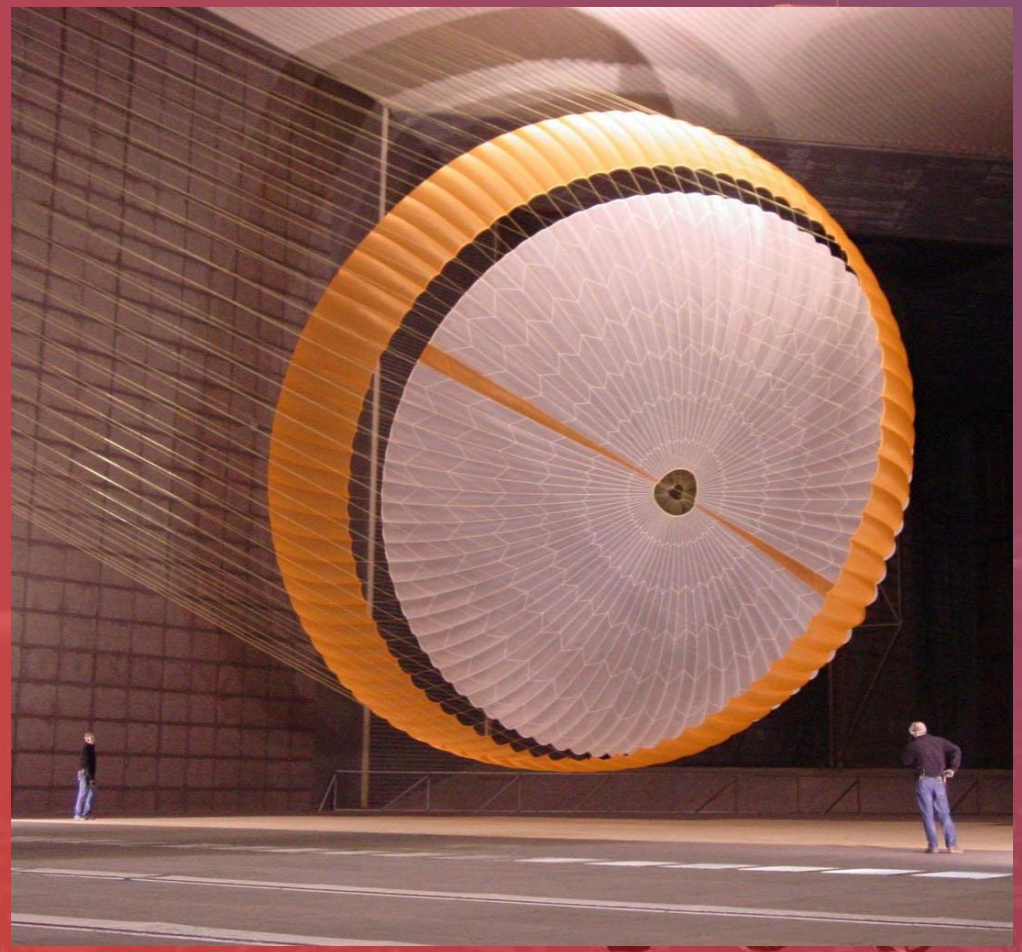
Parachutes for Landing





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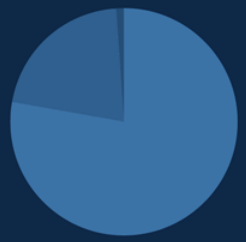
MARS FACTS / ATMOSPHERE

OVER 100 TIMES DENSER THAN MARS' ATMOSPHERE



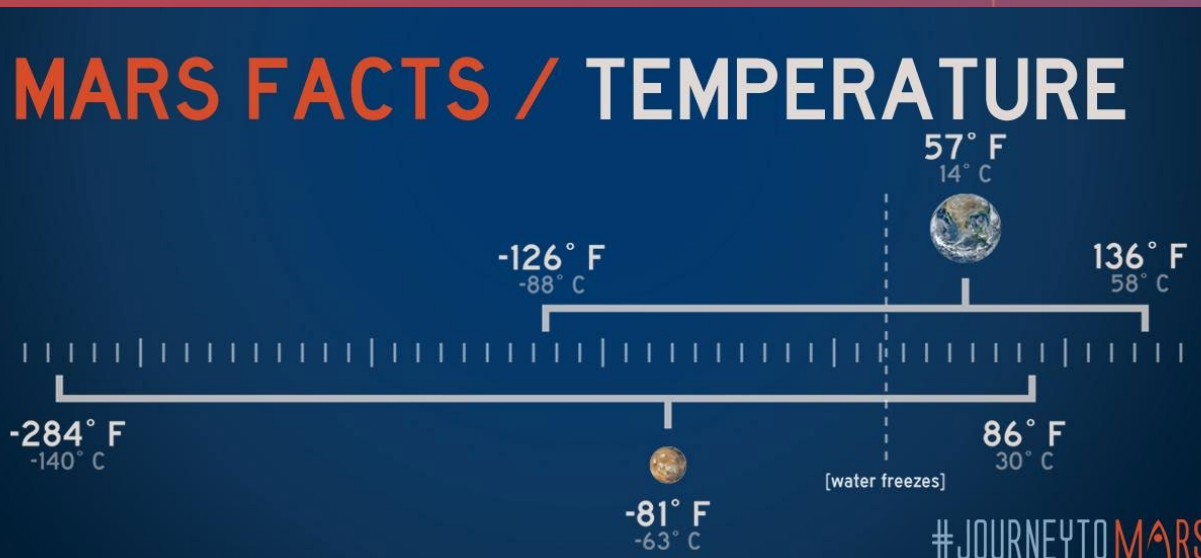
- 78% NITROGEN
- 21% OXYGEN
- 1% OTHER

- 96% CARBON DIOXIDE
- <2% ARGON
- <2% NITROGEN
- <1% OTHER

mars.nasa.gov

#JOURNEYTOMARS

MARS FACTS / TEMPERATURE



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Bringing Mars Into Afterschool

NASA invites educators and households to participate in its Mission to Mars Student Challenge. **Participants will get:**

- A guided **5-week education plan** for elementary, middle, and high school students with standards-aligned STEM lessons and activities from NASA.
- A **weekly newsletter** with links to recorded discussions with Mars 2020 engineers and scientists, tips, and resources related to the mission phase of the week.
- Opportunity to participate in **Q&As with NASA experts** during live stream events leading up to and on landing day.

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Activities

5-week education plans for ES, MS, and HS students with NASA lessons and activities
At home versions suitable for out-of-school time use

- **Learn About Mars**
- **Plan Your Mission**
- **Design Your Spacecraft**
- **Launch Your Mission**
- **Land on Mars**

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Educator Events

- January 21 (8:30 a.m. PST/11:30 a.m. EST)
  - Out-of-school time STEM Enrichment Training
  - Mars 2020 mission
  - Activity walk-through
  - Challenge overview
  - Q&A
- February 6 (10 a.m. PST/1 p.m. EST)
  - Educator showcase

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Student Events

- High school – Feb. 16, 8:30-9:15 a.m. PST
- Middle school – Feb. 16, 11:30-12:15 a.m. PST
- Elementary school – Feb. 17, 9:30-10 a.m. PST
- Everyone – Feb. 18, 9:30-10 a.m. PST

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Special Treats

- Share student work

- Submit questions for NASA experts

… both of which may be shared on NASA channels

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go.nasa.gov/mars-challenge

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What do you think your youth will appreciate most about participating in the Challenge?

- Learning about another planet
- Thinking about how to explore space
- Doing a hands-on activity
- Interacting with friends as a team
- Hearing from role models about what they do on
- Showing what they learned/built to their families
- Watching the actual landing of a spacecraft

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How will you implement this Challenge in your program?

Do one activity	
Do a series of the activities	
Have a regular STEM enrichment period	
Do activity(s) before/when Mars 2020 lands	
Do activity(s) later this school year	
Do activity(s) this summer	
Share this information with my colleagues	
Not sure yet	

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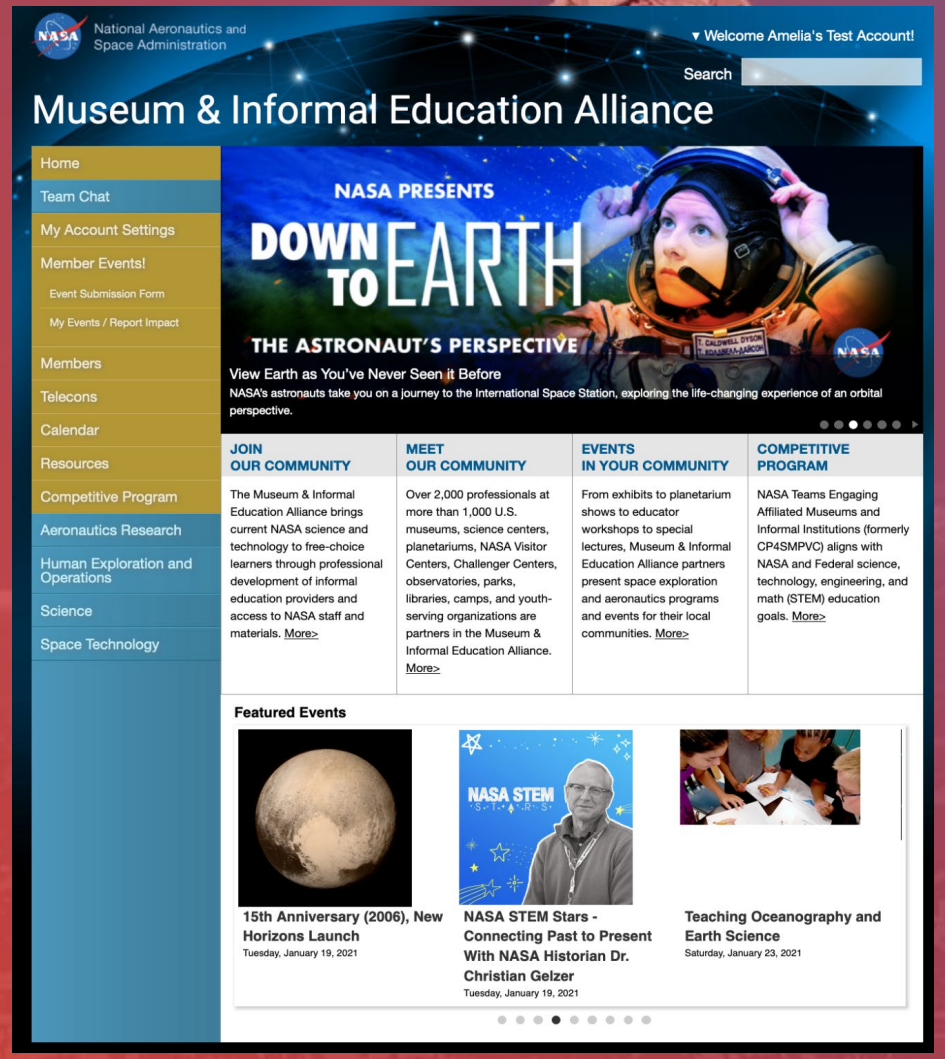
https://boostcafe.org/author/leslielowes/

Museum and Informal Education (MIE) Alliance

An active community of practice that provides informal educators access to NASA resources.

- ✔ Direct **assistance** to members
- ✔ Member **website** of searchable resources
- ✔ **Calendar** of mission events, deadlines, trainings, anniversaries, STEM-themed days, etc
- ✔ Collaborative **chat** forum
- ✔ Regular live **briefings** by NASA experts
- ✔ Weekly **newsletter**



Sign up (free!) at informal.jpl.nasa.gov/museum
Questions? Amelia.J.Chapman@jpl.nasa.gov

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Bonus Activity: Straw Rockets (without a straw)

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Jet Propulsion Laboratory
California Institute of Technology

go.nasa.gov/mars-challenge