

Mars



Destination

Each round, roll two six-sided dice:

2-3: Telemetry error deals 1 damage to all orbiting missions.

4-5: Dust storm deals 1 damage to all land-based solar missions. Tap all orbiting missions.

6-7: Rocky terrain deals 1 damage to all rover missions.

8-9: Instrument failure. Sacrifice one upgrade instrument. If none are available, deal 1 damage to a mission.

10-12: Marsquake deals 2 damages to all land-based missions.

40

Apollo



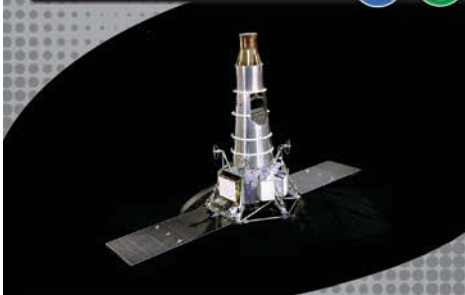
Lander - Battery

Can carry two additional instruments.

Apollo was the NASA program that resulted in American astronauts making a total of 11 spaceflights and walking on the Moon. The first four flights tested the equipment used in the Apollo program. Six of the other seven flights landed on the Moon.

5 / 3

Ranger



Lander - Solar

Impact achieved – gain +3/+0 this turn. At the end of the turn, Ranger self-destructs.

In the early 1960's, NASA sent a series of Ranger spacecraft to study the Moon. These missions, which were the first American spacecraft to land on the Moon, helped lay the groundwork for the Apollo program.

1 / 1

Research



Resource

 to use 1 

It takes some of the greatest minds to develop a spacecraft. Get to work!

Moon



Destination

Each round, roll two six-sided dice:

2-5: Hard landing. All rovers and landers brought into play this turn suffer 1 damage.

6-8: Rocky terrain. Deal 1 damage to all rover missions.

9-11: Instrument failure. Sacrifice one upgrade instrument. If none are available, deal 1 damage to a mission.

12: Communications lost. Select one mission to go into safe-mode. This mission stays tapped until restored by another instrument. The mission can still sustain damage during this time.

30

LCROSS




Orbiter - Solar



The Lunar Crater Observation and Sensing Satellite was a robotic spacecraft operated by NASA. The mission was conceived as a low-cost means of investigating the hydrogen detected at the polar regions of the Moon.

1 / 1

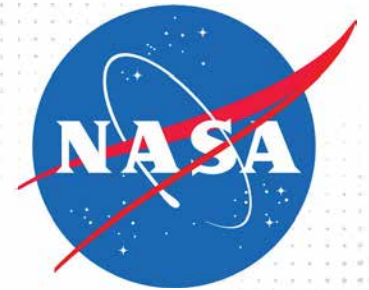
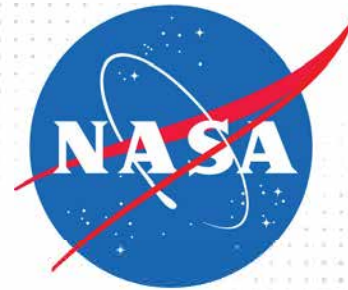
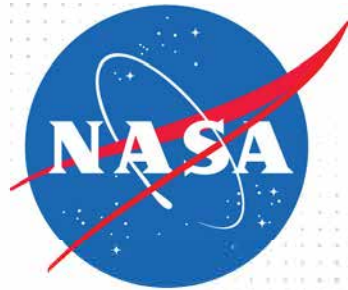
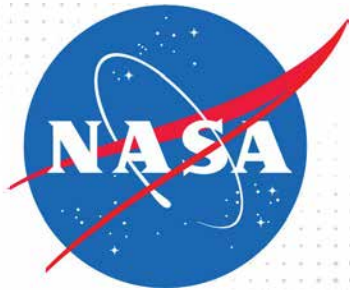
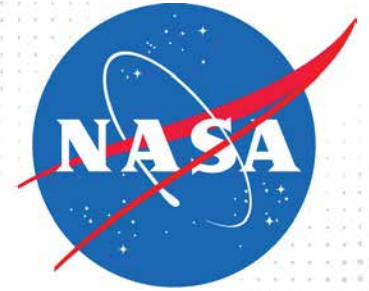
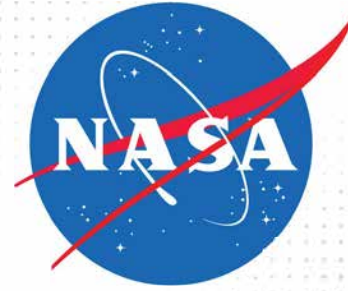
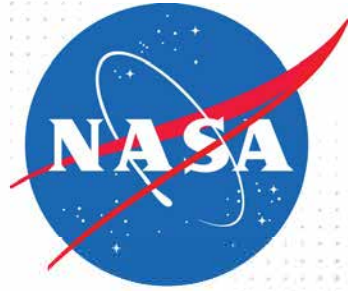
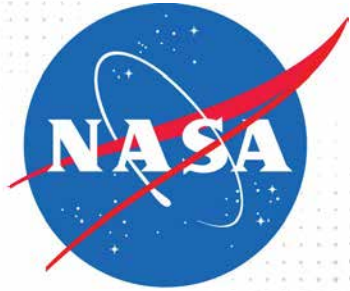
Funding



Resource

 to use 1 

No mission can take place without financial support. Raise funds needed for your mission.





Research



Resource

to use 1

It takes some of the greatest minds to develop a spacecraft. Get to work!



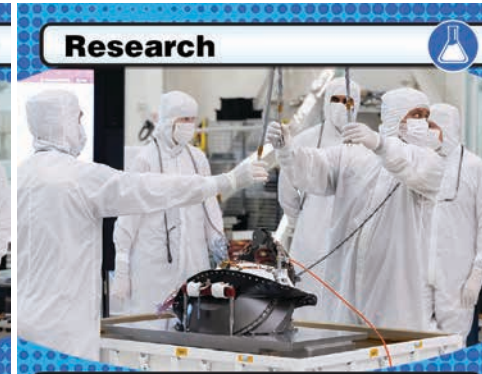
Research



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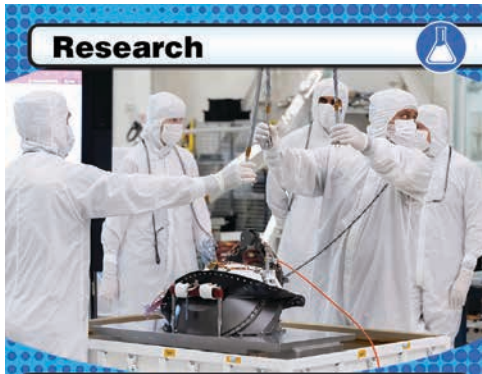
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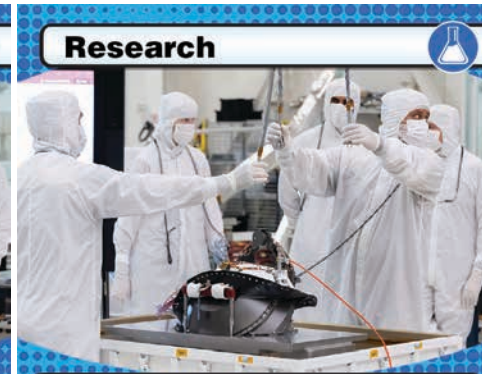
Research



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Research



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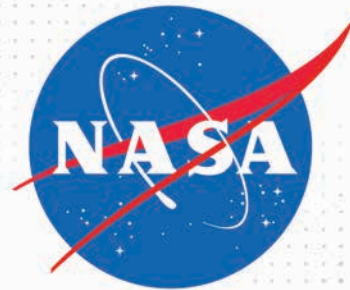
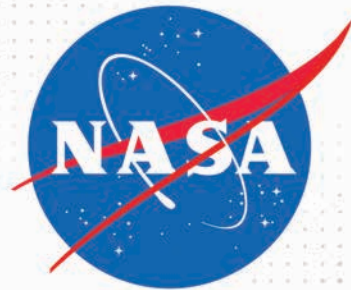
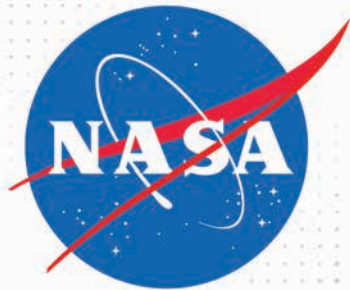
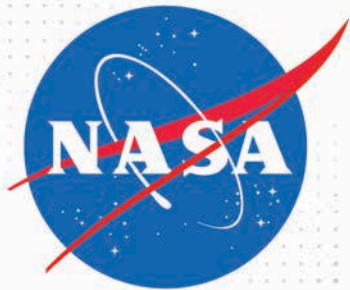
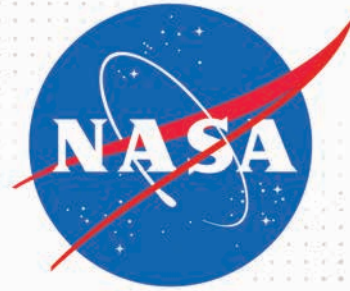
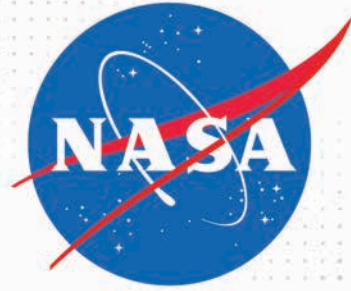
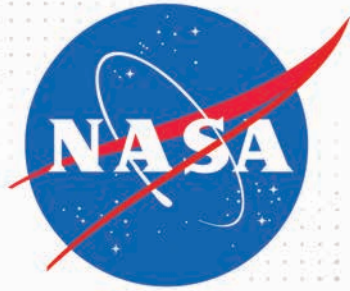
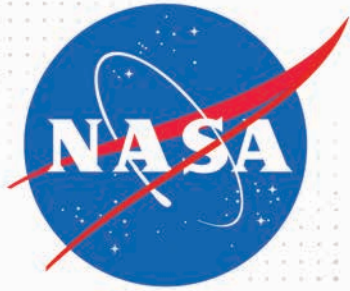
Research



Resource

to use 1

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Improved Antenna

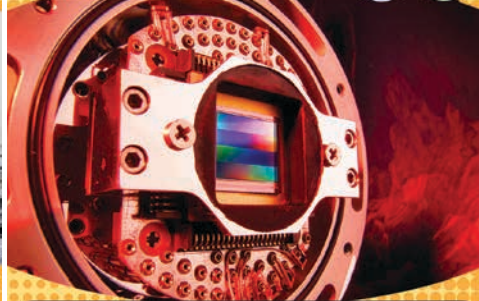


Instrument

Prevents effects of lost communications events, when added to a spacecraft.

The ability to communicate with your spacecraft is critical. That is why engineers at NASA are always developing new technologies to communicate more effectively across the solar system.

IR Camera



Instrument

+1/+0 when added to a spacecraft.

An infrared camera allows NASA to look beyond visible light and see the light associated with heat. These are sometimes called thermal imaging cameras.

Ingenuity

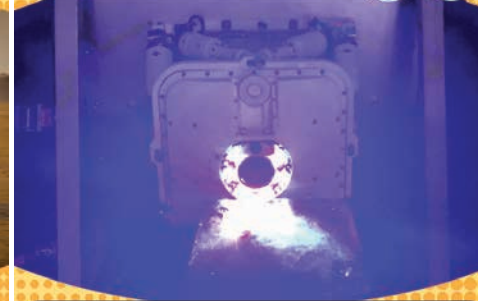


Instrument

+2/+0 when added to a spacecraft.
Can only be used on rover missions.

Ingenuity is a small helicopter designed to attempt the first powered flight on Mars.

Life Science Lab



Instrument

+2/+0 when added to a spacecraft.
Can only be used on rover missions.

To determine if ancient life ever existed, scientists look for what are called biosignatures – chemicals that make up living things.

HP3

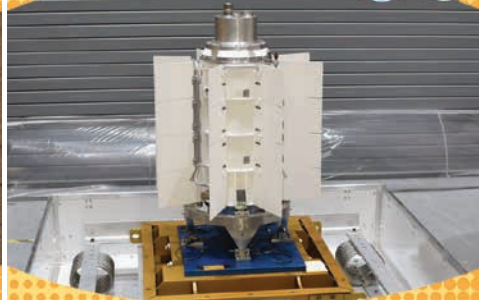


Instrument

+1/+0 when added to a spacecraft.
Can only be used on lander missions.

HP3 is a heat probe that digs up to 5m into the planet to determine how the interior is cooling.

Battery Backup



Instrument

Prevents any damage from solar events, when added to a spacecraft.

A backup battery can prevent a mission from failure by ensuring there is at least enough power for critical operations.

Upgrade Solar Cell



Instrument

Prevents damage from dust storm events, when added to a spacecraft.
Can only be used on rover and lander missions.

As solar cell technology advances, spacecraft can go farther using solar power.

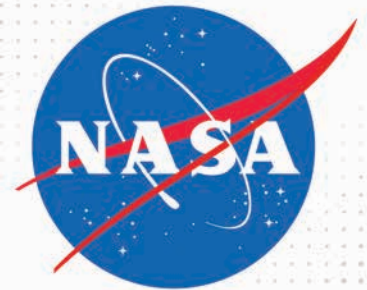
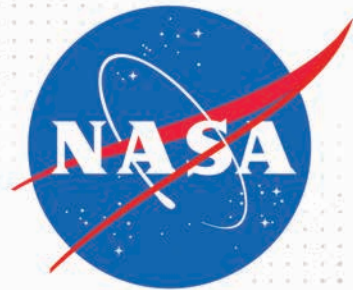
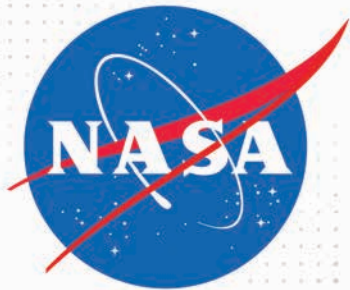
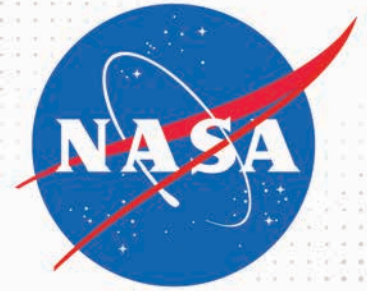
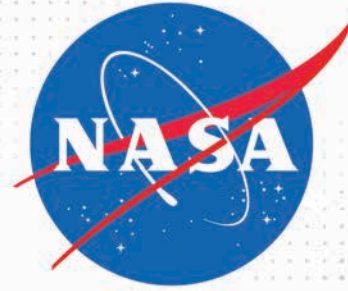
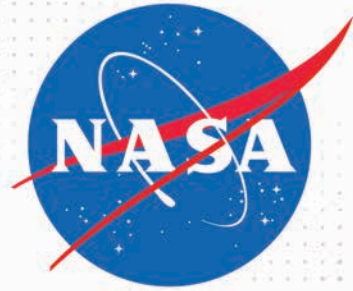
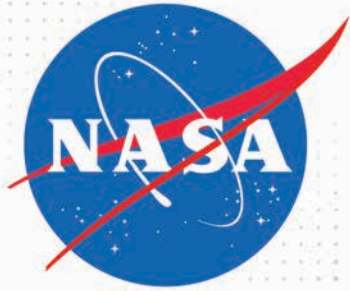
Upgrade Grousers



Instrument

Prevents any damage from rough terrain events, when added to a spacecraft.
Can only be used on rover missions.

After NASA engineers saw that the Curiosity Mars rover's wheels were getting punctured by rocks, they changed the wheel design for the newer Perseverance Mars rover.



Titanium Casing



Instrument

Prevents damage from solar and radioactive events, when added to a spacecraft. Can only be used on orbiter and flyby missions.

Titanium casing has been used by missions such as Juno to protect equipment onboard from the harmful effects of radiation.

Tracks



Instrument

+2/+0 when added to a spacecraft. Can only be used on rover and lander missions on ice worlds.

Getting around on the surface of a planet requires the right kind of locomotion. Tracks work better on some terrains than others.

Spectrometer



Instrument

+1/+0 when added to a spacecraft.

A spectrometer allows scientists to look at an object in different wavelengths of light, such as infrared or X-ray, to see details we might not otherwise be able to see with our eyes.

Rock Coring



Instrument

+2/+0 when added to a spacecraft. Can only be used on rover and lander missions.

This tool will allow missions to collect rocky material several centimeters underneath the surface while keeping it intact, potentially to be sent back to Earth for analysis.

Sample Cache



Instrument

+2/+0 when added to a spacecraft. Can only be used on rover missions. Add +1/+0 if rock coring also in play.

A sample cache will allow a mission to collect rock samples that a potential future mission can send back to Earth. This would allow for more detailed analysis by scientists in state-of-the-art labs.

Rock Drill

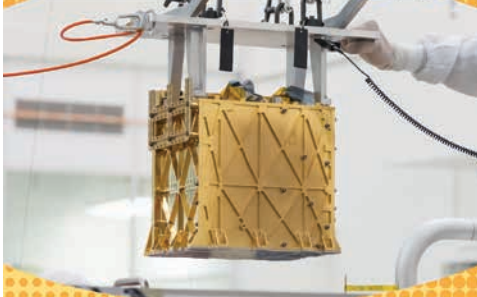


Instrument

+1/+0 when added to a spacecraft. Can only be used on rover and lander missions.

The rock drill allows a mission to look underneath dirt and dust that may be covering a sample of interest. The deeper we're able to look, the further back in time we can see.

MOXIE

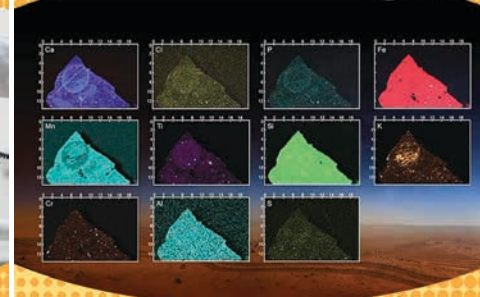


Instrument

+1/+0 when added to a spacecraft. Can only be used on rover and lander missions.

MOXIE is an instrument that will test our ability to convert Martian atmosphere into breathable oxygen.

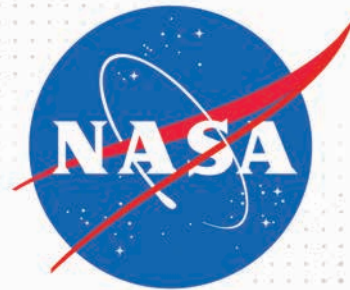
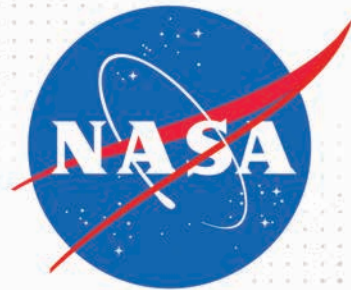
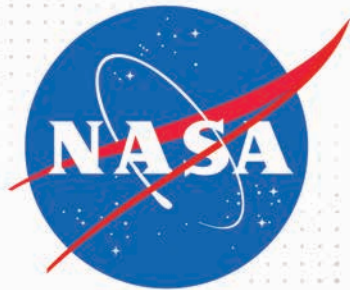
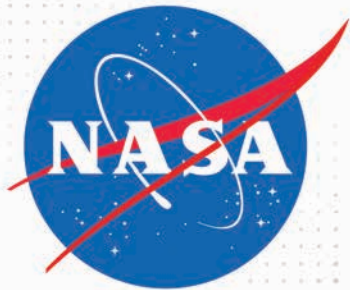
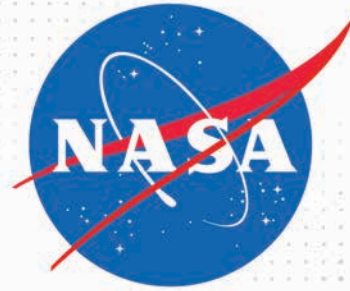
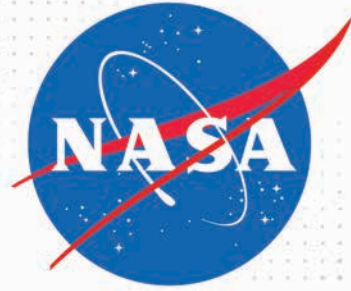
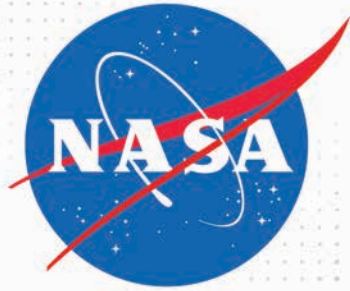
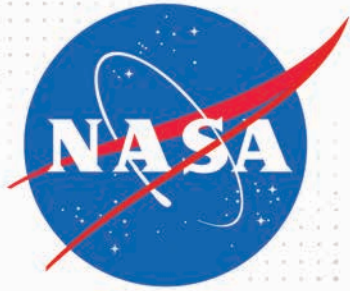
PIXL



Instrument

+1/+0 when added to a spacecraft. Can only be used on rover and lander missions.

PIXL uses X-rays to find biosignatures of ancient life in rock structures.



Viking



Lander - RTG

The Viking program consisted of a pair of American space probes sent to Mars. Each spacecraft, Viking 1 and Viking 2, had two main parts: an orbiter designed to photograph the surface of Mars from above, in orbit, and a lander designed to study the planet from the surface.

1 / 3

Sojourner

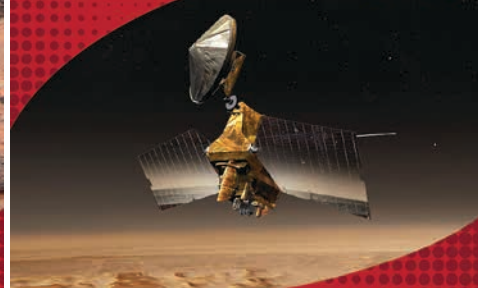


Rover - Solar

Sojourner landed on Mars' Ares Vallis on July 4th, 1997. Delivered by the Pathfinder lander, it was the first-ever robotic rover to the surface of the Red Planet.

1 / 1

MRO



Orbiter - Solar

Bonus ability: HIRISE – to gain +3/+0 next turn.

The Mars Reconnaissance Orbiter, or MRO, has studied the Red Planet's atmosphere and terrain from orbit since 2006 and also serves as a key data relay for land-based Mars missions.

2 / 2

Mars Exploration Rover



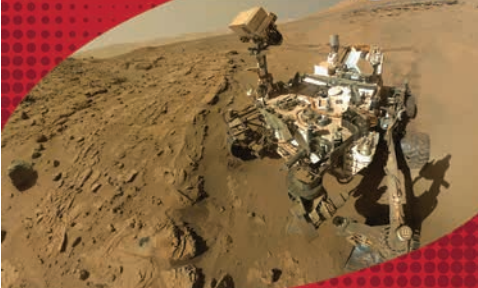
Rover - Solar

Can carry one additional instrument.

NASA's Mars Exploration Rover mission sent two identical rovers, Spirit and Opportunity, to explore the Red Planet.

2 / 2

Curiosity



Rover - RTG

Bonus ability: CheMin – Costs 1 . Gain +1/+0 this turn, when added to spacecraft. Can carry two additional instruments.

Curiosity was designed to assess whether Mars ever had an environment able to support life-forms called microbes.

4 / 3

InSight



Lander - Solar

Bonus ability: SEIS – InSight cannot be damaged by seismic events. Instead, add +1/+0 during a seismic event. Can carry one additional instrument.

The InSight mission is a robotic lander designed to study the deep interior of the planet Mars using a seismometer and heat-flow probe.

3 / 3

Perseverance



Rover - RTG

Bonus ability: SHERLOC – Costs 1 . Gain +1/+0 this turn, when added to spacecraft. Can carry two additional instruments.

Perseverance is a car-size rover designed to explore Jezero Crater on Mars as part of NASA's Mars 2020 mission.

2 / 1

Sample Return



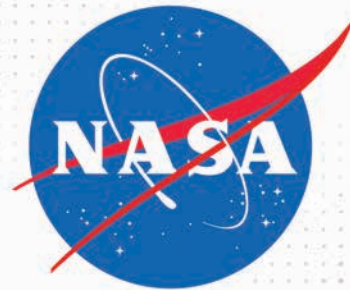
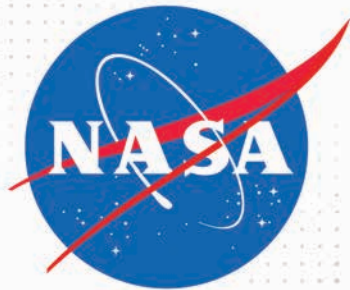
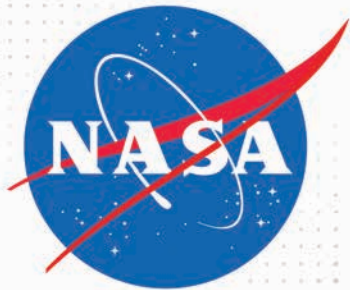
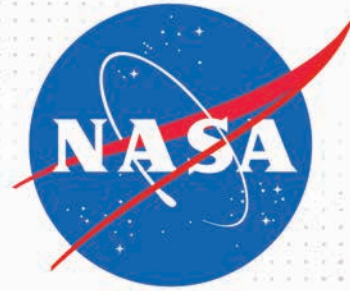
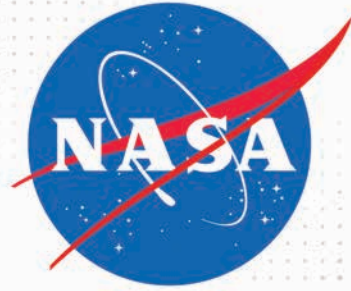
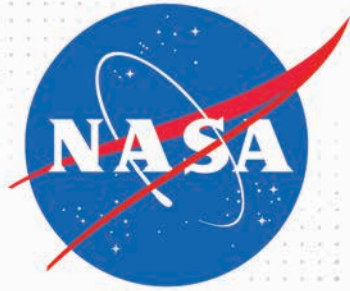
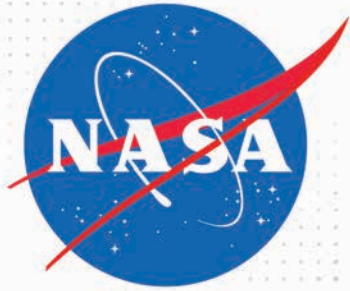
Lander - Solar

Costs 2 less if Apollo or Perseverance are already in play.

Can carry one additional instrument.

This mission would collect rock and dust samples on Mars and then return them to Earth.

3 / 2



Funding 



Resource 

 to use 1 

No mission can take place without financial support.
Raise funds needed for your mission.

Funding 



Resource 

 to use 1 

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