Mars or Bust

Challenge
Using the provided materials and your knowledge of Mars, create a prototype for a structure that will be necessary to support life on Mars.

For the purposes of this Challenge, structures include: buildings, transportation systems, and facilities that will need to be specially designed to support human life on Mars.

Time
Teams will have up to 5 minutes to research the Red Planet using the provided fact sheet and then 10 minutes to use your imagination to create your structure prototype.

The Scene
NASA is about to send the first human spaceflight to Mars, but the buildings, cars, and other structures here on Earth aren’t well suited to the harsh conditions on Mars. Variations in temperature, gravitational pull, atmospheric composition, and terrain all create unique challenges for construction. Your challenge is to create a prototype of a new structure more suitable for the Red Planet.

Materials
- 1 Pack of mailing labels
- 2 Pieces of paper
- 5 Pipe cleaners
- 10 Popsicle sticks
- 5 Straws

Presentation
Each team will present their prototype to the facilitator, making sure to explain its form and function on Mars and how it is uniquely suited to help humans sustain life on Mars. Be sure to include at least one fact learned from the research portion of the Challenge.

FOR FACILITATORS ONLY
1. Present each team of 2-7 students with a TEAM COPY of the Challenge, and then read it aloud as the team follows along.
2. Present each team with the aforementioned materials.
3. At the end of the 15 minutes, have each team present their solution to you, they can also present to the group if that is suitable to your event.
4. Encourage teams to post their solutions to social media platforms using the hashtags #InstantChallenge #MarsOrBust.
**TEAM COPY**

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Be sure to share your solutions on social media using the hashtags #InstantChallenge and #MarsOrBust, with a short summary of your structure and the facts you learned about Mars.
RESEARCH MATERIALS

Since our first close-up picture of Mars in 1965, spacecraft voyages to the Red Planet have revealed a world strangely familiar, yet different enough to challenge our perceptions of what makes a planet work. Every time we feel close to understanding Mars, new discoveries send us straight back to the drawing board to revise existing theories.

You’d think Mars would be easier to understand. Like Earth, Mars has polar ice caps and clouds in its atmosphere, seasonal weather patterns, volcanoes, canyons and other recognizable features. However, conditions on Mars vary wildly from what we know on our own planet.

Over the past three decades, spacecraft have shown us that Mars is rocky, cold, and sterile beneath its hazy, pink sky. We’ve discovered that today’s Martian wasteland hints at a formerly volatile world where volcanoes once raged, meteors plowed deep craters, and flash floods rushed over the land. Mars continues to throw out new enticements with each landing or orbital pass made by our spacecraft.

Mars is a rich destination for scientific discovery and robotic and human exploration as we expand our presence into the solar system. Its formation and evolution are comparable to Earth, helping us learn more about our own planet’s history and future. Mars had conditions suitable for life in its past. Future exploration could uncover evidence of life, answering one of the fundamental mysteries of the cosmos: Does life exist beyond Earth?

While robotic explorers have studied Mars for more than 40 years, NASA’s path for the human exploration of Mars begins in low-Earth orbit aboard the International Space Station. Astronauts on the orbiting laboratory are helping us prove many of the technologies and communications systems needed for human missions to deep space, including Mars. The space station also advances our understanding of how the body changes in space and how to protect astronaut health. Our next step is deep space, where NASA will send a robotic mission to capture and redirect an asteroid to orbit the moon.
Astronauts aboard the Orion spacecraft will explore the asteroid in the 2020s, returning to Earth with samples. This experience in human spaceflight beyond low-Earth orbit will help NASA test new systems and capabilities, such as Solar Electric Propulsion, which we’ll need to send cargo as part of human missions to Mars. NASA’s powerful Space Launch System rocket will enable these “proving ground” missions to test new capabilities. Human missions to Mars will rely on Orion and an evolved version of SLS that will be the most powerful launch vehicle ever flown.

A fleet of robotic spacecraft and rovers already are on and around Mars, dramatically increasing our knowledge about the Red Planet and paving the way for future human explorers. The Mars Science Laboratory Curiosity rover measured radiation on the way to Mars and is sending back radiation data from the surface. Future missions like the Mars 2020 rover, seeking signs of past life, also will demonstrate new technologies that could help astronauts survive on Mars.

Engineers and scientists around the country are working hard to develop the technologies astronauts will use to one day live and work on Mars, and safely return home from the next giant leap for humanity. NASA also is a leader in a Global Exploration Roadmap, working with international partners and the U.S. commercial space industry on a coordinated expansion of human presence into the solar system, with human missions to the surface of Mars as the driving goal. Follow our progress at www.nasa.gov/exploration and www.nasa.gov/mars.