Mars Adventure Travel Corporation

Participants write a script and act out a 30-60 second commercial convincing tourists to come to Mars for a visit. Use a green filming backdrop and Space Stage app to capture videos of the skits – using real images of Mars as the backdrop!

Credit: Space Science Institute/NCIL

Materials

- Script-writing materials:
  - Mars Adventure Travel Corporation Realistic Script (below)
  - Space Colony Report Silly Script (below)
  - Colored pencils or crayons
  - Chart paper or dry erase board (and markers)
- Green Screen set up on its stand (see the Green Screen Setup Guide and Calibration Guide in Section 4)
  Tip: Avoid wearing the color green
- Tablet and Space Stage App
- **Optional (recommended):** props and costumes, such as astronaut costumes; mittens or gloves; snow boots; ski masks; snow suits; umbrellas; sunglasses; sunscreen; a fan for wind; Styrofoam peanuts for snow
- **Optional:** Craft supplies for making costumes or props, such as large cardboard boxes, cardstock, scraps of fabric, colored markers, yarn, scissors, glue etc.
- Computer, speakers, projector, projection screen, and access to the Internet to provide background information

Recommended Ages:
School-aged children ages 8-9
Tweens up to about age 13
Teens

Learning Goals:
After doing this activity, participants will be able to:

- Describe the environment on Mars
- Describe ways that people can work and play on the surface of Mars

Preparation Time:
20 minutes

Activity Time:
1-2 hours

Preparation

1. When promoting the activity, emphasize that participants will need to avoid wearing green-colored clothing.

2. If possible, arrange to have at least one older child, teen, or adult available to help the groups write their scripts and hold the tablet during filming.

3. Gather materials.

4. Set up the Green Screen and provide a tablet with the Space Stage app preloaded on it. Have props and costumes – or the craft supplies to make them – available nearby.

5. Print out the Space Colony Report Silly Script, which may help some students create a script.

Tip: If you do not have a Green Screen, create your own backdrop of Martian landscapes by projecting a NASA image of the surface of Mars.

Procedure

1. Introduce yourself. Help the participants learn each other's names (if they don't already).

2. Explain to the participants that they will create skits about an imagined visit to Mars, beginning with writing scripts and ending with filming their skits in front of a Green Screen.

3. Introduce the technology required for the activity. Find out what the participants know about Green Screens and their use in TV and film. Show a short video with tips on using Green Screens.

4. Explore sources of information on Mars and possible future human exploration by viewing short videos and photos about Mars, reading books, and/or visiting NASA websites.

5. Allow some time for participants to discuss what they viewed. Encourage open-ended discussion on what things people would need and what they would want to have for a trip to Mars and on a Mars base. (10 minutes)
   Example discussion questions:

   - What do you use every day that you couldn't live without?
   - What do you do for fun on Earth? Would it be challenging to do this on Mars?
   - What could you live without that you could leave at home?
   - Would you need to travel around the planet to explore? How would you get around?
   - Do you need to communicate with Earth when you are on Mars? How?
   - How do you create power on Mars to run your electronics and equipment?

Optional (recommended): Post these ideas on a chart or dry erase board (or similar) for participants to incorporate into their scripts.

Procedure (continued)

6. Explain to the participants that they will be writing and filming a 30-60-second commercial or report. Provide information to get them started. Say:

   You are living in the year 2060, and you work for the Mars Adventure Travel Corporation in their advertising office. Your main job is to convince people from Earth to visit Mars. There are new bases on Mars, with habitats that maintain temperature, provide air to breathe, protect from radiation, and have running water. Although it's no Hilton, it's a fun place to go for a visit! Your advertising office has been given the task of creating a new advertisement.

7. Invite participants to form small groups and create a script, using one or more sources of ideas:
   a. Interesting facts and ideas listed on the chart paper or white board
   b. Mars Adventure Travel Corporation Realistic Script (see at the end of this guide)
   c. Space Colony Report Silly Script (see at the end of this guide)

8. If time allows, practice the skits and coach the participants in their presentation skills. Encourage them to take time to pause and take a breath between sentences, smile (if appropriate in the skit), keep arms relaxed at their sides, and look directly at the tablet's camera.

9. Using a Green Screen and a tablet with the Space Stage app, have participants playact their skits. Guide participants in using the app, as needed.

Recommeded Extension Activities

- The Space Place at NASA game, "Let's Go to Mars," has students load items into a Mars-bound rocket
  https://goo.gl/quRHQX

- Mars Match Game
  https://goo.gl/EeHbZa

- Trip to Mars
  https://goo.gl/AfrguA

- NASA Space Place Loopy Legends
  https://goo.gl/p29E62

References

Permission to use existing text and modify NASA's MAVEN Mission's Red Planet: Read, Write, Explore! Lessons 4 and 5 provided by the University of Colorado Boulder's Laboratory for Atmospheric and Space Physics.
https://goo.gl/9pGA9S

About the MAVEN Mission

The Mars Atmospheric and Volatile EvolutioN (MAVEN) mission to Mars has instruments onboard to explore why Mars and Earth evolved in such different ways. One of the goals of the MAVEN mission is to get very accurate measurements of Mars' atmosphere. These measurements enable scientists to determine what happened to Mars' atmosphere throughout history since Mars is thought to have been warmer and wetter in the past.

Common Core for English Language Arts

Writing

- W.2.2. Write informative/explanatory texts in which they introduce a topic, use facts and definitions to develop points, and provide a concluding statement or section.
- W.3.2., 4.2, 5.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
- W.4.9., 5.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.

Speaking and Listening

- SL.2.2. Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.
- SL.3.2. Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
- SL.2.4, 3.4., 4.4, 5.4 Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.
- SL.4.5., 5.5 Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.

Mars Adventure Travel Corporation - Realistic Script

Convince tourists to visit Mars! You are living in the year 2060, and you work for the Space Adventure Travel Corporation in their advertising office. There are new bases on Mars with habitats that maintain temperature, provide air to breathe, protect from radiation, and have running water. Create an advertisement convincing people to visit the Red Planet. Here are some ideas of what to talk about:

- What Mars is like
- What the trip to Mars will be like (for example, you could describe your ship and talk about how it usually takes at least six months to get to Mars)
- Where the tourists will stay once they get to Mars (use what you know about Mars, but also your imagination!)
- Fun activities you could do on Mars (for example: science activities, travel to destinations on Mars, recreational sports in lower gravity, etc.)
- A description of safety features for a stay on Mars

Write your script here.

Space Colony Report - Silly Script

NASA Headquarters, this is _____ reporting to you live from
YOUR NAME

_____ on Mars. We have been living at our base, Base
PLACE YOU LIKE TO VISIT

_____ , for _____. We are
NOUN (PERSON, PLACE OR THING) TIME (WEEKS, MONTHS, YEARS)

growing some _____ and _____ in our greenhouse.
LIVING THING FAVORITE FOOD

We have been exploring Mars in our _____ and collecting lots of
TYPE OF VEHICLE

_____
NOUN (PERSON, PLACE OR THING)

We have named a _____ after the famouse
NATURAL FEATURE (MOUNTATIN, CANYON)

_____, _____
TYPE OF JOB PERSON IN THE ROOM

Destination Mars

Credit: NASA

Mars is a dry, desolate place without flowing water or vegetation. The surface is covered by fine, dusty sand, similar to a desert on Earth. Children may believe that because it is red-colored, Mars is hot. In fact, it is quite cold. Since it's farther from the Sun than Earth—about 78 million kilometers (48.5 million miles) farther out—it's also very cold at the surface. Average temperatures hover around -80 degrees Fahrenheit (-60 degrees Celsius), but the temperature can drop as low as -225 Fahrenheit (-153 degrees Celsius). Even at noon at the equator on a summer day, the warmest temperatures are usually only up to about 70 degrees Fahrenheit (about 20 degrees Celsius). The temperature drops dramatically just a few feet above the surface, so your feet would be much warmer than your head!

The diameter of Mars is 6,800 kilometers across—about half the diameter of Earth. It has only ten percent the mass of Earth. Because of the small diameter and low mass, the surface gravity on Mars is only about 1/3 the gravity on Earth (0.38 to be exact). If you weighed 45 kilograms (100 pounds) on Earth, you would weigh 17 kilograms (38 pounds) on Mars.

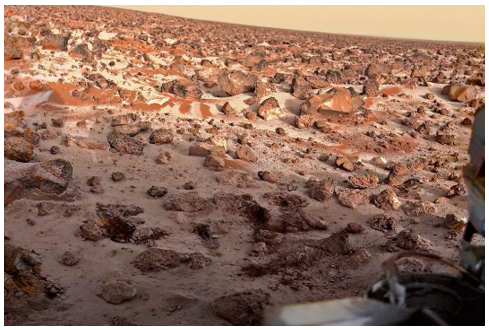
The thin atmosphere of Mars has very little oxygen, and unlike on Earth, its atmosphere does not trap much heat. The atmospheric pressure is 1/100 of Earth's. Huge sandstorms sometimes cover the face of the entire planet, but because of the low atmospheric pressure, the winds are very weak (just enough to stir up the dust). Mars has some of the same types of weather as on Earth, including dust devils, clouds, frost, and sunny days. It may even snow on Mars; NASA's Phoenix lander spotted what appeared to be a high-altitude snow storm in 2008. NASA's Mars Reconnaissance Orbiter observed dry-ice snow falling over the southern pole of Mars.

Note: The following images are all from the Space Stage App.

Mars is much colder than Earth because it is farther away from the Sun. Temperatures average a frigid -81 degrees Fahrenheit! Is your spacesuit well equipped to keep you warm?

URL: https://goo.gl/63fy97

Mars goes through extreme temperature changes from day to night due to a thin atmosphere and lack of water vapor. Average temperatures hover around -80 degrees Fahrenheit. Of course, temperatures vary based on seasons and distance from the equator.



NASA mission: Viking 2, 1979. Credit: NASA / JPL / Ted Stryk is licensed under CC BY-NC-SA 3.0

Destination Mars

Sunsets on Mars look very different than on Earth! Dust in the Martian atmosphere allows blue light to pass through while other wavelengths get blocked. Twilight, the time when you can still see a soft light from the sun even though it's below the horizon, is much longer on Mars – it lasts for close to two hours! This is caused by sunlight reflecting off of dust high in the atmosphere.

Mars boasts some of the biggest features in the entire Solar System! It has the largest volcano, Olympus Mons, three times taller than Mt. Everest, and the deepest and widest canyon, Valles Marinaris, which is about as long as the United States is across, making it four times longer and, in places, four times deeper than the Grand Canyon!

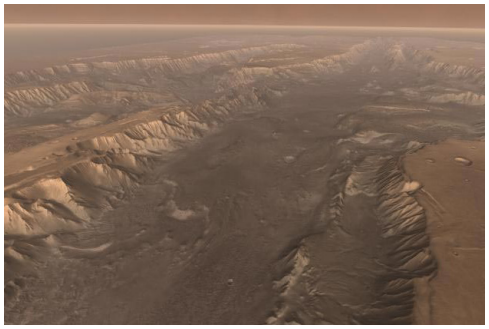
URL: https://goo.gl/r4cH4Z

NASA Mission: Curiosity Rover, 2015

Valles Marineris is the largest canyon in the Solar System. Valles Marineris is sometimes called "The Grand Canyon of Mars," but this Martian canyon is much deeper, longer, and wider than its terrestrial counterpart. It could stretch across the entire United States! It is approximately 2500 miles long, 400 miles across, and 4 miles deep!

Scientists believe that the canyon formed billions of years ago as the Martian crust cooled and cracked.

URL: https://goo.gl/tVNQaF



NASA/JPL/Arizona State University, "Flight Into Mariner Valley", 2006

Rising approximately 18,000 feet above the surrounding Martian landscape, Mount Sharp is taller than any peak in the continental United States. Still, it's not even a quarter of the height of Olympus Mons, the tallest peak on Mars. Scientists study the mountain's layers to better understand early Martian environments.

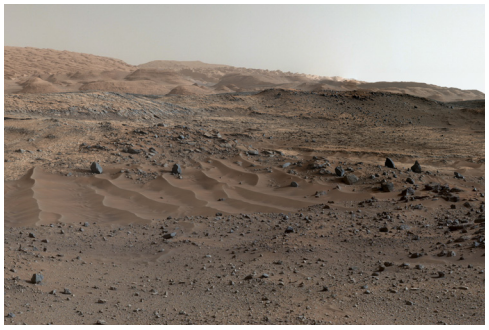
URL: https://goo.gl/w2pWvY

NASA mission: Curiosity Rover, 2015

Destination Mars

Studying the rocks, minerals, and landscapes on Mars's surface helps scientists better understand past Martian environmental conditions. This region on Mars likely had environmental conditions in its past that were suitable for supporting life.

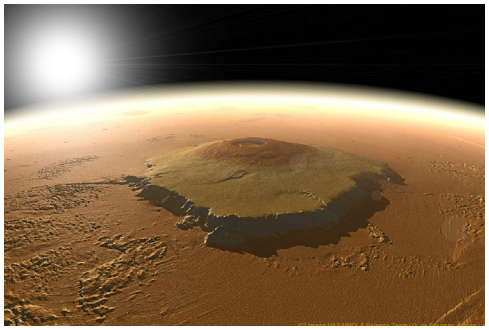
URL: https://goo.gl/os9Ac3



NASA Mission: Curiosity Rover, 2015

At over 90,000 feet tall, Olympus Mons is the largest known volcano in the entire Solar System. For perspective, Olympus Mons is three times as tall as Mt. Everest and as wide as the state of Arizona. Since the gravity on Mars is 62% lower than on Earth, climbing it should be a breeze!

URL: https://goo.gl/dnh2Zk



NASA/Mola Science Team/ O. de Goursac, A. Lark, 9 May 2012

Imagine what it would be like to go for a visit! Scientists and engineers are considering what it would take for humans to explore Mars. It's important to consider what a human would need to take with them just to step out onto the surface and take a quick glance around. If we want to visit the planet Mars and stay for any period of time, we have to consider the complexities involved in engineering an interplanetary journey and what a human needs to survive and thrive in a completely different environment. Along with our basic requirements of food, water, clothing, shelter, and oxygen, what else do we use and do every day that makes us not only able to survive, but keeps us happy and healthy, both mentally and physically, on Earth? These are questions scientists and engineers have when trying to design a space mission involving humans, whether they are simply going into orbit around Earth, staying for awhile in the International Space Station, or traveling farther out into space.

Humans require a lot to keep them alive, and that makes sending humans into space both risky and expensive. A long mission to Mars would not only be dangerous, but very physically and mentally taxing on the participants. Huge amounts of equipment are required to provide radiation protection, oxygen, waste removal, food, and exercise equipment. In space, muscles degrade, bones deteriorate, and the heart shrinks. Just to get to Mars would be an amazing feat for a human.

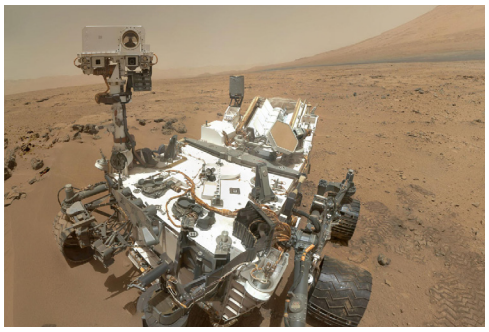
Once there, the shelter would have to be shielded from harmful radiation (e.g. from the Sun). Water and energy would have to be generated, and food would have to be grown. A trip to Mars would be for scientific research and that would include bringing transportation, digging equipment, and scientific instruments. To top it all off, some of the equipment would arrive needing assembly!

Destination Mars

Does the risk outweigh the benefit? Many would argue, "yes," yet there are many reasons to push the limits of our capabilities by exploring *farther* and *farther*, both on Earth and off.

NASA's Curiosity rover has many different tools to help it complete its mission, including a scoop that helps it collect rock samples.

URL: https://goo.gl/SeZ6kA



NASA mission: Curiosity Rover, 2012

Supporting Media

Videos, images, and websites can be incorporated before, during, or after Mars-related activities.

Green Screen Filming Tips

- "How Does a Green-Screen Work?"
  https://goo.gl/wbZu2e

Mars Background Information

- Mars in Minute: Is Mars Red Hot? (NASA JPL)
  https://goo.gl/wJmr2j

- Mars in a Minute: Is Mars Really Red? (NASA JPL)
  https://goo.gl/KXnyWe

- Mars 101 (National Geographic)
  https://goo.gl/mSrcHL

- Learn about Mars Facts with Pictures!
  https://goo.gl/woVuca

- The Mysteries of Life with Tim and Moby: Is there Life on Mars (Brain Pop)
  https://goo.gl/6RW6FV

- Mars Lithograph, NASA Educational Product LG-2013-07-569-HQ:
  https://goo.gl/aXmKSb

- Check out Rover POV: Five Years of Curiosity Driving on Mars to find out what driving NASA's Curiosity rover on Mars is like!
  https://goo.gl/4tYqsN

Near-real-time Weather Data

- Access to Mars weather updates from the Curiosity rover on Mars (cut and paste into browser)
  https://goo.gl/ChPXJo

- Access to weather website such as National Weather Service:
  https://goo.gl/YV8UGF

What's the Weather Like on Mars?

- Wispy Blue Clouds Over Mars:
  https://goo.gl/EYVaSv

- Clouds over the Eastern Martian Horizon:
  https://goo.gl/LzmLhx

- Clouds Sailing Overhead on Mars:
  https://goo.gl/f9Co3J

- Clouds Sailing Above Martian Horizon:
  https://goo.gl/JeGqii

- Frost at the Viking 2 landing site:
  https://goo.gl/8cfh3r

- The Serpent Dust Devil of Mars:
  https://goo.gl/HtMr2F

- NASA's Curiosity Sees Blue Sunset On Mars:
  https://goo.gl/QsWVs1

- Seasonal Cycles at Gale Crater (as measured by NASA's Mars rover Curiosity):
  https://goo.gl/5qYn3W

Mars Scenery

- Take a tour of Valles Marineris in NASA's Flight Into Mariner Valley video.
  https://goo.gl/8n959c

- Use NASA's Mars Trek website to get a firsthand view of the Martian surface!
  https://goo.gl/iB1VGH

Human Exploration of Mars

- Mars: Enduring the Journey (National Geographic)
  https://goo.gl/MRud3v

- Mars: How to get to Mars (National Geographic)
  https://goo.gl/z6taHs

- Today I learned how to transform Mars into our second home (National Geographic)
  https://goo.gl/CiZ25x