



Lesson Plans & Activities

Activities, lesson plans, and a universe of educational resources.

Educational Resources

While there is no official Educator Guide for the *Apollo 11 First Steps Edition* film, there is a universe of **educational resources** available through NASA and other sources.

What follows are examples of lesson plans, hands-on activities for museums and classrooms, an Earth and Space Science Toolkit and an Educator Guide on the lunar surface. These materials can be **shared with teachers**.



Classroom Activities



Jet Propulsion Laboratory Classroom Activities

Search by: Type, Subject, Grades, Topics

Grades: K-12

Subjects: Science, Technology, Engineering
Math, Language Arts, and Arts

NGSS standards: Provided for each activity.

Visit this website to look at hundreds of activities.

<https://www.jpl.nasa.gov/edu/teach>



Sample Activity



Jet Propulsion Laboratory
California Institute of Technology

Jet Propulsion Laboratory Classroom Activities

Sample: Roving on the Moon Activity

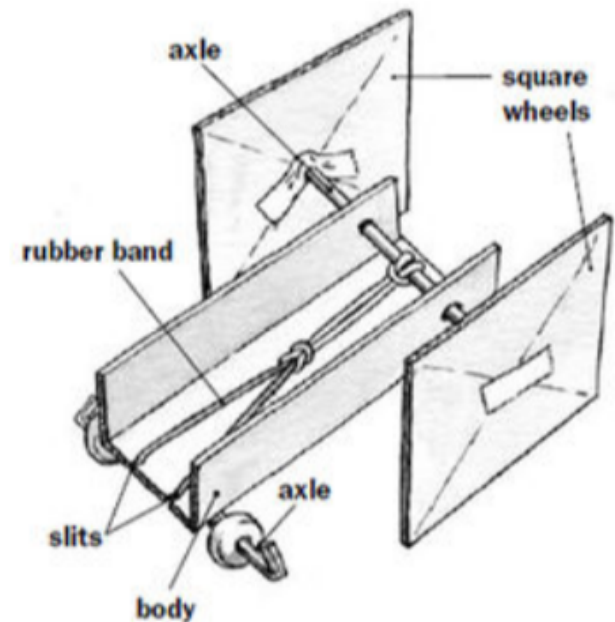
Grade level: 6 - 12

Subjects: Engineering

NGSS standards: Provided.

Engineering students design a rubber band-powered rover that can scramble across the room.

<https://www.jpl.nasa.gov/edu/teach/activity/roving-on-the-moon/>



Sample Activity



Jet Propulsion Laboratory
California Institute of Technology

Jet Propulsion Laboratory Classroom Activities

Sample: Touchdown Activity

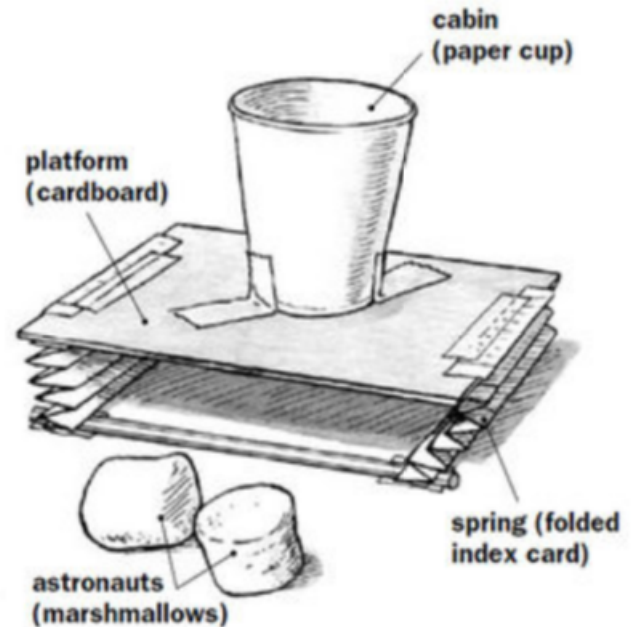
Grade level: 3 - 8

Subjects: Engineering & Technology

NGSS standards: Provided.

Students design and build a shock-absorbing system that will protect two "astronauts" when they land.

<https://www.jpl.nasa.gov/edu/teach/activity/touchdown/>



Educator Guide

Exploring the Lunar Surface

Grade level: 3 - 5

6 Lesson Plans

Subjects: Science, Engineering, Math

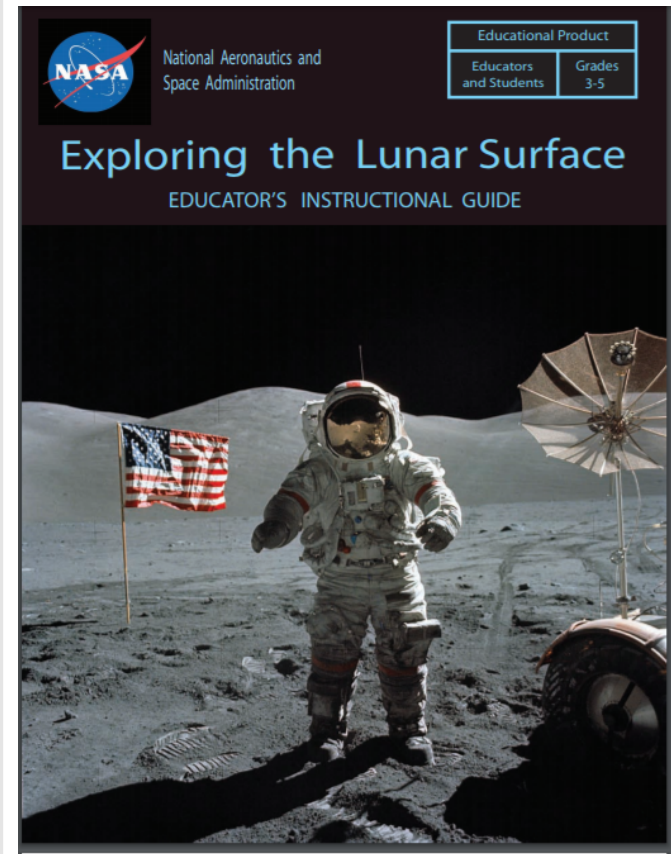
NGSS standards: Provided.

Created by: SpaceMath@NASA

Students will build models to learn about spacecraft, do experiments to understand weightlessness, and will explore the lunar surface using photos, data, math and other skills.

Download the Educator Guide here:

https://www.nasa.gov/pdf/737171main_Exploring_Lunar_Surface.pdf



STEM Activities and Teacher Guide

Lunar Math

Grade level: 5 - 12

Subjects: Math and Science

NGSS standards: Provided.

Created by: SpaceMath@NASA

Students will learn about the moon, its cycles, its craters, eclipses and will learn math skills at the same time. This Guide is a collection of activities, based on one-page space science problems with an answer key and Teacher's Guide and can also be used as a classroom challenge activity.

Download the Educator Guide here:

https://www.nasa.gov/pdf/737171main_Exploring_Lunar_Surface.pdf



Educational Toolkit



Explore Science: Earth & Space 2019 Toolkit

Components:

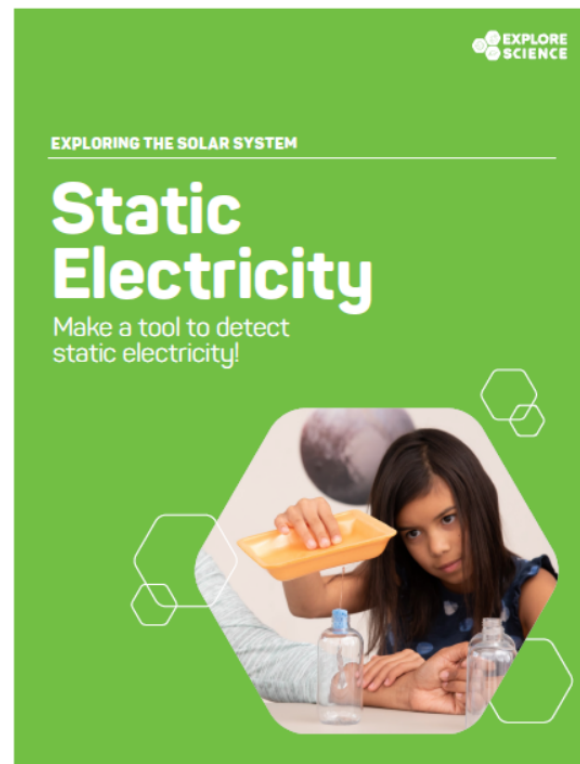
- 9 planning documents
- 5 training materials
- 11 hands-on STEM activities

Subjects: Earth, Science, Technology

Created by:

In collaboration with NASA, the NISE Network has assembled a new set of engaging, hands-on Earth and space science experiences with connections to science, technology, and society.

<http://www.nisenet.org/earthspacekit-2019>





Level: Kids all ages, Families, Educators

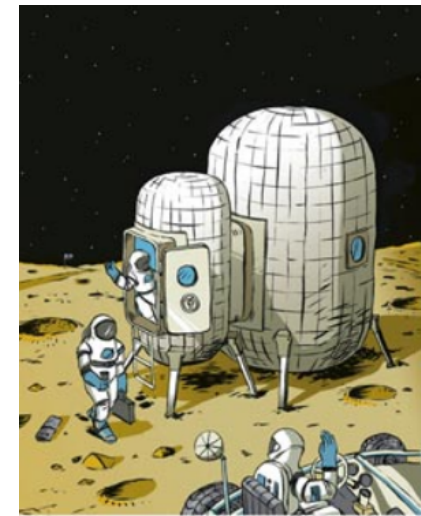
Subjects: STEM

Components: Hands-on activities, fun games, articles, short videos.

Created by: NASA Space Place Team at JPL

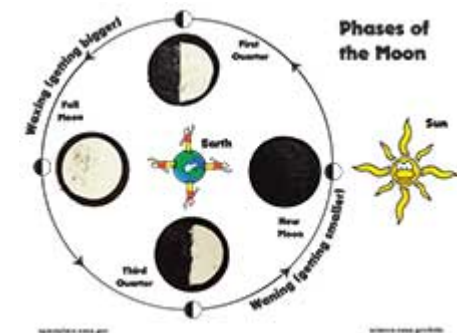
NASA Space Place's mission is to inspire and enrich upper-elementary-aged kids' learning of space and Earth science online through fun games, hands-on activities, informative articles and engaging short videos. Material in both English and Spanish and resources for parents and teachers.

Visit this site: <https://spaceplace.nasa.gov/>

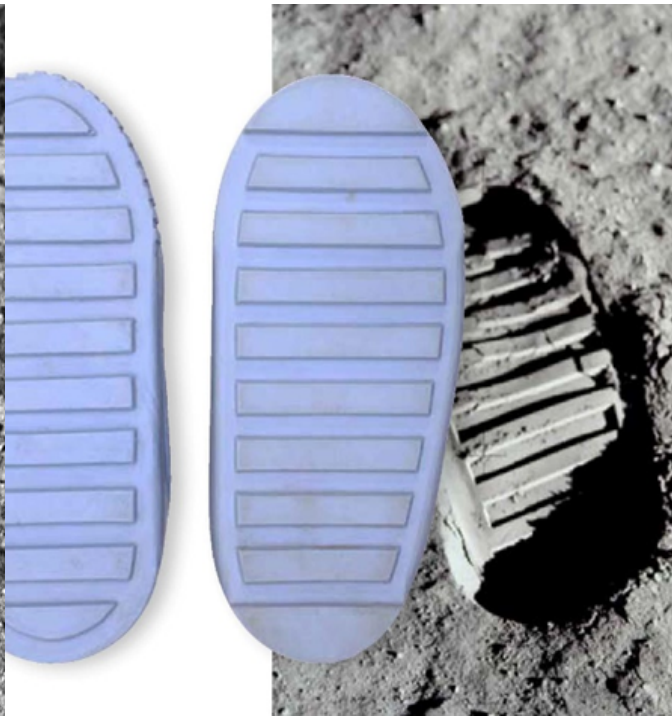
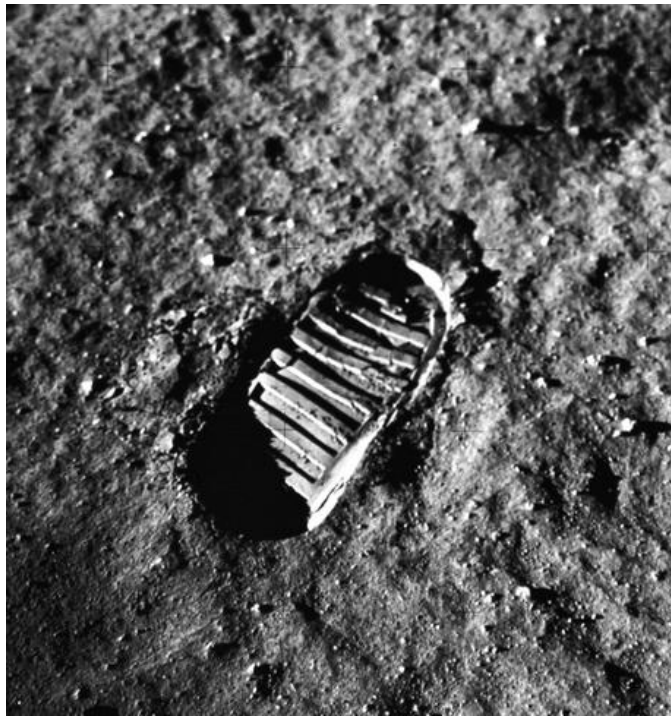


Carl DeTorres (with permission)

Build a Lunar Habitat



Make Oreo Moon Phases



Make your own Lunar Footprint!

Build a mock-up of a moon boot and the lunar surface and have kids try on the moon boot and see what its like to create a footprint on the moon, just like Neil Armstrong!

How far away is the moon?



Farther than you think! Use this demo to explain *how* far.

To show how far and how hard it is to get to the moon, use this demo to compare it to sending a spacecraft into Earth's orbit. Start with Earth as the size of a basketball, the moon the size of a softball, then take a string and ask students to guess how far away the softball would be from the basketball. **Answer: 24 feet!**

Then use a model of the ISS or space shuttle, that flies in earth orbit and ask them how far away the model would be. Most will guess half way. **Answer: 1 centimeter!**

The moon is 240,000 miles from earth and the ISS flies 250 miles above Earth.

NGSS Connections for *Apollo 11*: *First Steps* *Edition*

Teachers can use *Apollo 11: First Steps Edition* with additional activities and discussion to support the **Next Generation Science Standards**.

What follows are the NGSS standards and film tie-ins for Upper Elementary through High School.

Upper Elementary:

[3-PS2-2](#) Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

When we see the diagrams *Apollo 11*'s path, it is clearly possible to make predictions about where it will go in the future.

[4-PS3-4](#) Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.

Students who see *Apollo 11* will be primed to do a water rocket or paper rocket design challenge when they get back to class.

[5-PS2-1](#) Support an argument that the gravitational force exerted by Earth on objects is directed down.

Watching the Saturn V launch and the re-entry capsule splashdown are clear examples of Earth's gravity pulling down.

NGSS Connections for *Apollo 11*: First Steps Edition

Middle School

[MS-PS2-4](#) Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.

We see the difference in how the astronauts move while on the moon (where gravity is less, because of the moon's smaller mass). Also, gravity is clearly an attractive force since the large Saturn V rocket is needed to get the astronauts off the Earth.

[MS-PS3-3](#) Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.

This is the kind of problem that NASA engineers had to solve many times in the space program. The astronauts needed to maintain a comfortable temperature while on the moon, so the suit could warm or cool them as needed. The re-entry capsule had a heat shield to protect the crew from high temperature gasses around them on descent.

[MS-ESS 1-1](#) Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.

The diagram of Apollo 11's path from the Earth to the moon could be used to reinforce the arrangement of the Earth, moon, and sun.

[MS-ESS 1-3](#) Analyze and interpret data to determine scale properties of objects in the solar system.

The diagram of Apollo 11's path from the Earth to the moon helps to convey the scale of distances in the Solar System. Also, the emphasis on how many days the astronauts were in transit from Earth to the moon, even though they were travelling very, very fast. Finally, the motion of the astronauts as they moved around on the moon clearly shows that they weigh less there.

[MS-ETS 1-1](#) Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

President Kennedy's speech could be thought of as the beginning of the definition of the engineering challenge of getting to the moon. He specified a time frame, that the astronauts would land on the moon (not just orbit it), and that they would return to Earth safely.

NGSS Connections for *Apollo 11*: First Steps Edition

High School

[HS-PS2-1](#) Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.

To support this, ask students to use Newton's second law to explain the staged design of the Saturn V launch vehicle. Why have sections of the rocket drop off after the fuel was consumed? Compare the size of the rocket motor at the bottom of the Saturn V to the rocket on the lunar lander. Why is the lunar lander rocket so much smaller?

[HS-PS2-4](#) Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects.

Obtain the mass and radius data for the Earth and the moon and have students calculate the difference in gravitational force at the surface of each body. At one point on the journey from Earth to the moon, the gravitational force of the Earth on the astronauts would be exactly the same as the gravitational force of the moon on the astronauts. Where would that point be?

[HS-PS3-3](#) Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.

There are many examples in the film of NASA engineers working on design challenges like this. The Saturn V launch vehicle converts chemical energy into kinetic energy, which is converted into gravitational potential energy. On reentry, the kinetic energy of the vehicle is converted into heat.



Apollo Photos, Videos and Audio

<https://www.nasa.gov/specials/apollo50th/index.html>

Visit this site to get Apollo photos, videos and audio - including the full CBS TV broadcast of the lunar landing and first steps - with Walter Cronkite.



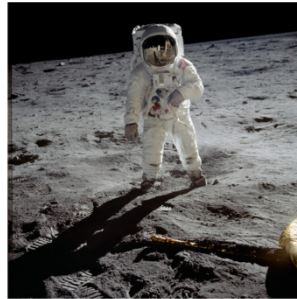
Apollo 17 - Eugene Cernan working at the Rover.

Image Credit: NASA/Jack Schmitt (assembled by Mike Constantine)

Apollo 11



One of the first steps taken on the Moon; this is an image of Buzz Aldrin's bootprint from the Apollo 11 mission.
Image Credit: NASA



Apollo 11 astronaut Buzz Aldrin on the Moon.
Image Credit: NASA



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Apollo 50th Anniversary Websites

Visit these sites for Apollo photos, 50th anniversary logos and info on all the Apollo missions:

<https://www.nasa.gov/apollo11-gallery>

<https://www.nasa.gov/feature/nasa-releases-logo-to-mark-apollos-50th-anniversary>

<http://www.nisenet.org/moon50>

https://www.nasa.gov/mission_pages/apollo/index.html



NASA STEM Engagement



NASA Education Resources

Search hundreds of resources by subject, grade level, type and keyword. This site is designed for educators, students, and even a NASA Kids Club. Use the **NASA Youtube Channel** and join **NASA Wavelength**, a digital collection of resources for educators.

<https://www.nasa.gov/offices/education/about/index.html>

<https://www.youtube.com/channel/UC9SM7V7J1pAhPabOUST01fw>



NASA Space STEM Forum

Find a universe of resources related to Apollo 11, the moon, events, other STEM topics and future space exploration like the Moon to Mars Mission. Activities and materials are designed for teachers, museums and students.

<https://spacestem.nasa.gov/nasa.gov/moon2mars>



[Apollo Info / Original Sources](#)



[Images / Audio / Video](#)



[Lessons / Activities \(pending\)](#)



[Printables](#)



[Our Moon](#)

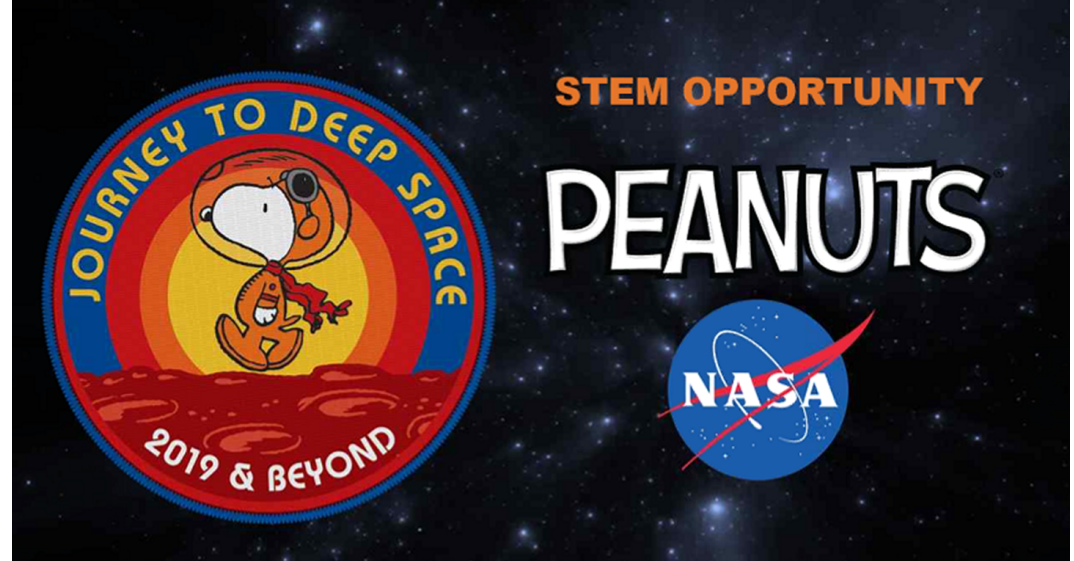
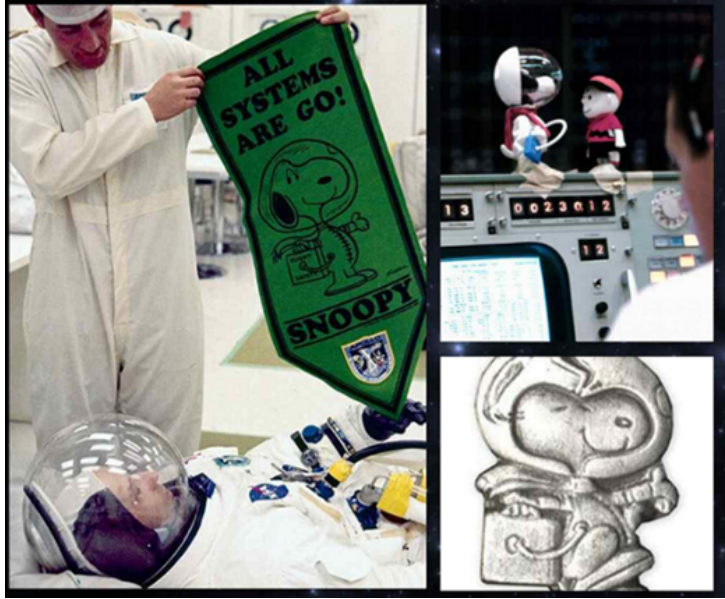


[Contests and Challenges](#)

NASA Space STEM Forum Resource Page

Categories are listed on the Forum Resource Page.

<https://spacestem.nasa.gov/resources>



Charlie Brown & Snoopy on Apollo 10

In **May 1969**, **Apollo 10** traveled to the moon, and the actual command and lunar modules were named **Charlie Brown** and **Snoopy**. The Charles M. Schultz Museum has created educational materials available for schools and museums.

SCHULZ MUSEUM EXHIBITION TO THE MOON: SNOOPY SOARS WITH NASA



Just before the first man landed on the moon, Charlie Brown and Snoopy soared through space with NASA's *Apollo 10* mission in May 1969. The exhibition *To the Moon: Snoopy Soars with NASA* examines the history of *Apollo 10* and the *Peanuts* characters' role in that flight and in the NASA Manned Flight Awareness safety program.

Created by the Charles M. Schulz Museum and Research Center, Santa Rosa, California.

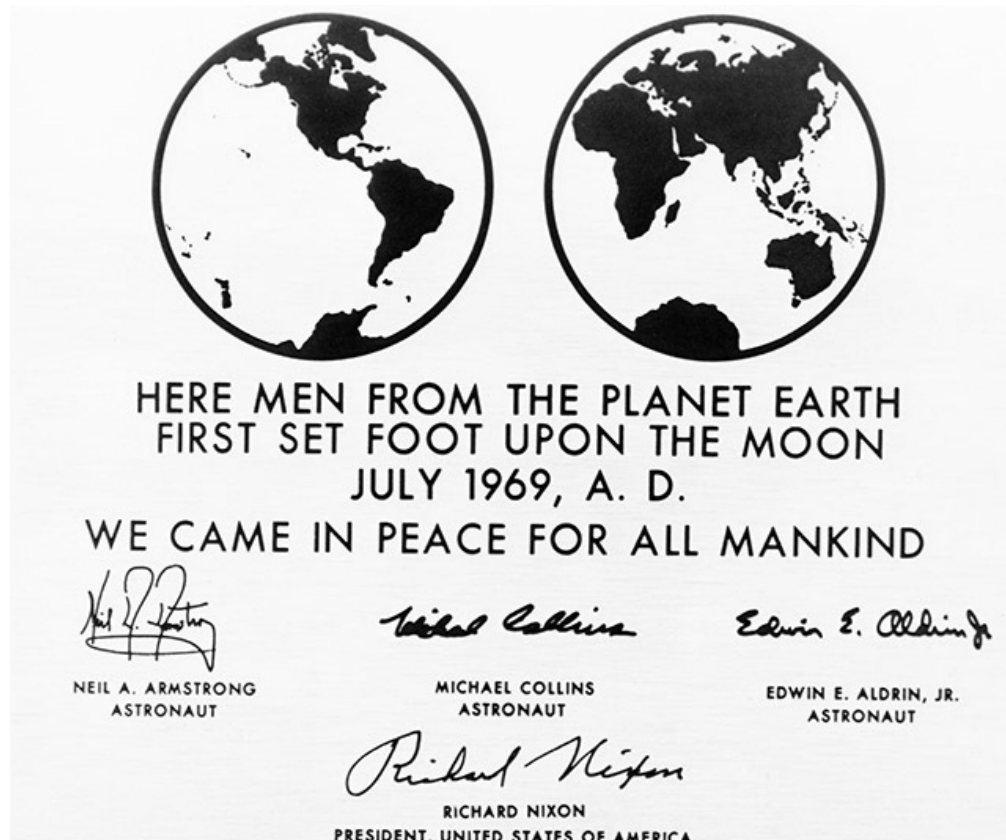
Educational material
available from the Charles M.
Schultz Museum
Contact: natasha@schulzmuseum.org

Educational Materials:

- In-school curriculum & digital apps
- A 2000 sq. ft exhibit *To The Moon: Snoopy Soars*, with artwork, photos, available for lease.
- STEM content for kids

We are all one

The astronauts placed a plaque on the moon on behalf of all humankind.



"ENTIRELY AWE-INSPIRING"
THE NEW YORK TIMES

"MAGNIFICENT"
THE WALL STREET JOURNAL

"COMPLETELY RIVETING"
THE LOS ANGELES TIMES

A TODD DOUGLAS MILLER FILM

APOLLO 11

FIRST STEPS EDITION

FEATURING NEVER BEFORE SEEN 70MM FOOTAGE

PRESENTED BY

ABOVE & BEYOND

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statementpictures

This Marketing & Educational Guide was produced and compiled by MacGillivray Freeman Films for use in marketing and planning educational programs for *Apollo 11: First Steps Edition*. We hope your mission is successful!