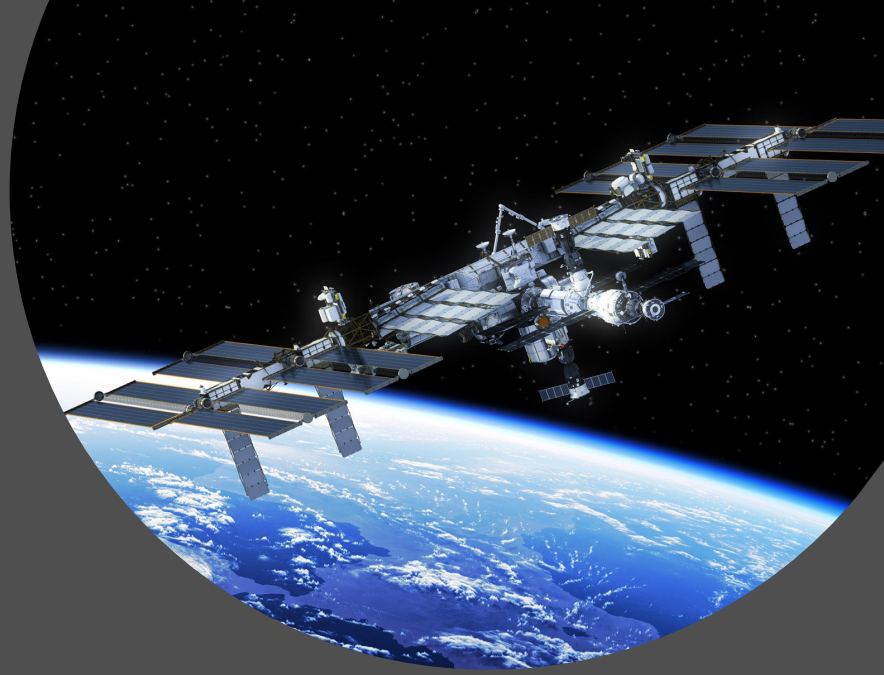
Key Messages

Going to the moon was one of the **greatest engineering feats** ever achieved … taking humans on the longest trip in history **240,000 miles from earth**.

How many times have you heard the phrase…. **If they can land a man on the moon, they can do …. anything.**

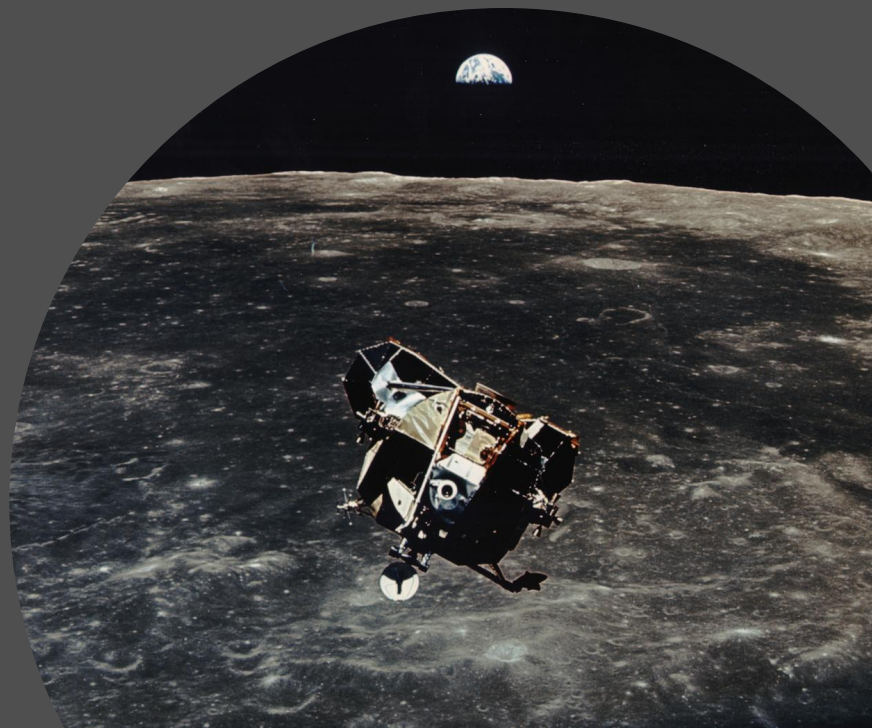
Key Messages

The International Space Station flies **234 miles** above earth.



The Apollo spacecraft flew **240,000 miles** from the earth to the moon.

That's **1,000 times farther away!** And much more difficult to reach.



Go to slide #27 for an activity that demonstrates why!

Key Messages

Apollo 11 was the **ultimate adventure**.

Neil Armstrong and Buzz Aldrin were the **first humans** to ever set foot on **another world.**

In total, 12 Apollo astronauts walked on the moon.

Key Messages

Nostalgia for that great year in history … **1969**

- Where were you on July 20, 1969 when man first walked on the moon?
- Grandparents can take their grand kids to the movie and tell their stories.
- Tap into the music and culture of the day… Woodstock was only 3 weeks away.

Key Messages

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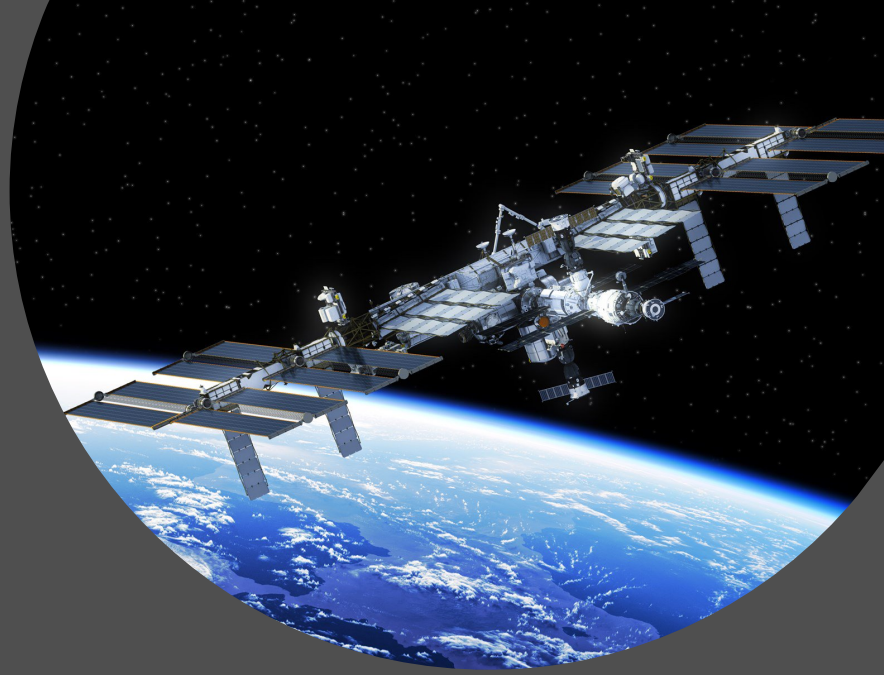

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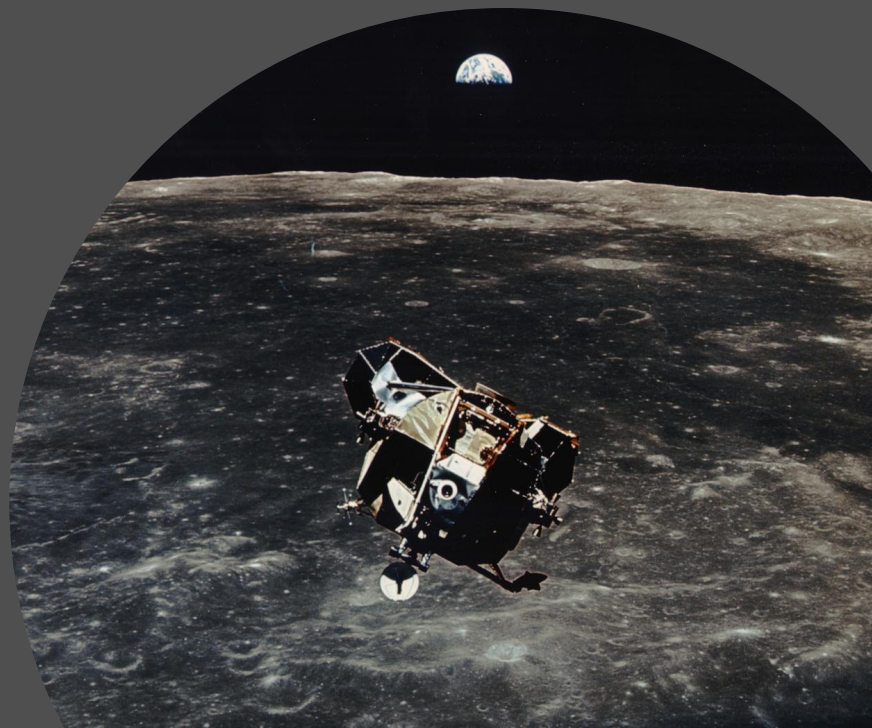
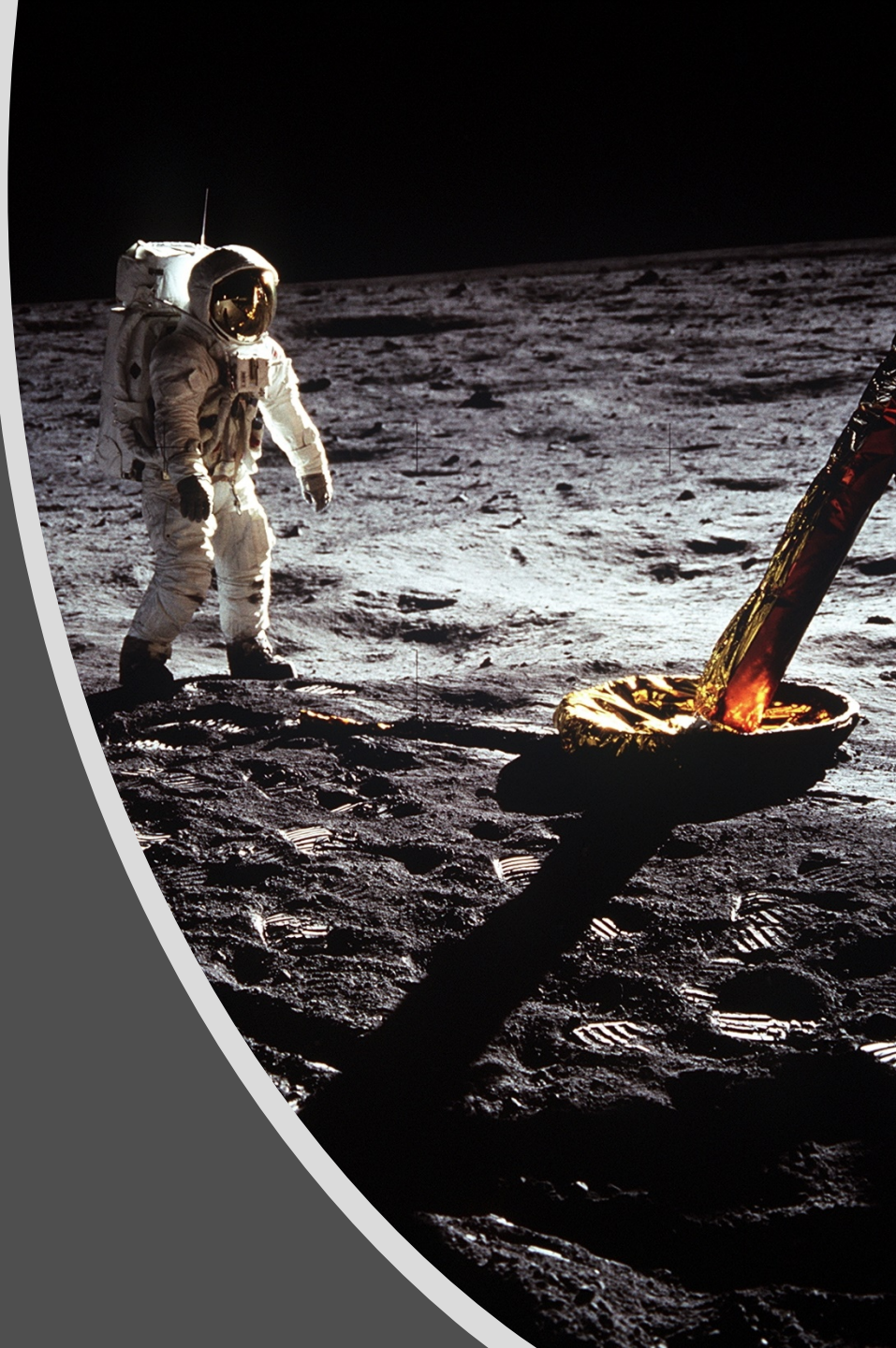


Go to slide #27 for an activity that demonstrates why!

Key Messages

Kids can experience what its like to be an astronaut and **walk on the moon**!



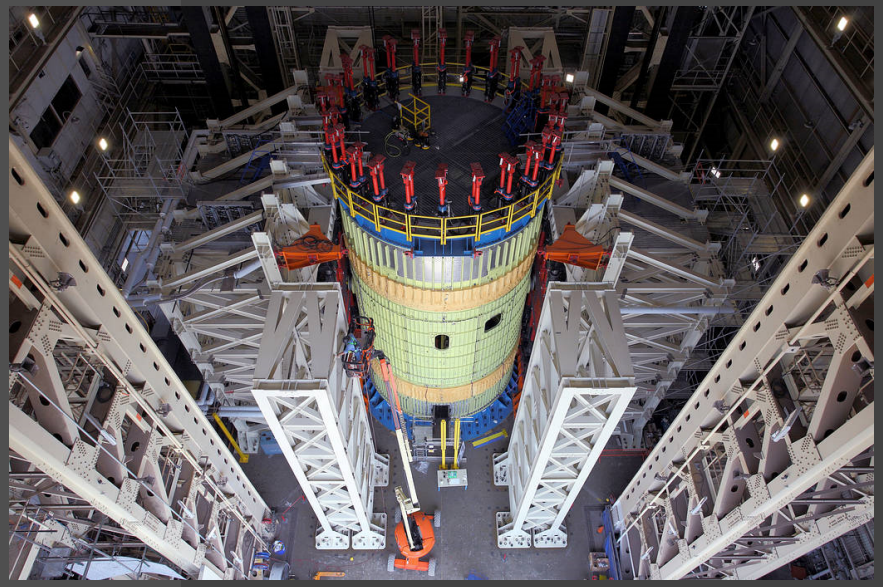
Key Messages

NASA looks to the Future and the **Next Generation** with the **"Moon to Mars"** program. Goal – build a permanent human presence on the moon.

A new Space Launch System and Orion spacecraft is being built now – target is to fly to the moon in 2024.

Next stop … Mars!

VISIT nasa.gov/moon2mars



Key Messages

The goal was to explore the moon, but when we looked back, **we discovered the Earth**.

Seeing the Earth as a whole without borders had a profound effect on the world.

In 1971, during the Apollo missions, organizations like **Doctors Without Borders** were formed.

Apollo Alumni across the U.S.

It is estimated that **411,000 people** employed at more than **20,000 industrial firms and universities** across the U.S. worked on the Apollo missions.

Reach out to companies in your city that worked on the Apollo missions and **invite the alumni** to participate in events and bring in their kids, grand kids, and friends to see the film.

Technology Then and Now

There is more
COMPUTING POWER
in your cell phone than the
entire computing power for the
Apollo 11 program.

Technology Then and Now

Great message for young people:: Your smartphone is millions of times **more powerful** than NASA's combined computing in 1969. It shows what you can do with **creativity and determination**!

Computers were used for only a **limited** number of tasks on Apollo, such as guidance and communications. But Apollo did use computers for the FIRST TIME, **launching the computer era.**

At left is the now ancient **Apollo Guidance Computer** (AGC) developed by MIT. Astronauts could type in nouns and verbs that controlled the spacecraft. It only had 64K byte of memory and operated at 0.043MHz.

She wrote the code that helped land man on the moon.

Margaret Hamilton, from MIT, stands next to program "listings" of the actual computer code that she wrote by hand for the Apollo Guidance Computer.

She is credited with inventing the term "software engineering."

"There was no choice but to be pioneers," she said.

In 2016 she received the Medal of Freedom from President Obama for her pioneering work.

Women in STEM Then and Now!

Many **women were part of the NASA team in** the early space program leading up to Apollo. They worked on mathematical problems and were sometimes called the human computer!

Watch this video as NASA honors women throughout its history:

https://www.youtube.com/watch?v=jIL-iRF5u34

Encourage Girls to explore STEM

Now there are many resources available for girls to experience STEM. Use *Apollo 11: First Steps Edition* to inspire girls in STEM and maybe even … **rocket science!**

Technology Then and Now

Then …at the Goddard Space Flight Center in Maryland flight technicians and computer experts employed the

IBM System/360 Model 75s mainframe for independent computations and to maintain communications between Earth and lunar landers.

These computers cost **$3.5 million** each and were **the size of a car!**

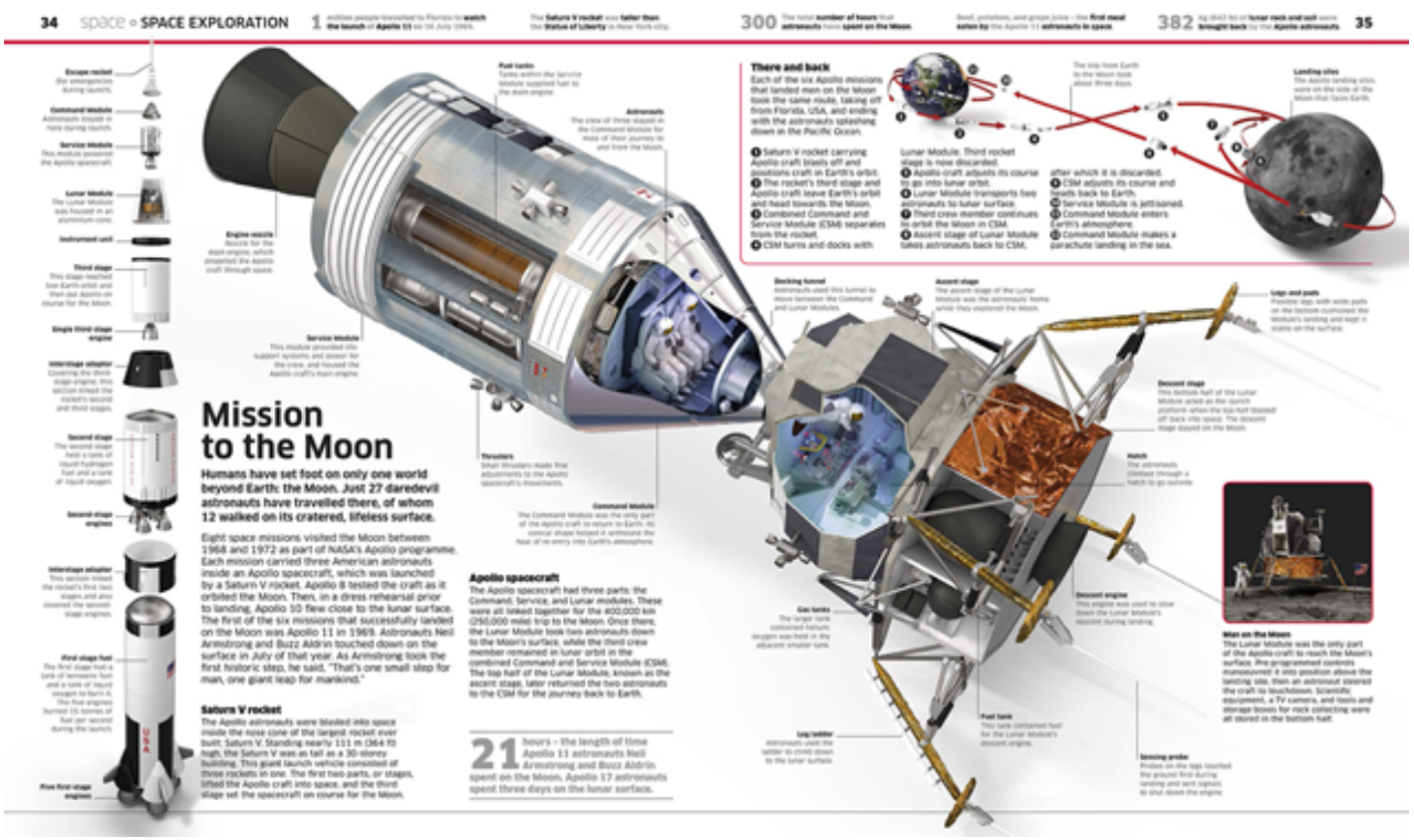
Now … A simple **USB stick** is more powerful!

The F-1 Engine on the Saturn V rocket lifted man to the moon.

Amazing Engineering … all done with a slide rule!

There were five F-1 engines and each one created **1.5 million pounds** of thrust.

The turbo pump had to withstand liquid oxygen coming in at **300 degrees F below zero** and when ignited it was **1,500 degrees F hot.**



A million elements and it all had to work perfectly. And it did!

The Saturn 5 rocket had 3 stages with 11 different engines that had to be timed perfectly. The Service Module and Lunar Module separated, then docked in space, the Lunar Module then separated, landed on the moon and then one engine lifted the LEM off the moon and it docked again with the Command Module. The only part of the entire 360 foot tall Saturn 5 that returned to earth was the tiny Command Module at the top, the module that carried the astronauts home. **And it all worked perfectly.**

"One of the unexpected but welcome things *Apollo 11* accomplishes is restoring a sense of how **insanely complex** the lunar mission was, and how **audacious**.

How did people even have the nerve to **dream a dream this big**, not to mention the determination and skill to **pull it off** without a hitch?"

-The Los Angeles Times

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!