Water Rokit

NASA Artemis Sessions

These sessions consist of:

- An overview of Artemis 1.
- The Artemis Mission 1, 2 and 3.
- What makes up the SLS and Orion capsule?
- Building the biggest rocket in the world.
- Who has hitched a ride inside Orion?
- The stages of the Artemis 1 mission.
- Some comparisons, whilst flying the Water Rokit.
- A fun quiz about the Artemis Programme.
- Moon shots / video clips.

N.B: There is a lot of information here. Have a read through, as depending on the age of your audience and the time you have available, you may want to only use part of this document in your session.

Contact Charlotte Harverson – Head of Education with any questions at: charlotte@waterrokit.com or 07730 777219.

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A Night to Remember

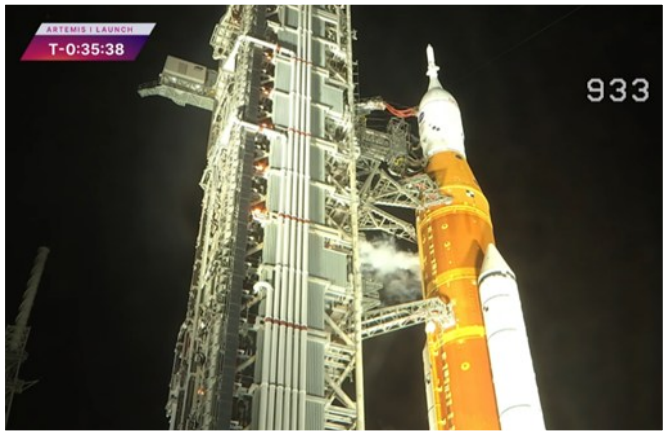
It was a pitch-black night on 16th November 2022 in Florida, USA, and lurking in the darkness, a colossus sat patiently waiting, quietly exhaling, with breath so cold that it instantly evaporated against the humid air surrounding it. The beast was bigger than New York's Statue of Liberty or London's Big Ben, with enough power to light the heavens, explode giant holes in the Earth's surface, or to keep eight Boeing 747 aeroplanes in the air at the same time.

What was this strange creature — you might be thinking — waiting to burst into life?

You may think I'm describing a mythical dragon or some such creature. But no. This monster represents years of research and development with humankind working at its best, in the biggest team imaginable, spanning continents. Their hard work culminating in something so awe inspiring that it makes you feel like you could achieve anything – **even fly to the Moon and back.**

HANG ON…… wait a minute, did you say **"fly to the Moon and back"**? Well, that's exactly what this COLOSSUS is designed to do.

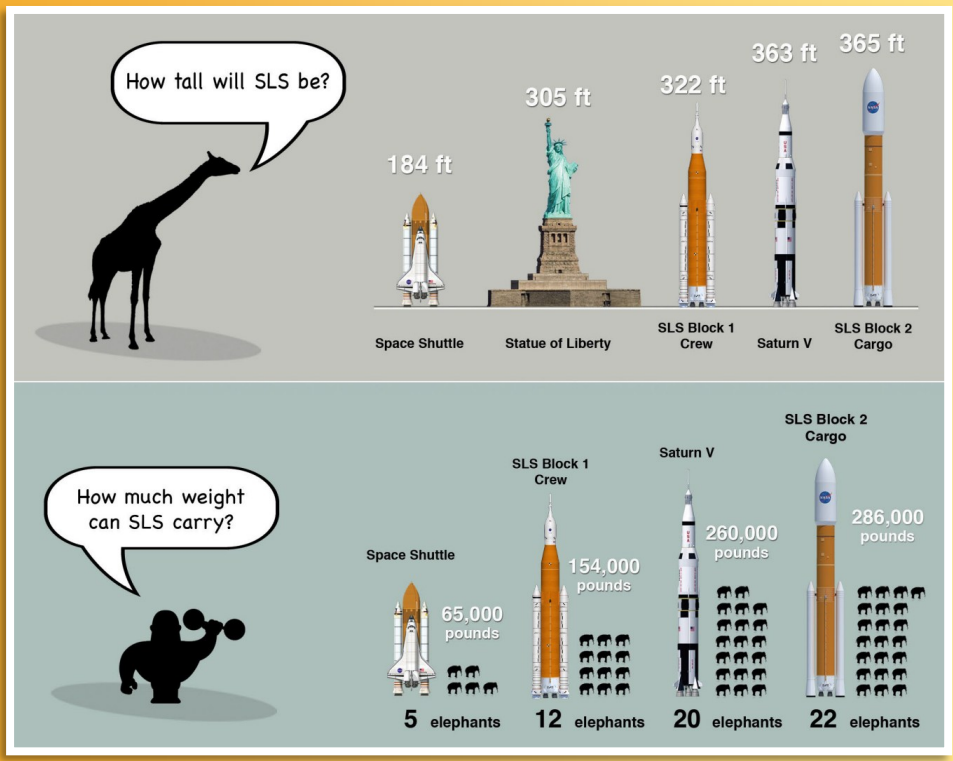
Ask your group what they think you are talking about.



Meet NASA's mega rocket, the most powerful rocket ever. The Space Launch System, or SLS. Currently, the SLS is the only rocket with enough power to send lots of cargo and equipment, or a manned spacecraft, to the Moon and beyond.

(As a side note, watch out for SpaceX's Starship coming soon).

How many elephants do you think the SLS could carry into Space?



The SLS crew version weighs almost as much as 8 fully-loaded 747 jumbo jets, producing as much thrust at launch as 139 jet engines.

On top of this rocket sits a large, heavy capsule named Orion, which is designed for interplanetary travel, and can carry four astronauts. Inside this spacecraft is everything needed for travelling into deep Space, where the crew live, eat, sleep, work, and yes, I know what some of you are thinking – go to the toilet too.

Your mission, should you choose to accept it, is to travel with me on this thrilling journey to the Moon and back, to learn about the most exciting mission yet that human-kind are embarking on. As Buzz Lightyear says famously in the movie Toy Story, **"to infinity and beyond"**. Or at least to the Moon and back, with an end goal of colonising Mars!

Put your helmets on, strap yourselves in, and let's get started!

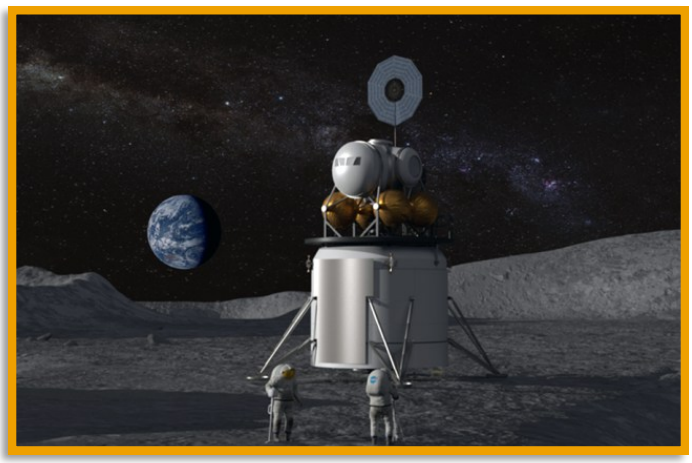
An Overview of Artemis 1

The SLS is part of the Artemis Programme.

Who can tell me what the Artemis Programme is?

The goal of NASA's Artemis programme is to put astronauts on the lunar surface (the Moon), and to develop an ongoing presence there. Yes, they're going to set up camp!

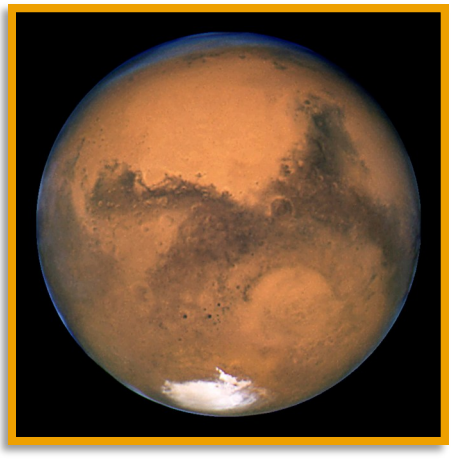
The programme's name comes from Artemis, the Greek goddess of the Moon, and twin sister to Apollo. The Apollo programme first brought astronauts to Earth's natural satellite, the Moon, on 20th July 1969.



It may feel like we are talking science fiction here, but the Artemis mission's objectives involve them making use of the Moon as a stepping stone for a mission onwards to Mars.

Do you think you would like to go to Mars? What do you think it would be like?

Robots have done all the detective work on Mars so far, but NASA now aims to send astronauts there. With a future target set on Mars (also nicknamed the Red Planet), the return to the Moon will provide us with valuable data, knowledge, and tools to prepare us for visiting Mars.



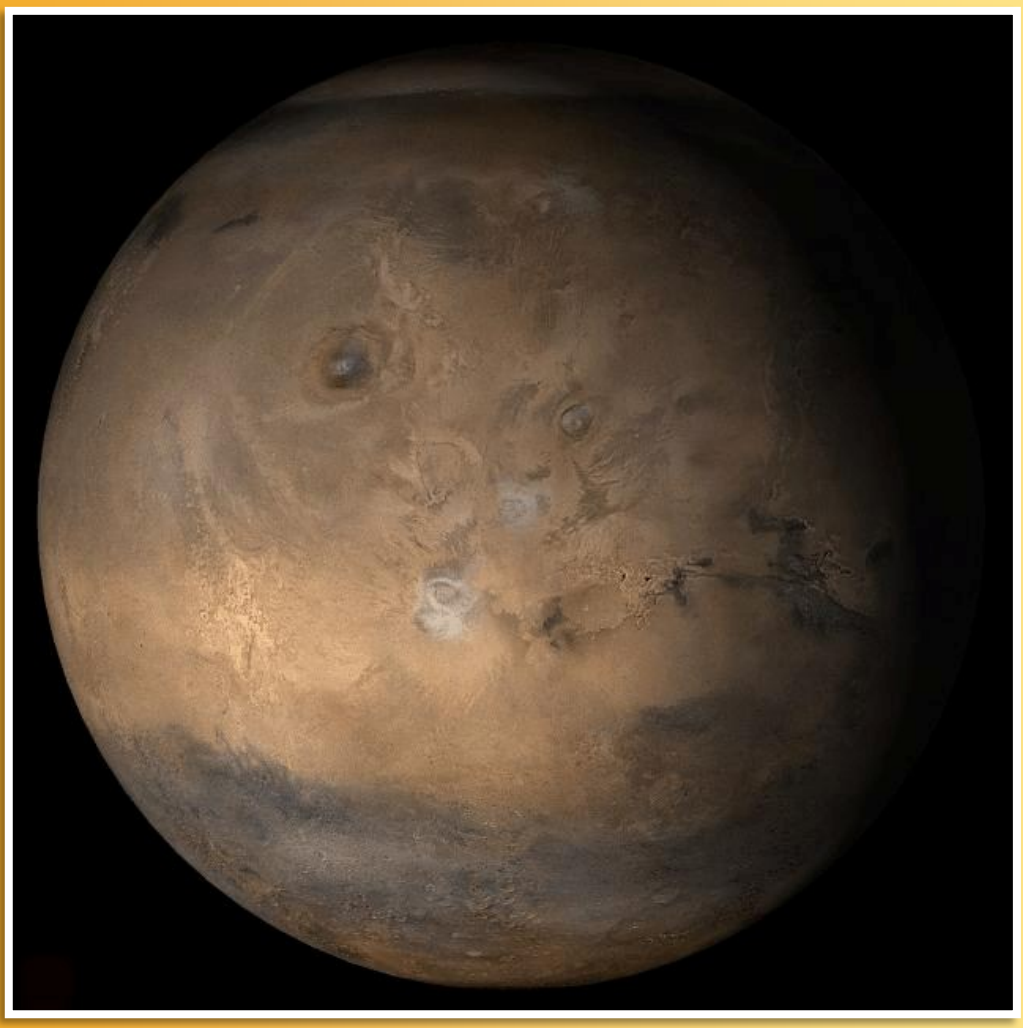
How many miles is the Moon away from Earth?

Approximately 250,000 miles – so a round trip from Earth and back is 500,000 miles. A bit too far away for a weekend break.

How many miles is Mars away from Earth? And how long do you think it would take to get there?

The exact answer varies as both Mars and Earth are constantly moving on their own orbits around the Sun, but on average, Mars is about 140 million miles from Earth.

Getting to Mars is a seven or eight-month journey, and when you get there, you would have to wait 15 months for the planets to align correctly again before you were able to return to Earth.



Quiz: An overview of Artemis 1

1. What is the goal of the Artemis programme?

Answer: The goal of NASA's Artemis programme is to put astronauts on the lunar surface (the Moon), and to develop an ongoing presence there.

2. Who is Artemis in Greek Mythology?

Answer: Artemis is the Greek goddess of the Moon.

3. What was the name of the Space programme that first brought astronauts to Earth's natural satellite, the Moon, on 20th July 1969?

Answer: The Apollo Programme.

The Artemis Mission 1, 2 & 3

Here is a quick road map of the 3 stages of the Artemis programme.

2022: NASA successfully launched Artemis 1 at 01:47 a.m. EST – Eastern time - (06.47 GMT- Greenwich Mean Time, which is local time in England) on 16th November, from Launch Complex 39B at NASA's Kennedy Space Centre in Florida.

The first mission, now successfully completed, was to send the Orion Spacecraft 'uncrewed' (that is with no astronauts aboard) to test the safety of the SLS rocket and the capsule's ability to reach the Moon, perform a lunar orbit, and return to Earth for an ocean splashdown. The SLS rocket deployed several small satellites into Space to perform experiments and technology demonstrations. For six days, the craft orbited the Moon, collecting performance data.

(Although NASA rehearsed this mission many times, simulating the complete trip, it's not the same as the real thing. Therefore, before they send real human beings on this mission, it was critical to test the hardware.)

2024: Artemis 2

Carrying the first four Artemis astronauts, the Orion will transport the crew farther from Earth than humans have ever travelled before. Over the approximate 10-day mission, the crew will complete a lunar flyby and return to Earth, evaluating the spacecraft's systems, while carrying humans.

2025: Artemis 3

This is the big one. We will see the next man and first woman step onto the Moon. Providing the previous missions have been successful, the astronauts will shoot towards the Moon, using the Lunar Lander to lower two people to the Moon's South Polar region. They will remain on the Moon for approximately one week, conducting experiments and practicing their Moon walking.

Remember that as the Moon is 1/6th the size of Earth – the astronauts will only weigh 1/6th of what they do here on the Earth, so walking becomes jolly good fun, and you can take giant leaps into the air.

For the initial Artemis Moon missions, the selected astronauts will likely fly to the Moon's south pole. This area has great potential as it is believed to be home to the highest abundance of water ice. If we can extract this water, it could be used to sustain human exploration farther into Space, whether that's as a human hydration source, rocket fuel resource, or cooling system for equipment.

The Shackleton crater that measures 12-miles across on the Moon's surface, (and a feature definitely worth visiting when you are looking for fun things to do whilst on the Moon), has a permanent shadow cast in the dips of the crater. The low temperatures make it a promising place for ice to form. **So, it may be worth taking your ice-skates.**

In fact, these permanently lightless areas maintain some of the coldest temperatures (-163 degrees Celsius, or -260 degrees Fahrenheit) in the entire solar system. Although it's possible that water can even be found on the Moon's lit surfaces, an area likely to have the highest abundance of water is the best spot to start looking for this crucial natural resource. **There is, as we speak, a probe called 'Spot Light' which is currently whizzing its way to the Moon to hunt out water.**

The Gateway Space Station

The Gateway is a vital component of NASA's Artemis programme. It will serve as a multi-purpose outpost, orbiting the Moon, that provides a platform for scientific experiments. An essential support for longer term astronaut jaunts to the lunar surface, serving as a staging-point for deep Space exploration. Just like the International Space Station that orbits Earth and houses its astronauts whilst they work in Space, the Gateway will offer similar functions whilst orbiting our natural satellite, the Moon. NASA is working with commercial and international partners to establish the Gateway.

Quiz: The Artemis Mission 1, 2 & 3

1. What's the purpose of the mission for...

a) The Artemis 1 mission?

Answer: To send the Orion spacecraft 'uncrewed' (that is with no astronauts aboard) to test the safety of the SLS rocket and the capsule's ability to reach the Moon, perform a lunar orbit and return to Earth for an ocean splashdown.

b) The Artemis 2 mission?

Answer: To carry the first four Artemis astronauts, the Orion will transport the crew farther from Earth than humans have ever travelled before. Over the approximate 10-day mission, the crew will complete a lunar flyby and return to Earth, evaluating the spacecraft's systems while carrying humans.

c) The Artemis 3 mission?

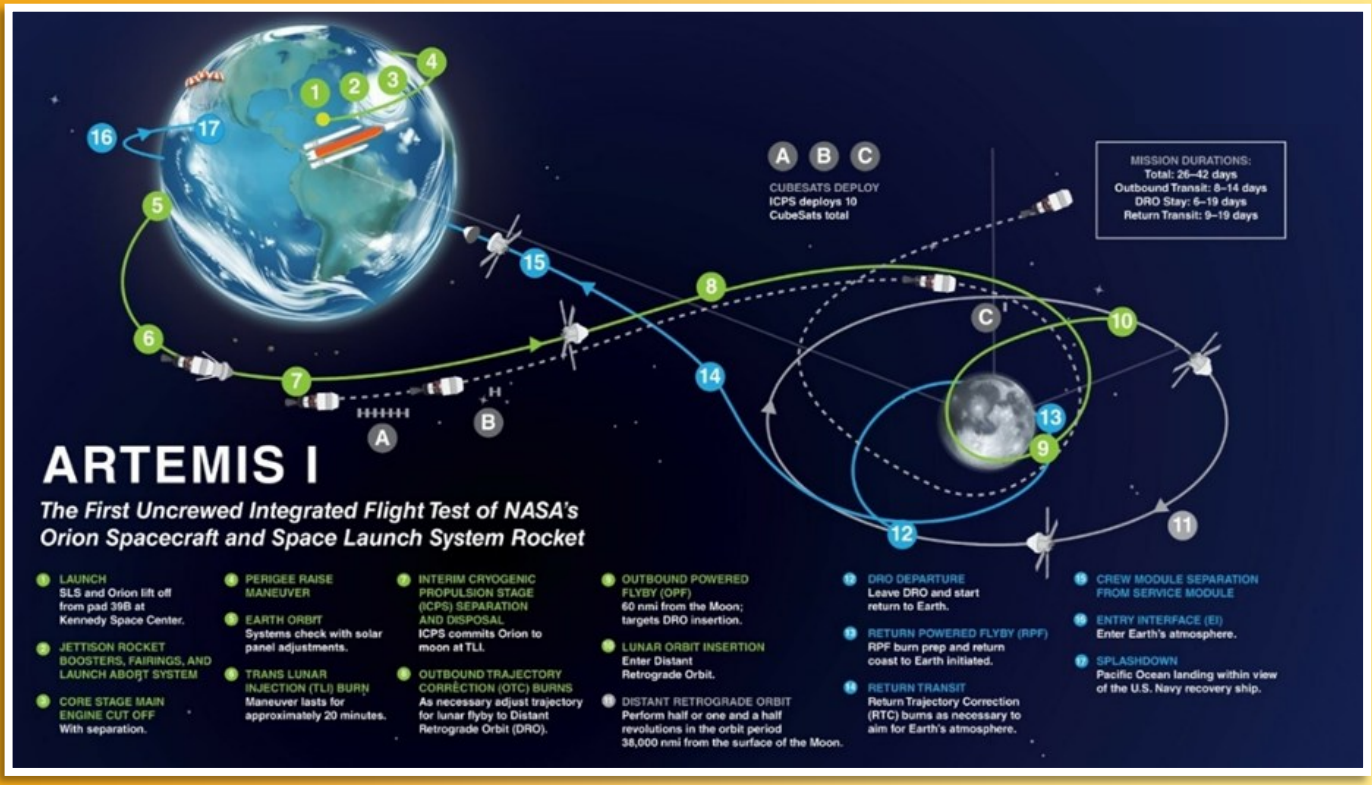
Answer: To see the next man and first woman step onto the Moon. The astronauts will shoot towards the Moon, using the Lunar Lander to lower two people to the Moon's South Polar region. They will remain on the Moon for approximately a week, conducting experiments and practicing their Moon walking.

2. What is the purpose of the Gateway Space Station?

Answer: The Gateway will serve a similar function to the ISS. Just like the International Space Station that orbits Earth, it will house its astronauts whilst they work in Space.

So, let's re-wind back to the Artemis 1 Programme and have a quick re-cap.

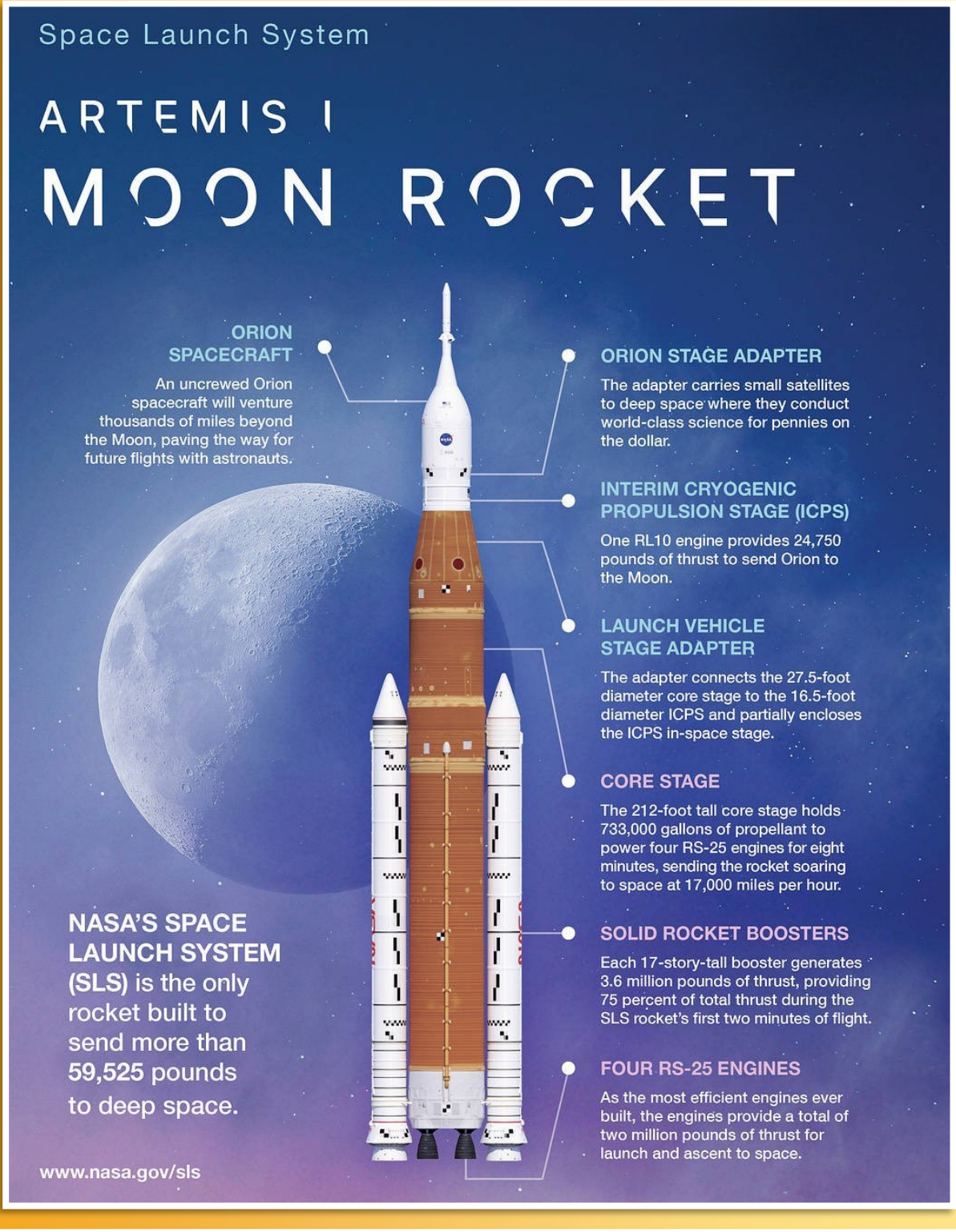
The mission was to fly an empty capsule in automatic mode, without a crew, past the Moon, orbit around it, and return it to Earth. Three weeks after the launch, the capsule lands in the Pacific Ocean. One of the main goals of the first Artemis mission was to test its ability to safely re-enter the atmosphere and land in the right place back on Earth.



It sounds quite straightforward, doesn't it?

So, before we look at the launch of the most powerful rocket the world has ever known, and look at the key stages of the mission, for all you rocket geeks in the room, let's have a quick nose at what makes up the Artemis Space Launch System and Orion capsule.

What Makes Up the SLS & Orion Capsule?



Want to learn how to draw the SLS? Check out this guide!

Quiz: What Makes Up the SLS & Orion Capsule?

1. What does the Orion's stage adapter carry and release into space?

Answer: The adapter carries small satellites to deep Space where they conduct world-class science for pennies on the dollar.

2. What percentage of power do the two solid rocket boosters provide to the rocket during launch?

Answer: The boosters provide 75% of the rocket's thrust during launch for its first two minutes of flight.

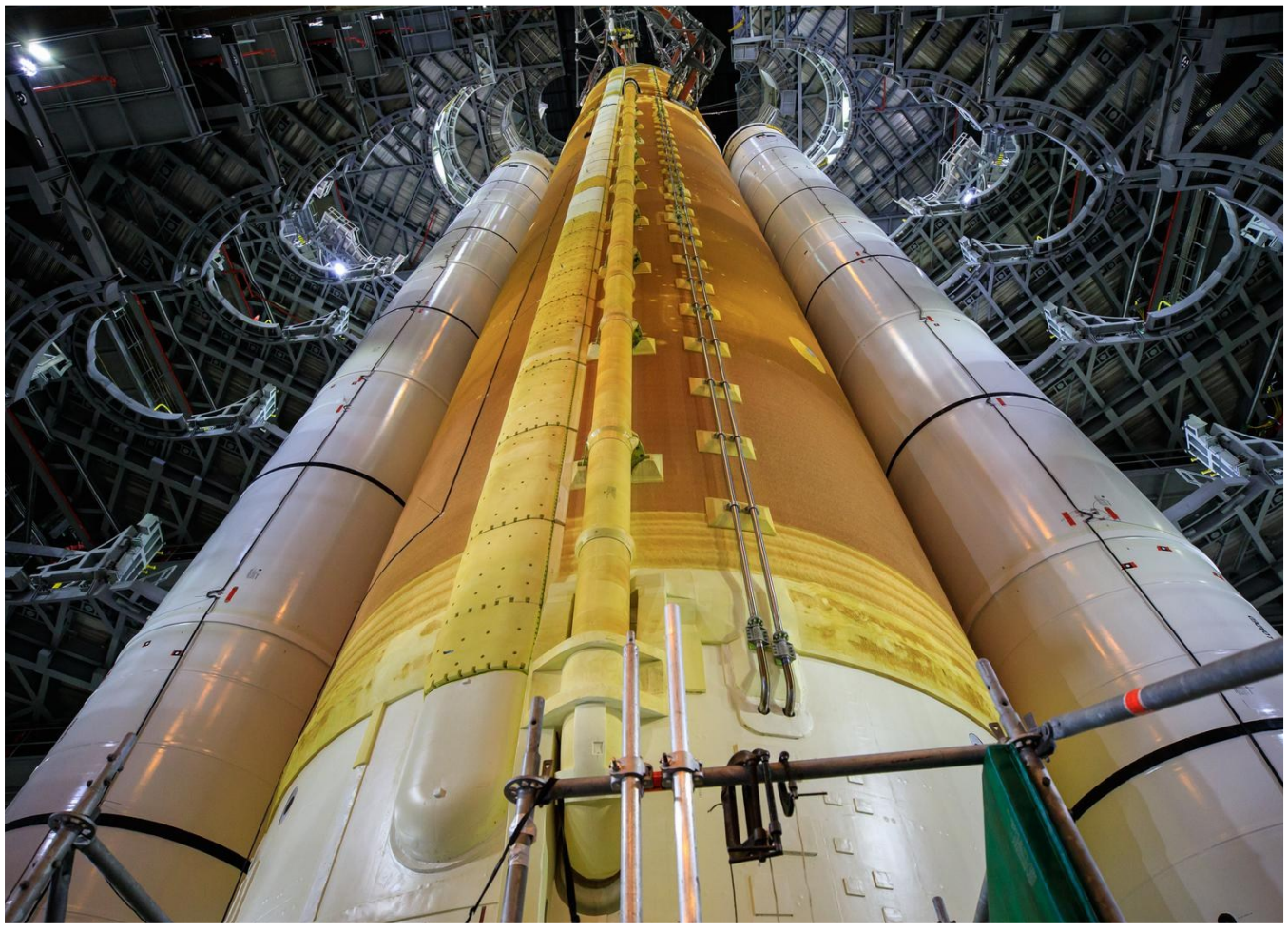
3. How many engines power the core stage of the rocket?

Answer: 4 engines. Did you know the liquid fuel (or propellant) is more flexible than the solid fuel as you can throttle it up and down – it's more off and on-able. Solid fuel is more like lighting a firework. Once it's ignited, it cannot be controlled– although you can pack the fuel to burn at a different rate).

Building the Biggest Rocket in the World

The SLS project began back in 2011 – involving a team of people that stretched across fifty states of America and 70,000 jobs and businesses, with further input and development from European countries. This really is a global collaboration, and shows humanity at its best. Working in synergy (together) and on different parts of the Artemis programme, this extensive team produced a rocket that has just flown around the Moon and back.

Mention to your group that they can to go onto a career in Aerospace and Space too.



Welcome to the Vehicle Assembly Building (VAB)

The coolest workshop/hangar ever — based at the Kennedy Space Centre in Florida.

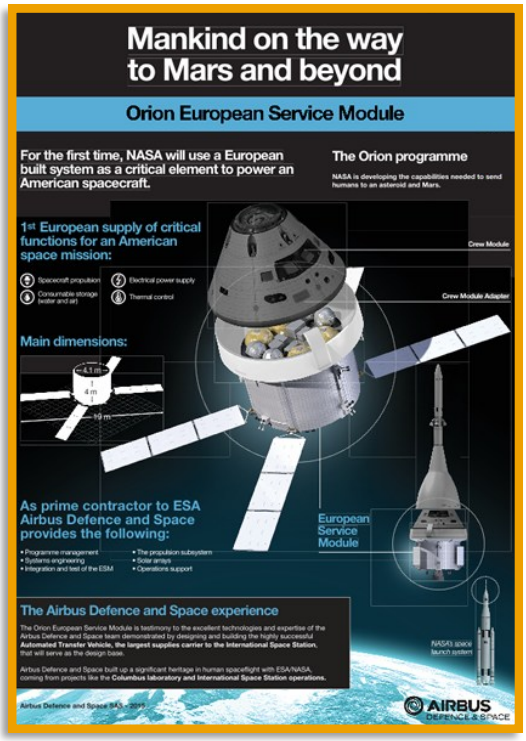
If you are building a big rocket, you need a big building to build it in. A building where you can stack and work on different levels at the same time.

- This iconic, gigantic building is one of the largest buildings in the world.
- It covers 8 acres, is 525 feet tall (160m) and 518 feet wide (158m).
- The **VAB** high bay doors are the largest in the world at 456 feet (139m) high, and it takes about 45 minutes to completely open or close them.
- The building is home to the largest American flag ever.
- The building is three to four miles away from the launch pads, so a specially designed vehicle called a 'crawler' carefully transports the rocket at a 'snail's pace' on a mobile launcher to the launch pad.

If you are scared of heights, working on this rocket may not be the right job for you.

Orion and the European Service Module — A Quick Shout Out

The Artemis programme really is a team effort. The European Space Agency (**ESA)** designed and developed Orion's service module, the part of the spacecraft that supplies air, electricity, and propulsion. Much like a train engine pulls carriages supplying power, the European Service Module will take the Orion capsule to its destination and back.



Quiz: Building the Biggest Rocket in the World

1. What is the VAB's purpose? Why was it constructed?

Answer: The VAB is where you can assemble, stack, and work on different levels of the rocket at the same time.

2. How long does it take to close and open the VAB's doors?

Answer: 45 minutes.

3. What is the name of the vehicle that is used to transport the rocket to the launch pad?

Answer: The crawler.

Who Has Hitched a Ride Inside the Orion Space Capsule?

The first important crew member to mention is SNOOPY— the famous beagle — who has previous history flying in rockets with NASA, and Shaun the Sheep, who is representing the European Space Agency, is on board too, both sporting their replica Space outfits.

Can anyone tell me what important role these two performed on the Artemis 1 mission?

Snoopy and Shaun aren't simply going along for a joy ride, thousands of miles into Space. They have an important job to do. They're zero gravity indicators, or zero 'g' indicators for short. This means that after Artemis launches, Snoopy and Shaun break free from the Earth's atmosphere and they will start to float in the capsule. This means that the Orion spacecraft has entered Space and they have achieved weightlessness of microgravity.

This is a mega exciting moment of any journey into Space. It has been a long-standing tradition for astronauts to take a mascot with them into Space, hanging them up in the capsule. Suddenly to see them floating about as weightlessness is achieved is great fun too. Anyway, it is important that these furry fellows earn their keep whilst they are on board.

The Orion Space Capsule also carried some unconventional crew members on its journey around the Moon. Rather than astronauts, a mannequin named Commander Moonikin Campos helmed the spacecraft, with two mannequin torsos called **Helga** and **Zohar** along for the ride.

Commander Moonikin Campos, a mannequin, now holds the world record for going farther into Space than any human astronaut has gone before — 40,000 miles away at its furthest orbit from our Moon.

Mannequins in a spacecraft with enviable views of the Moon may sound like a joke, but these three passengers had an important mission to carry out.

Who is Moonikin Campos?

Commander Moonikin Campos is named after a NASA electrical power subsystem manager who helped the troubled Apollo 13's safe return to Earth.

Moonikin Campos wore the 'Orion Crew Survival System Flight Suit' and collected crucial data on what future human crews may experience. This is the suit that the astronauts will wear on the second Artemis mission. It has been designed for astronauts to wear during launch and re-entry, and it's outfitted with two radiation sensors.

This suit can sustain a crew member for up to six days in the event of an in-Space emergency.

You can almost think of it as a personalised, mini spacecraft that protects the crew member, providing them the correct pressure, oxygen, cooling and other life-sustaining functions.

With new safety features, Commander Moonikin Campos' seat resembles that of a racing car, with a cocoon forming around its occupant. The seat has shock absorbers in case of landing in rough seas or other scenarios. The suit is weighted to resemble a real astronaut, and it's designed to work together with the seat.

Phanton Twins

The twin mannequins, Helga and Zohar, have a separate mission. The two torsos are based on phantoms, used for radiation treatment.

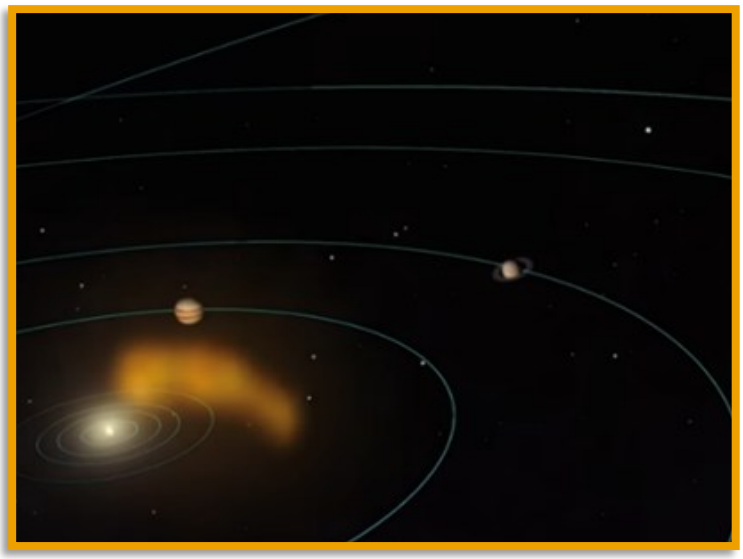
The phantoms Helga and Zohar will experience deep Space radiation inside Orion.

They are made of materials that mimic the soft tissue, organs, and bones of a woman. Their epoxy resin even resembles human lungs and brain tissue to test how radiation passes through the human body.

The torsos have more than 5,600 sensors and 34 radiation detectors to measure how much radiation exposure occurs within different organs during the mission.

What Are Space Radiation & Solar Storms?

Space radiation is a mixture of high energy, charged particles that originate from the Sun (and other solar systems), and is often dispersed in solar storms travelling nearly at the speed of light. (One year of Earth exposure to cosmic rays is equivalent to one day of Space radiation exposure in deep Space.) High levels of Space radiation can cause damage to the human body.



The mannequins are part of the Matroshka AstroRad Radiation Experiment or **MARE,** a collaboration between the German Aerospace Centre, the Israel Space Agency, NASA, and other institutions across multiple countries.

Zohar will wear AstroRad, a radiation protection vest, to test how effective it could be if future crews encounter a solar storm, while Helga will be unprotected.

The AstroRad vest was recently tested on the International Space Station (see above).

Solar storms unleashed by the Sun can last for days or weeks. The developers of AstroRad hope that the vest will allow future Artemis crews to continue performing daily activities despite Space weather. The vest is made up of thousands of shielding cores that can protect vital human organs against solar energy particles.

The MARE project aims to measure the differences between how specific organs, such as the brain, respond to radiation.

Previously, different limits of radiation exposure have been set for astronauts on the Space Station.

Data returned by the Artemis 1 mission should have an impact on the standard limit of allowable radiation for both male and female astronauts.

NASA has also sent 12,000 varieties of yeast on the mission – researchers hope that the Yeastronauts can teach them about how radiation will affect humans in Space.

They are also carrying a good variety of tree seeds. These will be planted on return to Earth to mark the accomplishment of the Space flight.

Quiz: Who Has Hitched a Ride Inside the Orion Capsule?

1. What is a zero-gravity indicator, and how do you know it's working?

Answer: A zero 'g' indicator shows that you have broken free from the Earth's atmosphere, and the indicator will start to float in the capsule. This means that the Orion spacecraft has entered Space, and they have achieved weightlessness.

2. How far did the mannequins travel at their furthest point from our Moon?

Answer: A mannequin now holds the world record for going farther into Space than any human astronaut has gone before. (40,000 miles away at its furthest orbit from our Moon).

3. What is Space radiation?

Answer: Space radiation is a mixture of high energy, charged particles that originate from the Sun (and other solar systems), and is often dispersed in solar storms travelling nearly at the speed of light. (One year of Earth exposure to cosmic rays is equivalent to one day of Space radiation exposure in deep Space.) High levels of Space radiation can cause damage to the human body.

Stages of the Artemis 1 Mission

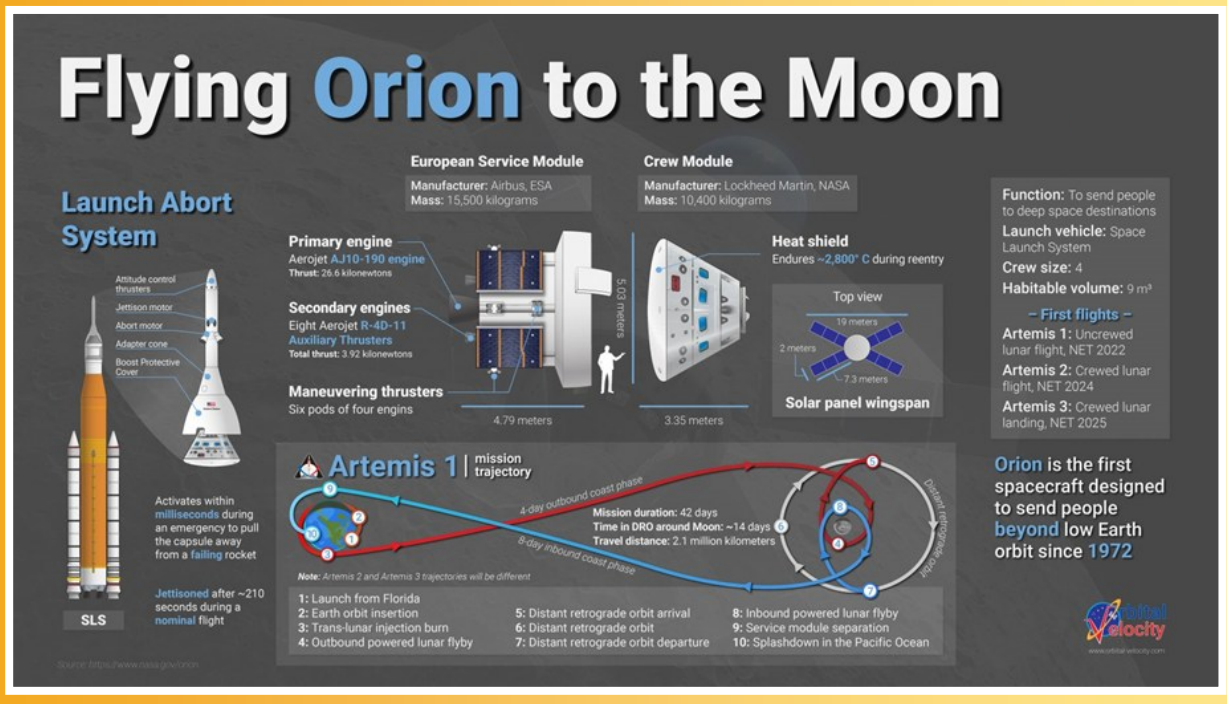
All aboard! Tickets please to the greatest trip everrrrrrrr!

Last call for passengers on Artemis 1.

Here is the itinerary for our Space Holiday.

Ask the group if they would like to be an astronaut, or not and why?

- **Flight day 1:** Launch
- **Flight day 2-5:** Outbound Transit
- **Flight day 6-9:** Transit to Lunar Orbit
- **Flight day 10-15:** Lunar Orbit
- **Flight day 16-19:** Exit Lunar Orbit
- **Flight day 20-26:** Return Transit
- **Flight day 26:** Splashdown (Dec 11)



From Launch Complex 39B at NASA's Kennedy Space Centre in Florida: Seconds after ignition, the SLS blasted off the pad and began its journey to the Moon, lighting up the night sky, turning night into day, burning its solid rocket boosters and four liquid hydrogen fuelled engines. The ignition of the Space Launch System rocket was so powerful that it damaged its mobile launch platform.

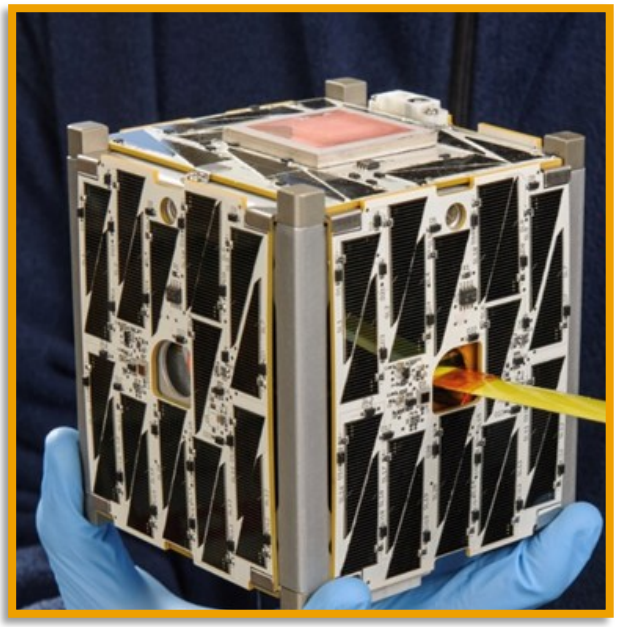
See this cool picture to the right of the blast proof doors on the platform. **Well, they did say that it was the most powerful rocket in the world!**

During launch, the SLS produced up to **39 million newtons (8.8 million pounds)** of thrust. That's 15% more thrust than the Saturn V rocket that took astronauts to the Moon during the Apollo programme. NASA calls SLS the most powerful rocket in the world, though SpaceX says its Starship Super Heavy booster, which they are currently developing, will produce **76 million newtons (17 million pounds)** of thrust.

Climbing with immense acceleration the twin SLS solid rocket boosters only burnt for two minutes and then their job was done. They detached from the craft and fell into the ocean. Meanwhile, the core stage, with its four recycled Space Shuttle engines, continued firing until about eight and a half minutes after lift-off. Thereafter, these too detached from the spacecraft and tumbled into the sea. None of the hardware was recoverable. (SpaceX are currently building a recyclable rocket - just like the Water Rokit.)

Once this happened, one more upper stage engine (a part of the Interim Cryogenic Propulsion Stage, or the ICPS) briefly ignited, putting Orion into Earth's orbit. Then a mere 90 minutes after leaving the launch pad, and carrying out 'a trans-lunar injection burn', it pushed Orion onwards, (including the crew module and the European Service Module) on its long journey, floating on its own, coasting towards the Moon.

Once Orion had drifted a safe distance away from the SLS upper stage, this stage was able to deploy small satellites that were hiding inside, called CubeSats.



One of the CubeSats was a spacecraft that uses an 86-square-metre solar sail to slowly spiral out of lunar orbit. **NEA Scout** made a slow flyby of the asteroid which measures just 18 metres across. The solar sail spacecraft captured humanity's first up-close images of an asteroid this small.

The other CubeSats had different jobs to do, including four aimed at studying the Moon. Two searched for water on the Moon, while another attempted to land, using what would be the smallest Lunar Lander in history.

Lunar Orbit: After its long journey across outer Space, Orion then arrived at the Moon in style, firing its service module engine, and skimming the surface at an altitude of just 69 miles. Coming so close to the Moon pushed the capsule away from our natural satellite, and a later engine burn sent Orion into its final orbit, known as a **Distant Retrograde Orbit,** or **DRO.**

Distant means the orbit travels far from the Moon, while **Retrograde** means the orbit is opposite the Moon's direction of rotation. A **DRO** allows a spacecraft to remain stable for long periods of time using very little fuel, making it an ideal place for Orion to test its capabilities.

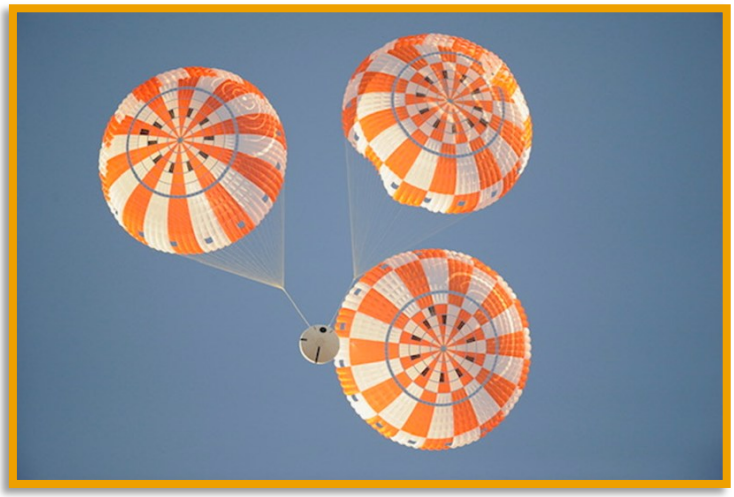
In DRO, Orion coasted roughly 40,000 miles beyond the Moon, breaking the record for a crew-rated spacecraft's distance from Earth set by Apollo 13. The capsule then departed DRO with an engine burn and a second lunar flyby, which put it on course back towards Earth.

Splashdown: After a return cruise back to Earth, Orion then slammed into the planet's atmosphere at 25,000 miles per hour. This was much faster than a usual re-entry from a spacecraft. During re-entry from Earth's orbit, the air molecules can't get out of the way of Orion fast enough, compressing and heating up to temperatures of 2,800 degrees Celsius, or 5,000 degrees Fahrenheit. The craft has a **heat shield** that is designed to protect the vehicle until it slows down to a more manageable velocity.

At this time, the team at NASA decided to do something really cool. To help remove some of the energy from the capsule and to help it slow down, they went for a **skipped re-entry** where they dip the craft into the upper part of the atmosphere, where along with the lift of the capsule, they are able to skip it back out again, and then finally re-enter into Earth's atmosphere.

Orion's Heat Shield

At 4.7 miles above the Pacific Ocean, Orion's drogue parachutes deployed to slow the spacecraft even further. Next came the pilot chutes and the main parachutes, which slowed Orion to less than 20 miles per hour.



The capsule then gently fell into the Pacific Ocean off the coast of San Diego in the States, where it was secured and towed into the flooded well deck of a U.S Navy ship.

This was then hauled back to dry land and shipped back to Kennedy Space Centre.

Although the whole mission has been constantly reporting data back to the team at NASA, a new wealth of information was still to be gained. I'm sure that the first task was to see how Snoopy, Shaun the Sheep, and the gang enjoyed their trip.

Quiz: Stages of the Artemis 1 Mission

1. What is the name of the small satellites that were deployed on the mission?

Answer: CubeSats.

2. What is a Distant Retrograde Orbit?

Answer: Distant means the orbit travels far from the Moon, while Retrograde means the orbit is opposite the Moon's direction of rotation. A DRO allows a spacecraft to remain stable for long periods of time using very little fuel, making it an ideal place for Orion to test its capabilities.

3. What speed does the Orion spacecraft travel on re-entry into Earth?

Answer: After a return cruise back to Earth, Orion slammed into the planet's atmosphere at 25,000 miles per hour. This was much faster than a usual re-entry from a spacecraft.

4. Why does the Orion capsule need a heat shield?

Answer: During re-entry from Earth's orbit, the air molecules can't get out of the way of Orion fast enough, compressing and heating up to temperatures of 2,800 degrees Celsius, or 5,000 degrees Fahrenheit. The craft has a heat shield that is designed to protect the vehicle until it slows down to a more manageable velocity.

Some Questions Whilst Flying the Water Rokit

Today, as part of your rocketeer training and whilst flying your rockets, I want you to think of three similarities between your Water Rokit and NASA's SLS Rocket.

Here are some questions to ask your group if they are struggling.

1. What is the name for what's needed to push a rocket up into the air? Both the SLS and Water Rokit need this to travel upwards.

Answer: Thrust.

2. What two substances are needed to generate thrust in liquid-propelled rockets?

Answer: A propellant (fuel) and oxygen/oxidiser. In the SLS: Liquid Hydrogen and Liquid Oxygen (LOX).

3. What two substances are needed to generate thrust in your Water Rokit?

Answer: Water and air.

4. What helps to keep your Water Rokit stable and on its course upwards into the sky?

Answer: Fins.

5. How do the SLS' engines keep the rocket on its correct trajectory (on its set course)?

Answer: It uses its engines to **gimbal** the rocket.

Quiz: About the Artemis Programme

1. What is the name of the capsule that will carry astronauts to the Moon?

Answer: Orion.

2. How many miles away is the Moon from Earth?

Answer: 250,000 miles.

3. What is the name of the planned Space Station that will orbit the Moon?

Answer: The Gateway.

4. What is the building called at the Kennedy Space Centre where the SLS is built, and stays until it flies?

Answer: The VAB (Vehicle Assembly Building).

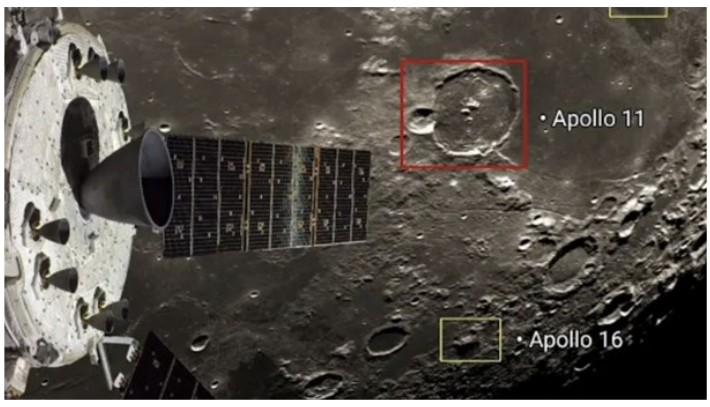
5. Who hitched a ride inside the spacecraft on the Artemis 1 mission acting as zero gravity indicators, and went to the Moon and back?

Answer: Snoopy and Shaun the Sheep.

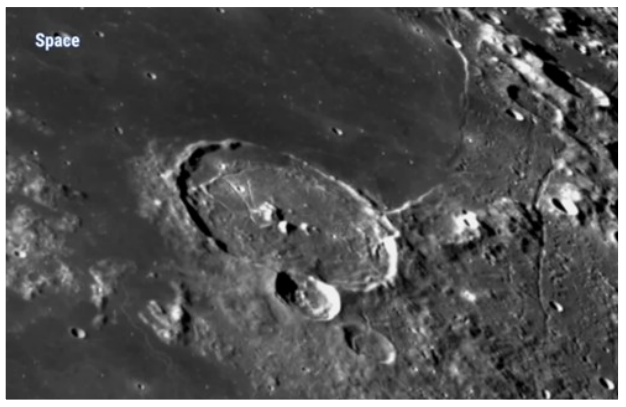
Gallery

Our stunning planet Earth, from the Moon's perspective:

The spacecraft flying over the Apollo sites on the Moon where astronauts landed before:



Craters on the Moon:



Fun Links from NASA

stem.nasa.gov/artemis

Videos

Artemis I: We Are Ready

Explore Kennedy Space Center: VAB

Videos Continued...

NASA's Artemis I 'Passengers'

Artemis I Mission Highlights