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Science Focus

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PLANET EARTH III

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OUR LUNAR LEGACY

The Moon has always offered the promise of adventure and discovery, which has driven space exploration for generations...

1958

The first attempt is made to reach the Moon by NASA's space probe Pioneer 0. It explodes 77 seconds after lift-off.

1959

The Soviet Union's Luna 2 impacts the Moon, becoming the first human-made object to reach another celestial body.

1959

Luna 3 successfully returns images that provide the first glimpse of the far side of the Moon.

Going back to the Moon

ARTEMIS AND A NEW DAWN OF LUNAR EXPLORATION

INFOGRAPHIC BY JAMES ROUND

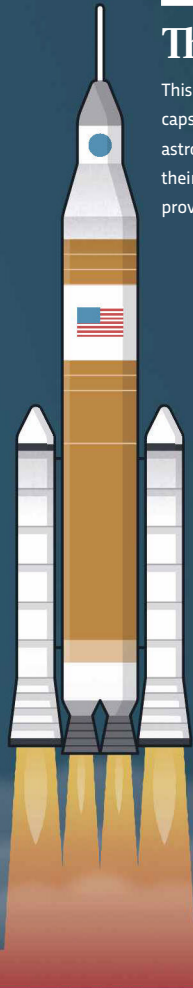
When Neil Armstrong took his iconic first steps on the lunar surface, it was a defining moment of the 20th century and beckoned a new age of space travel. But those ambitions were never quite realised and after just six crewed missions, humans never went back to the Moon.

That's all about to change. Scientists continue to uncover amazing insights about the Moon, with upcoming missions aiming to reveal even more. And NASA wants boots on the ground, embarking on an ambitious series of lunar missions through the Artemis program, which it hopes will provide scientific discoveries, economic opportunities and inspiration for a new generation.

THE ARTEMIS ROCKET

Space Landing System (SLS)

Every mission will start with NASA's SLS; the world's most powerful rocket. It's only been used once so far, during Artemis I, but will transport both cargo and crew throughout the duration of the Artemis program.



THE ARTEMIS SPACECRAFT

The Orion

This partially reusable, next-generation capsule can transport a crew of four astronauts into space, sustain them during their journey to and from the Moon, and provide safe re-entry back to Earth.

MOON MAP KEY

The map displays notable lunar landmarks, as well as every spacecraft to land on the Moon's surface.

MOON LANDMARK

APOLLO (1961–1972)

NASA's Apollo missions delivered 24 humans to the lunar surface.

LUNA (1959–1976)

The Soviet Union's Luna missions achieved many firsts in space exploration.

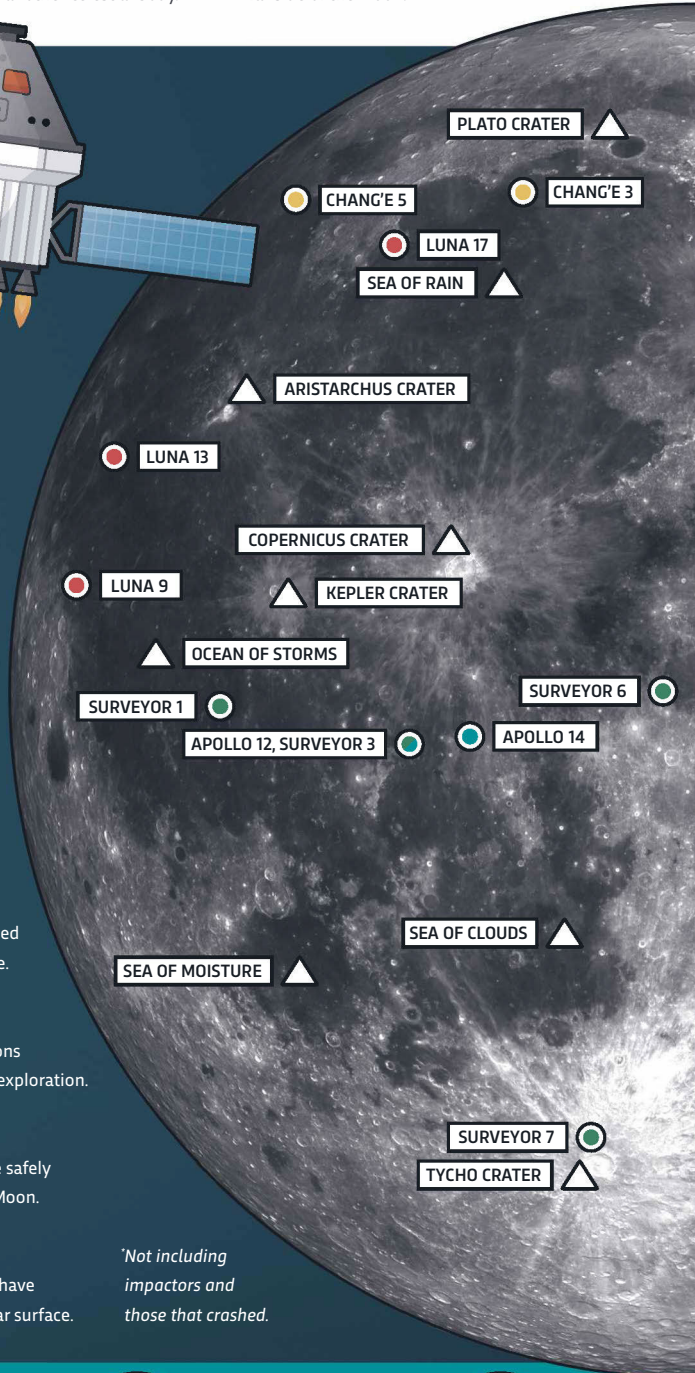
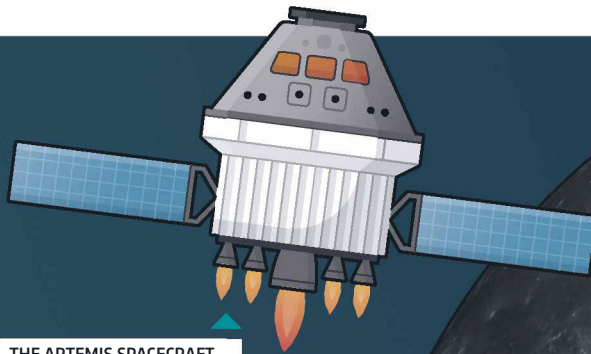
SURVEYOR (1966–1968)

NASA's other lunar programme safely landed five spacecraft on the Moon.

OTHER LANDING SITES

More recently other countries have succeeded in reaching the lunar surface.

**Not including impactors and those that crashed.*



THE ARTEMIS MISSIONS

This NASA-led lunar exploration program includes six other space agencies as well as a number of private space-flight companies and will, over the next decade and beyond, seek to establish a permanent human presence on the Moon.

ARTEMIS I

NOVEMBER 2022

Marking NASA's first return to lunar exploration since the Apollo program, Artemis I demonstrated that the Orion spacecraft and Space Launch System (SLS) rocket were ready for crewed flight.

ARTEMIS II

NOVEMBER 2024

In this 10-day mission, the Orion spacecraft and a crew of four NASA astronauts will perform a flyby of the Moon and return to Earth; the first crewed mission beyond low Earth orbit since Apollo 17 in 1972.

ARTEMIS III

NOVEMBER 2025

Astronauts will land in the Moon's southern polar region and take the first steps on the lunar surface in over five decades. The crew will include the first women and the first person of colour to land on the Moon.

1966

Luna 9 becomes the first spacecraft to achieve a soft-landing on the Moon and shares the first pictures from the surface.

1968

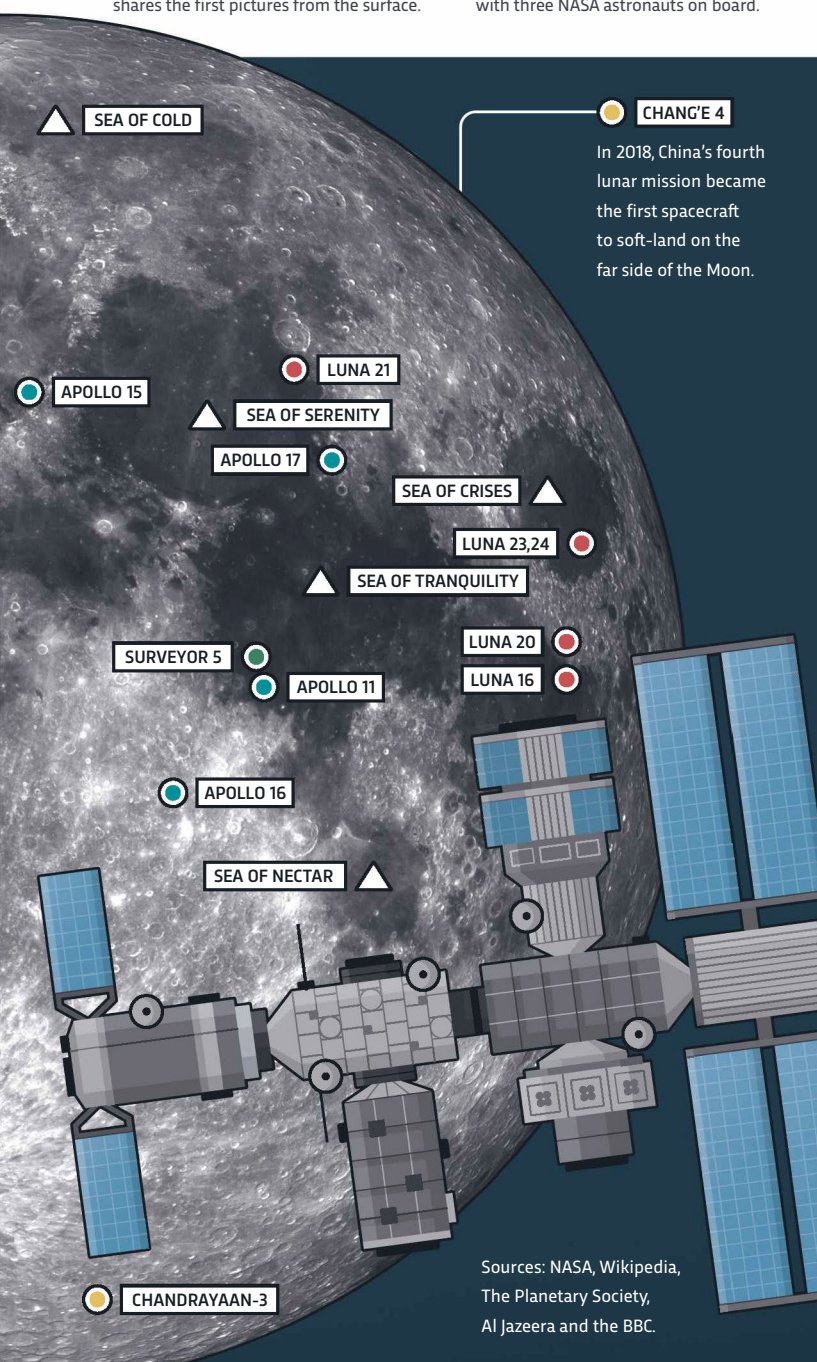
Apollo 8 becomes the first crewed mission, as it orbits the Moon 10 times with three NASA astronauts on board.

1969

Neil Armstrong makes history as he becomes the first person to walk on the Moon, as part of the Apollo 11 mission.

2009

NASA's Lunar Reconnaissance Orbiter launches, with a mission to map the lunar surface. It remains operational.



CHANG'E 4

In 2018, China's fourth lunar mission became the first spacecraft to soft-land on the far side of the Moon.

A GLOBAL ENDEAVOUR

Other Moon missions

1 Chang'e 5

2020 • China
This mission returned the first lunar sample since 1976. The spacecraft also had a number of scientific tools including cameras, a spectrometer and a radar.

2 Danuri

2022 • South Korea
Also known as the Korea Pathfinder Lunar Orbiter, this orbiter is designed to survey lunar resources and map the lunar surface to inform future landing sites.

3 Chandrayaan-3

2023 • India
This mission helped India become the fourth nation to reach the lunar surface. The mission was intended to study the Moon's composition.

4 Chang'e 6

2024 • China & Pakistan
Chang'e 6 will land on the Moon's far side, where it will return a lunar sample, study the Moon's exosphere and detect ice traces on the lunar surface.

5 Beresheet2

2025 • Israel
This private space mission will include an orbiter and two lunar landers, with the aim of giving students educational opportunities in space science.

6 Chandrayaan-4

2026 • India & Japan
This mission will explore the Moon's south pole with a lunar lander and rover, collecting sub-surface samples and looking for evidence of water.

THE ARTEMIS LUNAR LANDER

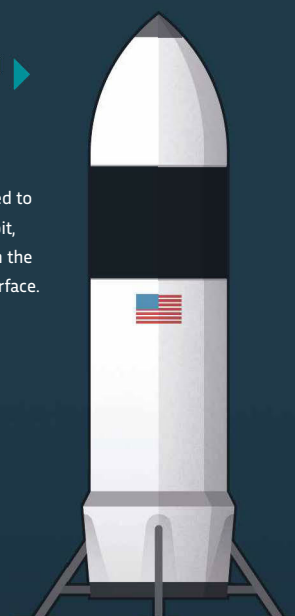
Starship HLS

The Human Landing System (HLS) is SpaceX's lunar lander and will be used to transfer Artemis astronauts from orbit, either in the Orion spacecraft or from the Lunar Gateway, down to the lunar surface.

THE ARTEMIS SPACE STATION

Lunar gateway

Before reaching the Moon, astronauts will dock at the Gateway, a space station in lunar orbit, featuring a laboratory, accommodation and a holding area for rovers and robots.



Sources: NASA, Wikipedia, The Planetary Society, Al Jazeera and the BBC.

ARTEMIS IV

SEPTEMBER 2028

As well as a second lunar landing, Artemis IV will see the arrival of the Lunar Gateway's habitat module, enabling further development of the space station with other sections delivered by SpaceX.

ARTEMIS V

SEPTEMBER 2029

The fifth Artemis mission will see a third lunar landing, but with this one using Blue Origin's Blue Moon to reach the surface. Previous missions will have used SpaceX's Starship HLS as a lunar lander.

FUTURE MISSIONS

Six other missions are planned as part of the Artemis program, including more crewed missions, further development of the Lunar Gateway and the construction of a base on the Moon's surface.

BEYOND ARTEMIS

For now, the Artemis program is focused on the Moon, but looking further ahead NASA has bigger plans. In the long-term, Artemis is just one step on a journey that will eventually take humans to Mars.