NASA ARTEMIS 2 MISSION

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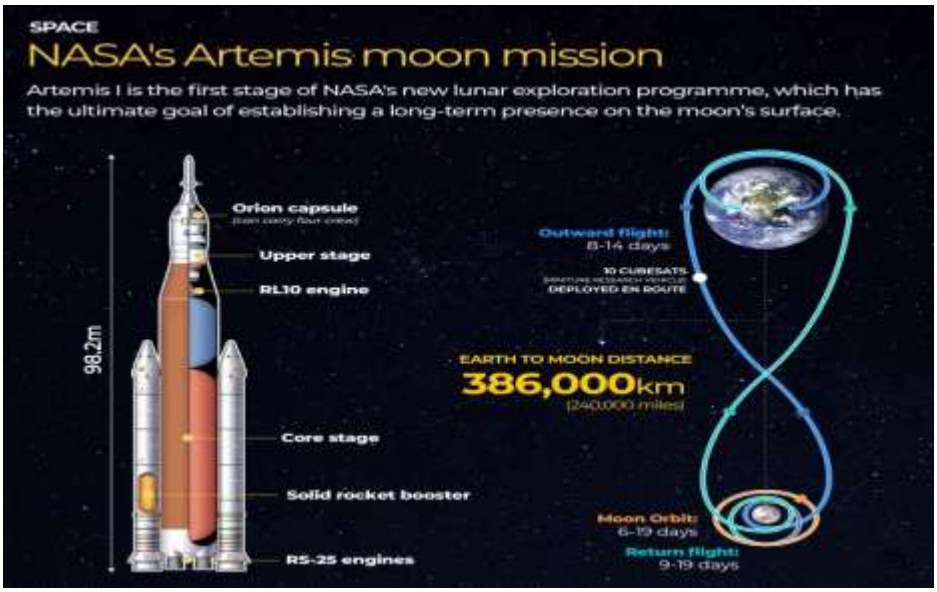
Context:

- **NASA's Artemis II astronauts** have **returned safely to Earth,** completing the **first crewed mission to travel around the Moon** in more than **50 years.**
- The **Orion spacecraft splashed down in the Pacific Ocean** off the coast of **California at 5:07pm local time** (00:07 GMT) following a **high-speed re-entry** through Earth's atmosphere.

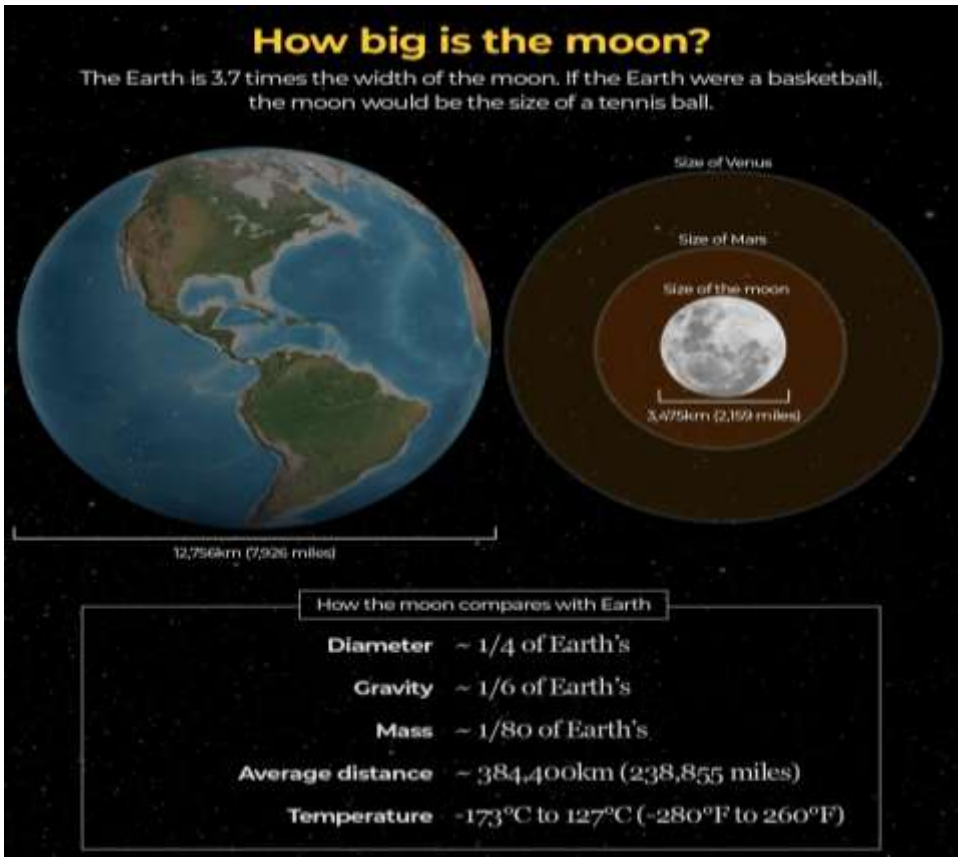
1. What is NASA's Artemis programme?

- The **Artemis programme is NASA's** multidecade mission to **return humans to the moon for the first time since 1972**, establish a long-term base there and eventually **enable future human missions to Mars.**
- The programme is currently divided into five missions:
  - **Artemis I, II, III, IV and V.**
- **Artemis I** was the inaugural uncrewed test flight, which launched on **November 16, 2022, and lasted 25 days.**
- It successfully placed the **Orion spacecraft into Earth's orbit and provided crucial data for Artemis II.**



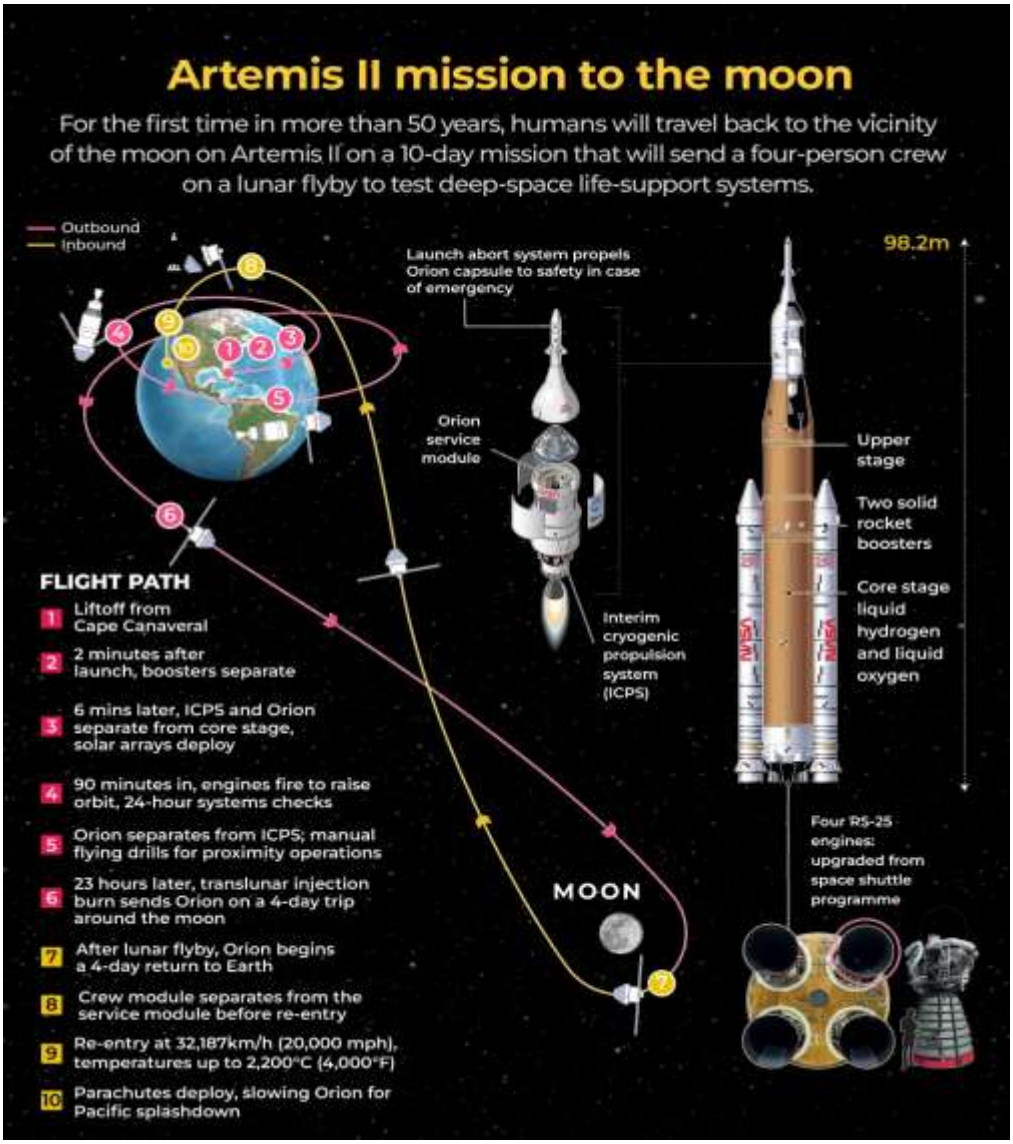
2. How big is the moon and how far away is it from Earth?

- **The average distance** between the **Earth and the moon** is about **384,400km (238,855 miles),** similar to **circling Earth's equator nearly 10 times.**
- **Earth is approximately 3.7 times the width of the moon**. To put that in perspective, if the **Earth were a basketball**, the **moon would be the size of a tennis ball.**
- Because the **moon has virtually no atmosphere to hold heat or circulate it,** the temperature on the surface fluctuates drastically from night to day.
- Its **temperature ranges from -173C (-180F) at night to 127C (260F) during the day**, making it much colder than anywhere on Earth at night and hotter than boiling water during the day.
- Because of its lower mass, the moon's surface gravity is about **one-sixth that of Earth (16-17 percent),** so a person with a mass of **60kg (132lbs)** would weigh about the same as a **10kg (22lbs) mass on Earth.**

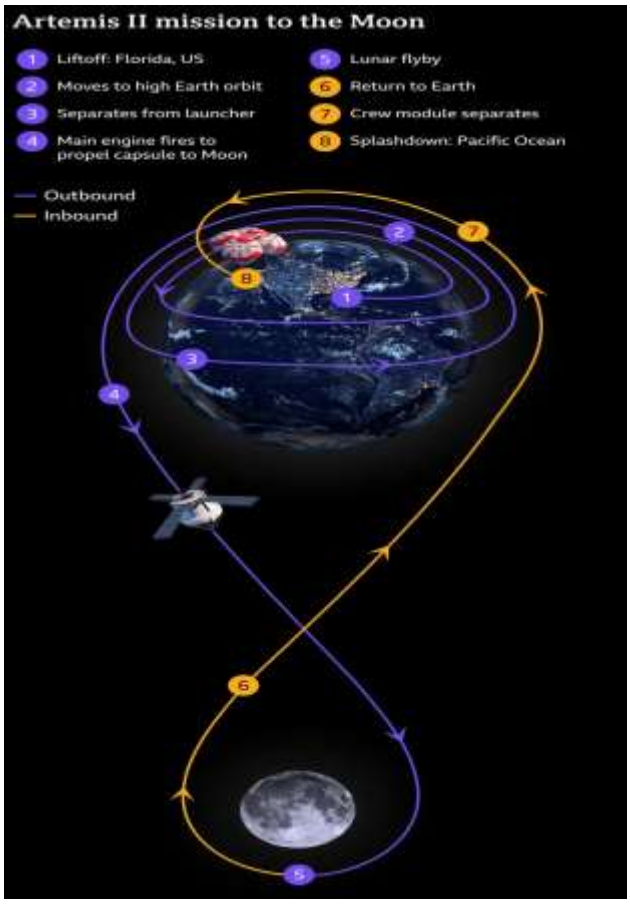


3. What is NASA Artemis II Mission?

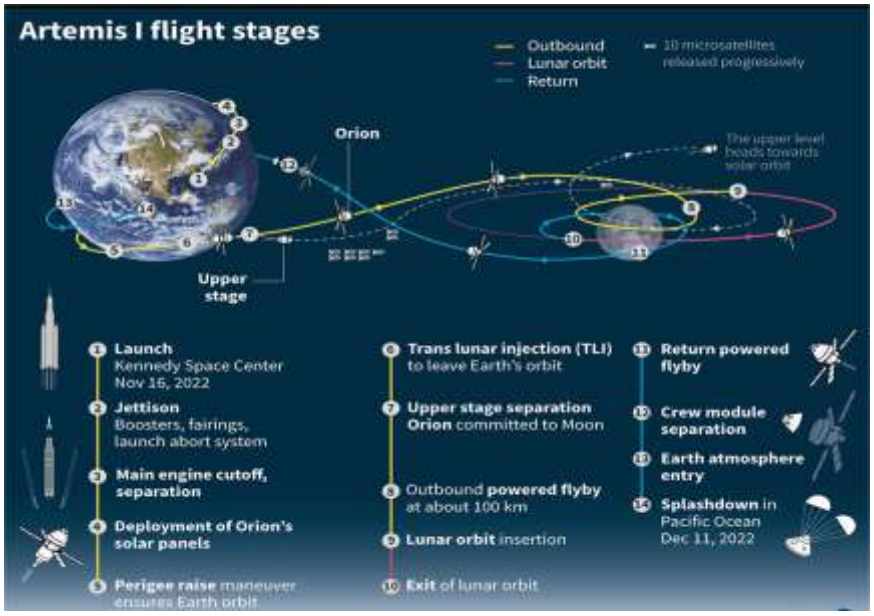
- **Artemis II is NASA's first crewed mission to the Moon** in over 50 years, successfully launching in **April 2026 for a 10-day test flight to orbit the Moon.**
- As part of the **Artemis program,** four astronauts flew the **Orion spacecraft beyond Earth's Van Allen belt** to test life support systems, paving the way for **future long-term exploration.**


Artemis II mission to the moon
For the first time in more than 50 years, humans will travel back to the vicinity of the moon on Artemis II on a 10-day mission that will send a four-person crew on a lunar flyby to test deep-space life-support systems.
Outbound
Inbound
Launch abort system propels Orion capsule to safety in case of emergency
Orion service module
Interim cryogenic propulsion system (ICPS)
98.2m
Upper stage
Two solid rocket boosters
Core stage liquid hydrogen and liquid oxygen
Four RS-25 engines: upgraded from space shuttle programme
MOON
FLIGHT PATH
1 Liftoff from Cape Canaveral
2 2 minutes after launch, boosters separate
3 6 mins later, ICPS and Orion separate from core stage, solar arrays deploy
4 90 minutes in, engines fire to raise orbit, 24-hour systems checks
5 Orion separates from ICPS; manual flying drills for proximity operations
6 23 hours later, translunar injection burn sends Orion on a 4-day trip around the moon
7 After lunar flyby, Orion begins a 4-day return to Earth
8 Crew module separates from the service module before re-entry
9 Re-entry at 32,187km/h (20,000 mph), temperatures up to 2,200°C (4,000°F)
10 Parachutes deploy, slowing Orion for Pacific splashdown


ICPS Earth disposal
Prox Ops Demonstration
ARTEMIS II
First Crewed Test Flight to the Moon Since Apollo
LAUNCH
Astronauts lift off from pad 39B at Kennedy Space Center.
JETTISON ROCKET BOOSTERS, FAIRINGS, AND LAUNCH ABORT SYSTEM
CORE STAGE MAIN ENGINE CUT OFF
With separation.
PERIGEE RAISE MANEUVER
APOGEE RAISE BURN TO HIGH EARTH ORBIT
Begin 24 hour checkout of spacecraft.
PROX OPS DEMONSTRATION
Orion proximity operations demonstration and manual handling qualities assessment for up to 2 hours.
INTERIM CRYOGENIC PROPULSION STAGE (ICPS) DISPOSAL BURN
HIGH EARTH ORBIT CHECKOUT
Life support, exercise, and habitation equipment evaluations.
TRANS-LUNAR INJECTION (TLI) BY ORION'S MAIN ENGINE
Lunar free return trajectory initiated with European service module.
OUTBOUND TRANSIT TO MOON
4 days outbound transit along free return trajectory.
LUNAR FLYBY
4,000 nmi (mean) lunar farside altitude.
TRANS-EARTH RETURN
Return Trajectory Correction (RTC) burns as necessary to aim for Earth's atmosphere; travel time approximately 4 days.
CREW MODULE SEPARATION FROM SERVICE MODULE
ENTRY INTERFACE (EI)
Enter Earth's atmosphere.
SPLASHDOWN
Ship recovers astronauts and capsule.
PROXIMITY OPERATIONS DEMONSTRATION SEQUENCE



4. What is the timeline of Artemis II Mission?

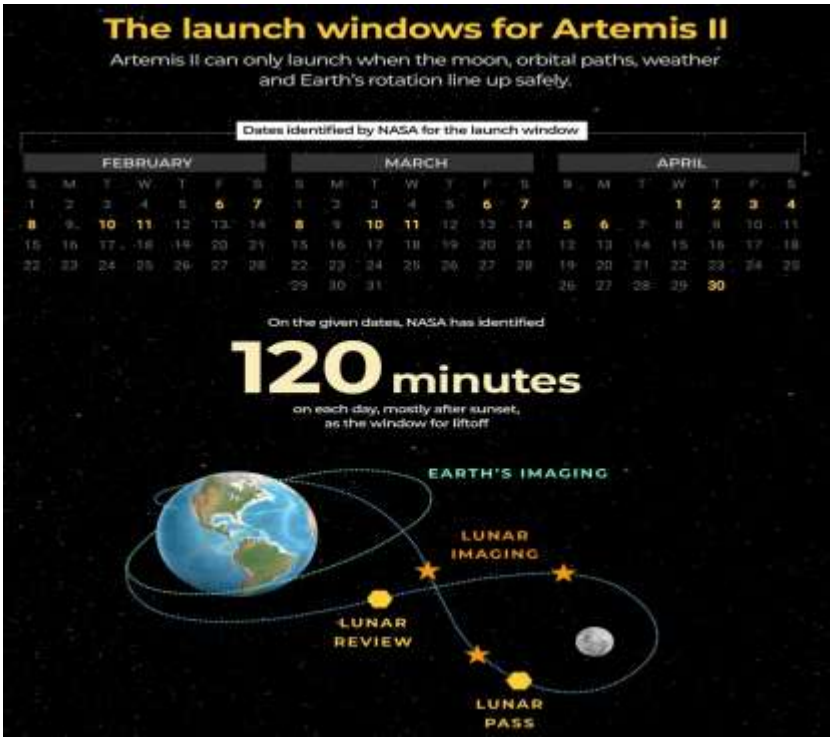


5. When was Artemis II launched?

- The **Artemis II space mission** has blasted off from the **US state of Florida,** sending **four astronauts on a historic journey around the moon** and marking the **first time humans have travelled beyond low-Earth orbit** in more than **50 years.**

- The mission, which **launched on Wednesday,April 1, 2026** is a major step in the **United States space agency NASA's plan to return humans to the moon** and eventually **send astronauts to Mars.**

- **Artemis II** has faced two major delays that pushed it from its **original early 2026 launch window.**
- In **early February**, the first attempt was scrubbed after a **liquid hydrogen leak was detected during a practice countdown.**
- A **second launch attempt in early March** was cancelled when engineers discovered a **helium flow issue in the rocket's upper stage.**



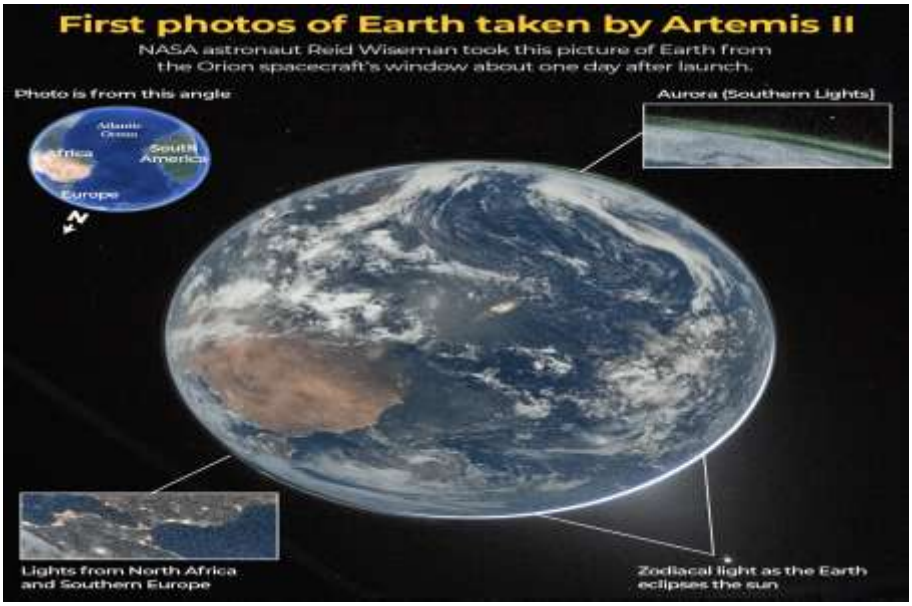
6. Who are the Artemis II astronauts?

- The **four astronauts onboard are:**

Astronauts	Description
Reid Wiseman, 50, commander	• The **NASA veteran and former International Space Station commander** is leading the **Artemis II mission**. • The **test pilot-turned-astronaut** has leadership and deep spaceflight experience.
Victor Glover, 49, pilot	• The **US Navy aviator is the first Black astronaut** assigned to a **lunar mission and flew on SpaceX Crew-1.**
Christina Koch, 47, mission specialist	• The record holder for th**e longest single spaceflight** by a **woman at 328 days is a veteran of multiple spacewalks** and has scientific and deep-space mission expertise.
Jeremy Hansen, 50, mission specialist	• The **first Canadian set to travel to the moon is a former fighter pilot** and represents international collaboration in deep space exploration.

7. What will the Artemis 2 astronauts do?

- The **Artemis II astronauts will verify that the spacecraft** and its **life-support systems** are ready for **deep-space missions by manually flying at times, overseeing automated systems** and testing key functions such as **propulsion, power, thermal control, navigation and proximity operations.**
- They will also **conduct scientific investigations on lunar observations and human health in space**, while rehearsing **critical steps such as course changes, long-distance communications** and managing re-entry and splashdown to **demonstrate Orion's readiness for future missions.**
- **Taking photographs** is one of the other things the **astronauts will be doing a lot of.**
- The photograph captures:
  - ***The Northern and Southern Aurora Lights with their vivid green lights.***
  - ***The night lights from various cities across Africa, Europe and South America.***
  - ***A faint patch of zodiacal light as the Earth eclipses the sun.***



8. What are the primary objectives of Artemis II Mission?

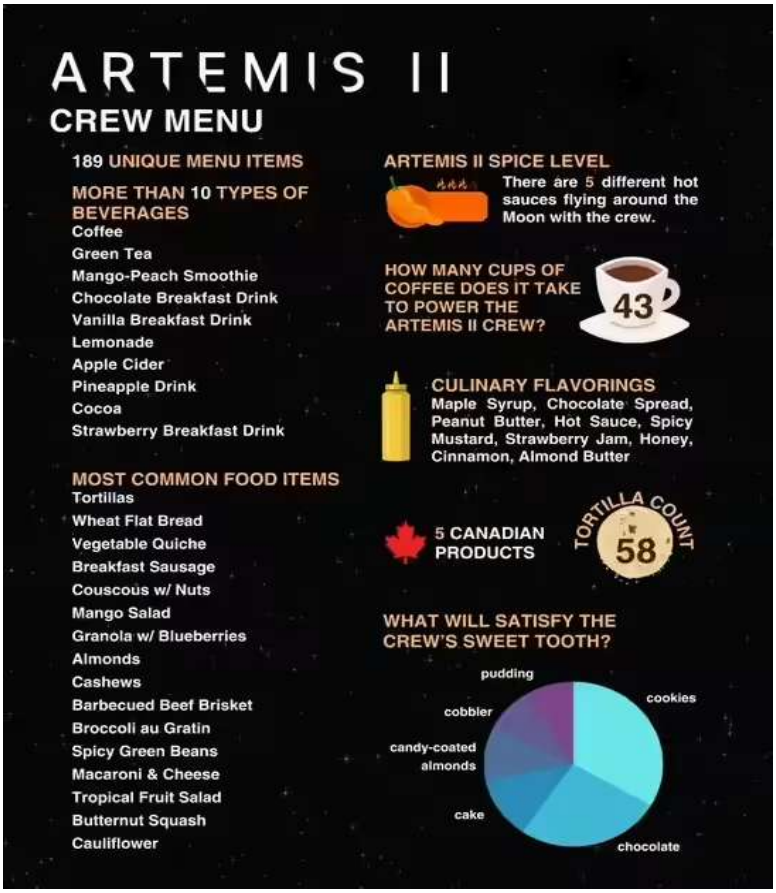
- The primary goal of **Artemis II is a crewed test flight in lunar space.**

Mission Priorities	Description
Crew	• Demonstrate the **ability of systems and teams to sustain the flight crew in the** • **Flight environment,** and through their return to Earth.
Systems	• **Demonstrate systems and operations essential** to a crewed **lunar campaign.** • This ranges from **ground systems to hardware in space**, and operations spanning from **development to launch, flight, and recovery.**
Hardware and Data	• **Retrieve flight hardware and data,** assessing performance for **future missions**
Emergency Operations	• **Demonstrate emergency system** capabilities and **validate associated operations to the extent practical**, such as abort operations and rescue procedures, as needed
Data and Subsystems	• Complete additional objectives to **verify subsystems and validate data.**

9. Why do we need astronauts to view the Moon when we have robotic observers?

- **Human eyes and brains are highly sensitive to subtle changes in color, texture,** and other surface characteristics.
- Having **astronaut eyes observe the lunar surface directly,** in combination with the **context of all the advances that scientists have made about the Moon** over the last several decades, may uncover new **discoveries and a more nuanced appreciation for the features on the surface of the Moon.**
- Though the **crew will not be able to downlink all their imagery before they return to Earth,** as much as possible will be made **available on the Artemis II Multimedia website**.
- Additional **imagery will also be added as it is processed following splashdown.**
- Understanding how humans live and **work on the Moon is critical for Mars missions.**
- It helps to study:
  - **Radiation exposure**
  - **Low gravity effects**
  - **Life-support systems**

10. What do the astronauts eat during the mission?



- The **Artemis II astronauts have access to 189 unique menu** items during their mission, **including 10 different beverages like coffee and smoothies**.
- Common **food items include tortillas, nuts, barbeque beef brisket, cauliflower, macaroni and cheese, butternut squash, cookies, and chocolate.**
- Food flying aboard **Artemis II is designed to support crew health and performance** during the mission around the Moon.
- **Menu selections are developed with space food experts and the crew to balance calorie needs**, hydration, and nutrient intake while accommodating individual preferences.

11. What is the Artemis II zero-gravity indicator and how was it selected?

- **NASA's Artemis II crew** selected **Rise as their zero-gravity indicator** for the mission.
- A **zero-gravity indicator is a small plush** item that flies along with a crew to visually indicate when they are in space.
- **Rise was designed by Lucas Ye from Mountain View, California,** as a tribute to the iconic Earthrise moment from the **Apollo 8 mission**, which deeply resonated with the crew.
- Rise was fabricated by **NASA's Thermal Blanket Lab at the Goddard Space Flight Center in Greenbelt, Maryland.**
- **NASA** worked with the company **Freelancer to hold a Moon Mascot Design Challenge** to design the **zero-gravity indicator for Artemis II,** which **drew more than 2,600 submissions** from more **than 50 countries, including from K-12 students.**

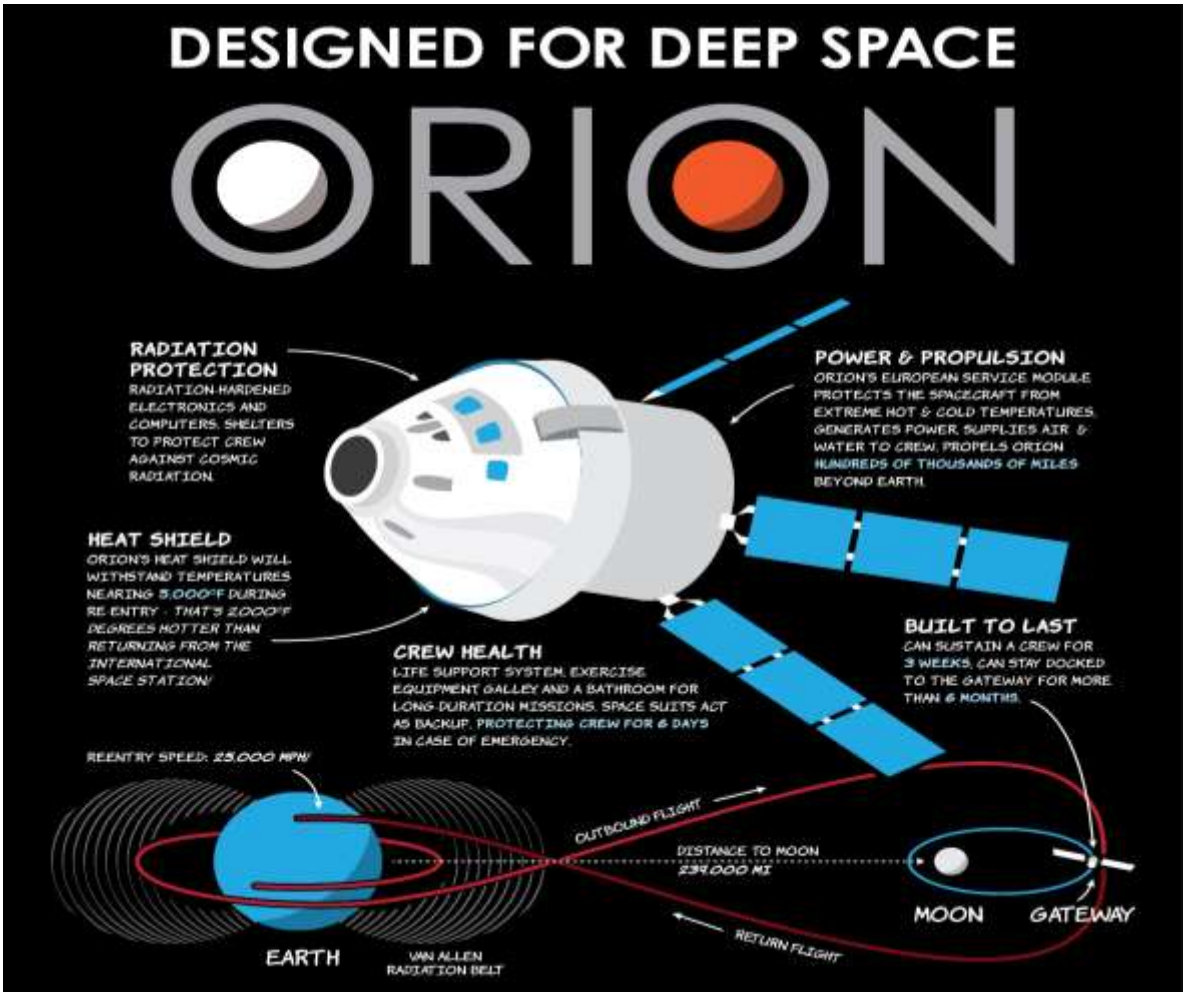
- The **tradition of bringing along a plush-toy "zero gravity indicator"** dates back to **Yuri Gagarin's Vostok 1 mission in 1961** and has included a **Snoopy on Artemis I and a Baby Yoda on SpaceX Crew-1.**

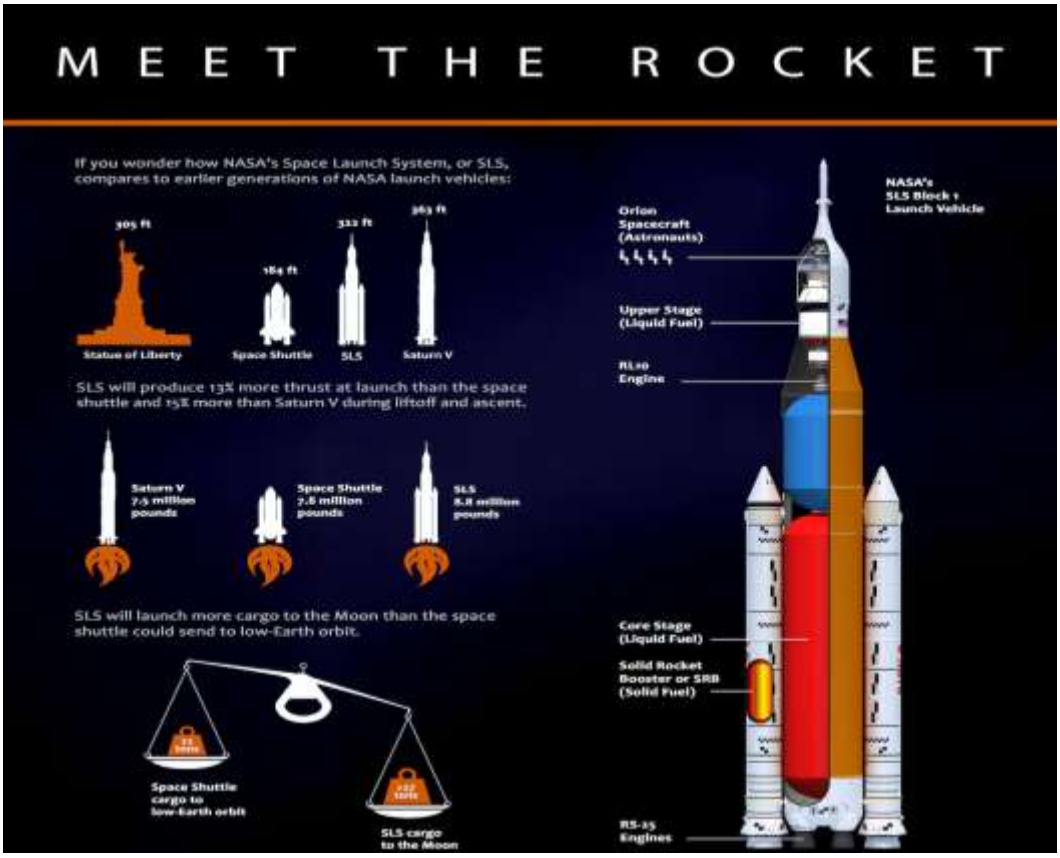
12. Highlight key features of Orion spacecraft?

- The **Orion spacecraft is NASA's next-generation** crewed spacecraft designed for deep-space missions under the **Artemis program**.
- Its design focuses on **safety, endurance**, and capability beyond **low-Earth orbit.**

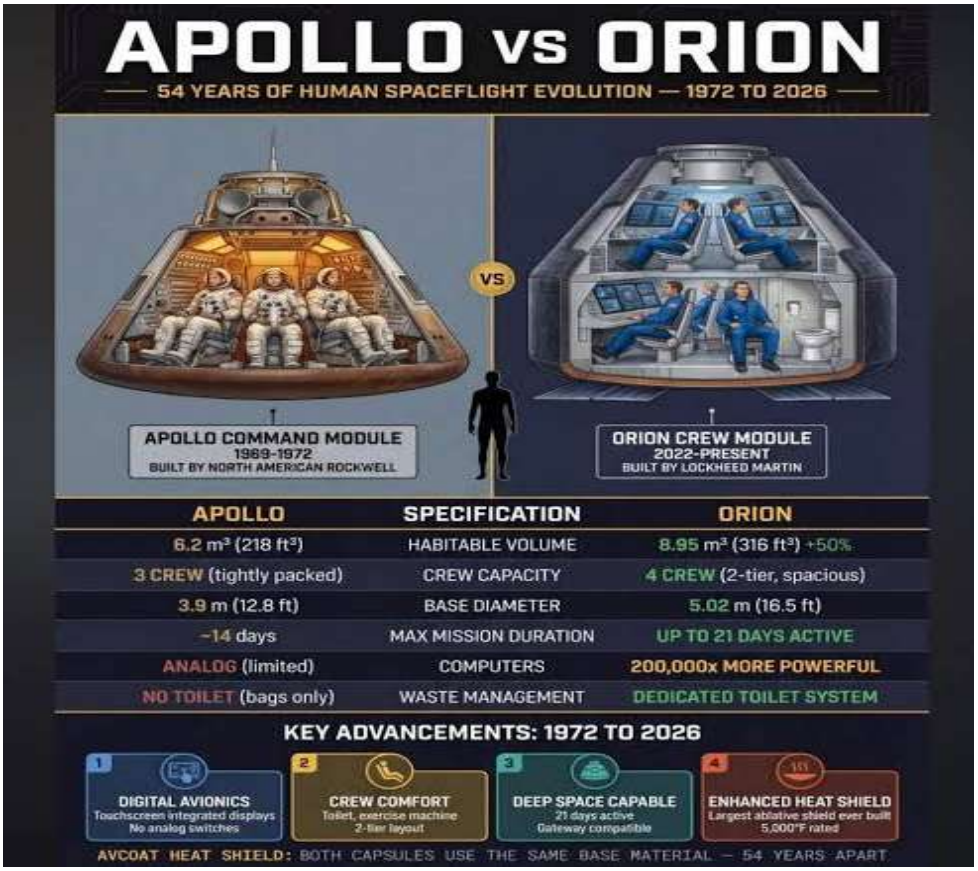
Orion has three main parts:

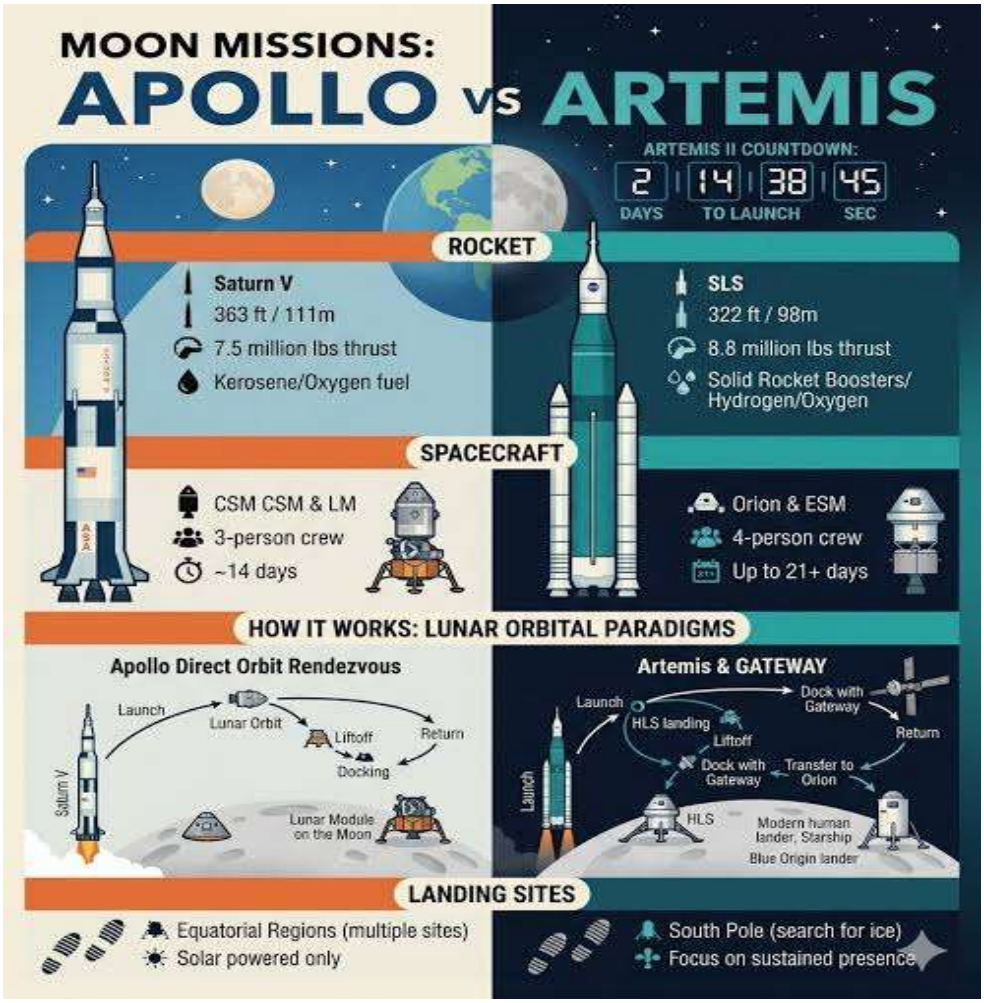
Parts	Description
launch abort system (LAS)	• The **launch abort system (LAS)** is at the top. • If there is an emergency during launch, the **LAS** will pull the crew capsule away from the **rocket for a safe landing.**
Crew module	• The **crew module** is in the **center.** • This is the **pressurized capsule** where the **astronauts** will live and work on their **journey to the Moon and back.**
Service module	• The **service module** is at the bottom. • This module **carries life support systems** that provide water and oxygen to the crew. • **Once in space**, it has **four solar array wings** that expand to **generate electricity**. • This module also provides **in-space propulsion and regulates temperatures** in the crew module.





13. Highlight key differences between Apollo Command Module and Orion spacecraft?

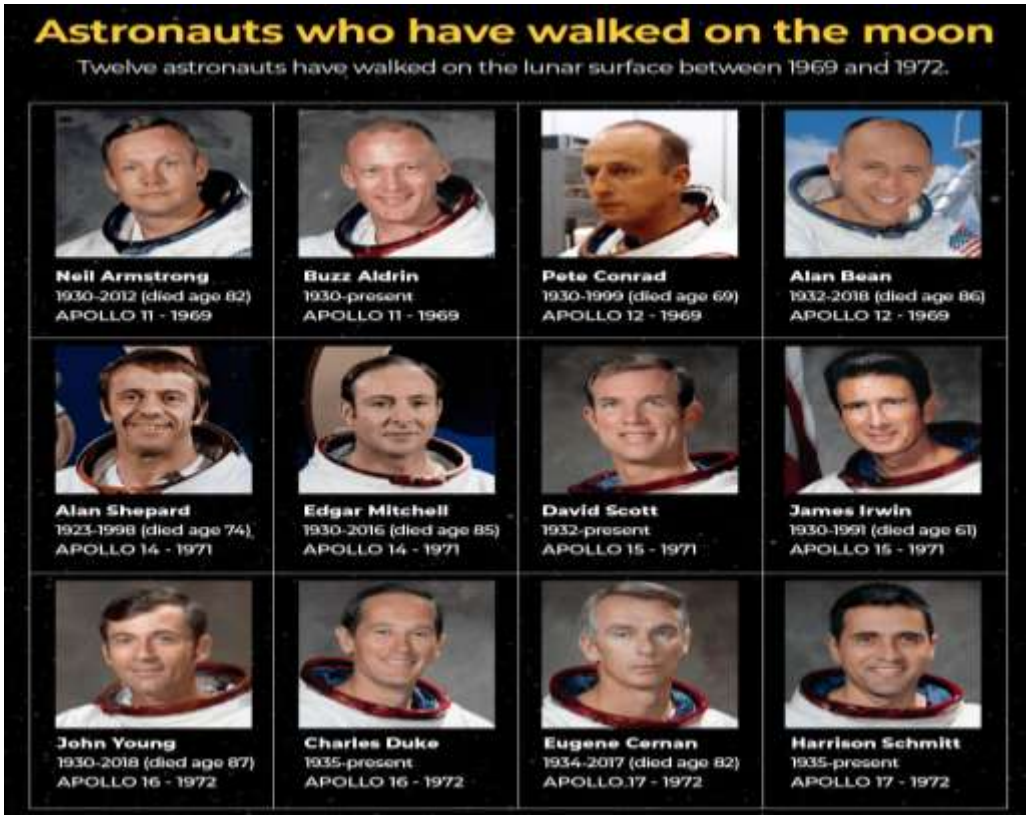

APOLLO vs ORION
54 YEARS OF HUMAN SPACEFLIGHT EVOLUTION — 1972 TO 2026
VS
APOLLO COMMAND MODULE
1969-1972
BUILT BY NORTH AMERICAN ROCKWELL
ORION CREW MODULE
2022-PRESENT
BUILT BY LOCKHEED MARTIN
APOLLO | SPECIFICATION | ORION
6.2 m³ (218 ft³) | HABITABLE VOLUME | 8.95 m³ (316 ft³) +50%
3 CREW (tightly packed) | CREW CAPACITY | 4 CREW (2-tier, spacious)
3.9 m (12.8 ft) | BASE DIAMETER | 5.02 m (16.5 ft)
~14 days | MAX MISSION DURATION | UP TO 21 DAYS ACTIVE
ANALOG (limited) | COMPUTERS | 200,000x MORE POWERFUL
NO TOILET (bags only) | WASTE MANAGEMENT | DEDICATED TOILET SYSTEM
KEY ADVANCEMENTS: 1972 TO 2026
1 DIGITAL AVIONICS
Touchscreen integrated displays
No analog switches
2 CREW COMFORT
Toilet, exercise machine
2-tier layout
3 DEEP SPACE CAPABLE
21 days active
Gateway compatible
4 ENHANCED HEAT SHIELD
Largest ablative shield ever built
5,000°F rated
AVCOAT HEAT SHIELD: BOTH CAPSULES USE THE SAME BASE MATERIAL — 54 YEARS APART


MOON MISSIONS:
APOLLO vs ARTEMIS
ARTEMIS II COUNTDOWN:
2 DAYS | 14 TO LAUNCH | 38 | 45 SEC
ROCKET
Saturn V
363 ft / 111m
7.5 million lbs thrust
Kerosene/Oxygen fuel
SLS
322 ft / 98m
8.8 million lbs thrust
Solid Rocket Boosters/ Hydrogen/Oxygen
SPACECRAFT
CSM CSM & LM
3-person crew
~14 days
Orion & ESM
4-person crew
Up to 21+ days
HOW IT WORKS: LUNAR ORBITAL PARADIGMS
Apollo Direct Orbit Rendezvous
Launch
Lunar Orbit
Liftoff
Return
Docking
Saturn V
Lunar Module on the Moon
Artemis & GATEWAY
Launch
HLS landing
Dock with Gateway
Liftoff
Return
Dock with Gateway
Transfer to Orion
Launch
HLS
Modern human lander, Starship
Blue Origin lander
LANDING SITES
Equatorial Regions (multiple sites)
Solar powered only
South Pole (search for ice)
Focus on sustained presence

14. How many astronauts have walked the moon?

Twelve US astronauts have **walked on the moon, all during NASA's Apollo programme** (1969–1972):

- **Apollo 11 (1969) – Neil Armstrong, Buzz Aldrin: First humans on the moon.**
- **Apollo 12 (1969)** – **Charles "Pete" Conrad, Alan Bean**: Precision landing near Surveyor 3 probe.
- **Apollo 14 (1971)** – **Alan Shepard, Edgar Mitchell**: Shepard famously hit golf balls on the Moon.
- **Apollo 15 (1971)** – **David Scott, James Irwin**: First use of the lunar rover; focused on geology.
- **Apollo 16 (1972)** – **John Young, Charles Duke**: Explored the lunar highlands.
- **Apollo 17 (1972)** – **Eugene Cernan, Harrison Schmitt**: Last Moonwalkers. **Schmitt was the only professional geologist** to walk on the moon.



15. When are the next Artemis missions?

Mission	Description
Artemis III – 2027	• **NASA recently overhauled** the mission profile of **Artemis III.** • The mission, **scheduled for next year**, will no longer land on the moon but **rather send a crew into low Earth orbit,** where it will **test integrated operations between the Orion spacecraft** and one or both commercial landers from **SpaceX and Blue Origin**

Artemis IV – early 2028	• The mission is **due to be the first crewed lunar landing since Apollo 17**. • NASA plans to **send its crew into lunar orbit** and **two astronauts down to the lunar south pole.**
Artemis V – late 2028	• With this mission, **NASA plans a second crewed lunar landing and the start of a lunar base.**

16. What is the heat shield, and why is it so critical?

- The **heat shield is a protective la**yer on the **bottom of the Orion spacecraft** that **absorbs and deflects the extreme heat generated** as it **re-enters Earth's atmosphere.**
- Returning from the moon, as the **Orion slams into the atmosphere, air in front of the capsule compresses** and heats up, creating temperatures of about **2,700 degrees Celsius** (4,900 degrees Fahrenheit), hotter than lava.
- To survive this, **Orion uses a specially designed ablative heat shield** made from a material called **Avcoat.**
- Instead of just resisting heat, **it slowly burns and erodes away, carrying hea**t with it and **protecting the astronauts inside.**
- If the **shield fails**, the underlying **metallic structure could melt, rupture and disintegrate.**
- During the **uncrewed Artemis I in 2022, Orion successfully returned from the moon**, with its heat shield protecting the capsule from **temperatures of up to 2,760C (5,000F).**

17. What is the Artemis Accord?

- **NASA,** in coordination with the **U.S. Department of State and seven other initial signatory nations**, established the **Artemis Accords in 2020.**
- With many **countries and private companies** conducting missions and operations around the **Moon, the Artemis Accords provide a common set of principles to enhance the governance of the civil exploration** and use of outer space.
- The **Artemis Accord**s reinforce the **commitment by signatory nations to the Outer Space Treaty,** the **Registration Convention**, the **Rescue and Return Agreement**, as well as best practices and norms of responsible behavior for civil space exploration and use.

18. Highlight key principles of Artemis Accord?

The Artemis Accords' Principles	
Peaceful Exploration of Space	Preserving Space History & Heritage
Transparency	Space Resources
Interoperability	Deconfliction of Activities
Emergency Assistance	Orbital Debris
Registration of Space Objects	

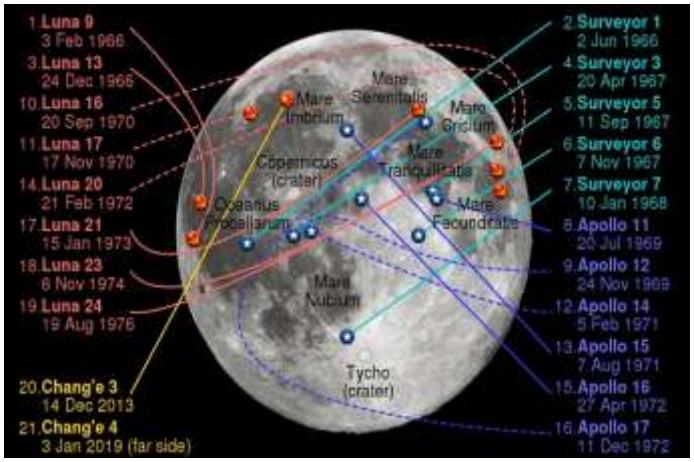
Key Principles	About
Peaceful Exploration of space	• **Nations agree that all activities** conducted under the **Artemis program** must be carried out for peaceful purposes in accordance **with international law**

Transparency	• **Signatory nations** should conduct their activities in a tra**nsparent way** in the hope this prevents both confusion and conflict. • This also extends to **signatories** sharing scientific information with the **public and the international scientific community** on a good-faith basis. • Signatories should apply this even to competing projects and are expected to coordinate the release of research and papers with each other. • The accords state: **"Artemis Accords signatories commit to the public release of scientific information, allowing the whole world to join us on the Artemis journey."**
Interoperability	• The accords say that nations participating in the **Artemis program** should aim to develop and **provide support for systems that can work in conjunction with existing infrastructure**, hopefully enhancing both the safety of space operations and the sustainability of these missions.
Emergency Assistance	• Nations signing the **Artemis Accords are committed to assisting astronauts** and personnel in outer space who are in distress.
Registration of Space Objects	• **Nations participating in Artemis should determine** which of them should register any relevant space object.
Preserving Heritage	• **Artemis Accords signatories** have committed to preserving **humanity's outer space heritage.** • This includes sites with **historic significance such as human or robotic landing sites,** artifacts, spacecraft, and other evidence of activity on other celestial bodies.
Space Resources	• The accord signatories affirm that **extracting and utilizing space resources** from the **celestial bodies** listed above is vital to supporting safe and sustainable space exploration. • They also commit to informing the **U.N. Secretary General, the public, and the scientific community of space resource extraction activities.**
Deconfliction of Activities	• The Artemis Accords nations are committed to preventing **harmful interference and exercising the principle of due regard.** • This also covers the establishment of s**o-called "safety zones"** with areas that can be established between countries and which can be **ended when relevant operations cease.**
Orbital Debris	• **Artemis Accords countries** are committed to planning for the **safe timely and efficient disposal of debris** as part of the mission planning process.

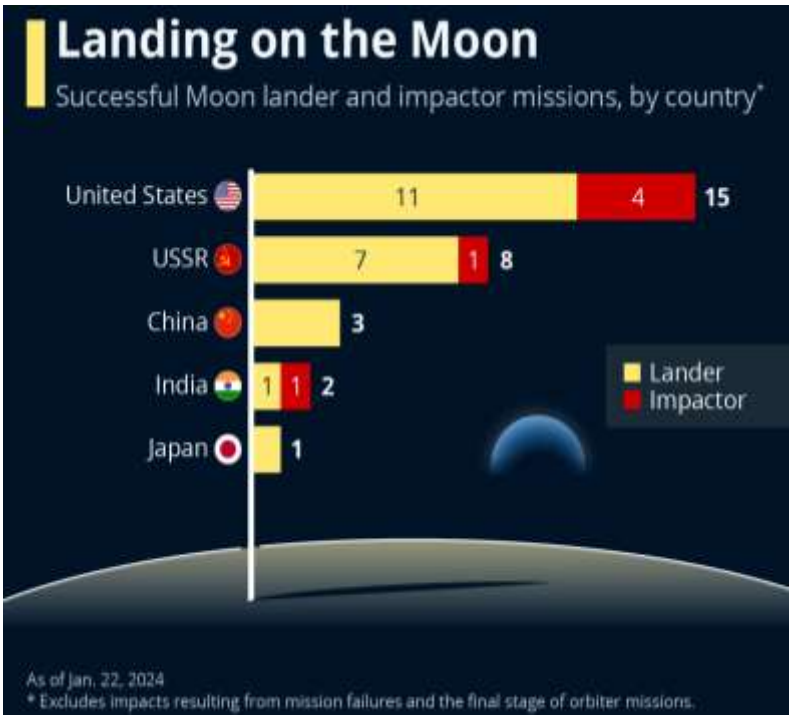
	• **Signatories of the accords** also agree that they should limit the generation of new long-lived or harmful debris. • This includes the **safe disposal of space structures in the post-operation phase of missions**

19. Enlist some previous moon missions?


Missions to the moon
Since 1958, there have been at least 77 successful and partially successful missions, including landers and orbiters, by seven nations to the moon, according to NASA's archive.
US: 35
USSR: 25
China: 9
Japan: 3
India: 3
EU: 1
South Korea: 1
Notable missions
Luna 9 (USSR)
First spacecraft to achieve a soft landing in 1966
Apollo 11 (US)
The first mission to land humans on the moon in 1969
Chang'e 4 (China)
First mission to land on the far side of the moon
Chandrayaan-3 (India)
First successful landing near the lunar south pole


1.Luna 9
3 Feb 1966
3.Luna 13
24 Dec 1966
10.Luna 16
20 Sep 1970
11.Luna 17
17 Nov 1970
14.Luna 20
21 Feb 1972
17.Luna 21
15 Jan 1973
18.Luna 23
6 Nov 1974
19.Luna 24
9 Aug 1976
20.Chang'e 3
14 Dec 2013
21.Chang'e 4
3 Jan 2019 (far side)
2.Surveyor 1
2 Jun 1966
4.Surveyor 3
20 Apr 1967
5.Surveyor 5
11 Sep 1967
6.Surveyor 6
7 Nov 1967
7.Surveyor 7
10 Jan 1968
8.Apollo 11
20 Jul 1969
9.Apollo 12
24 Nov 1969
12.Apollo 14
5 Feb 1971
13.Apollo 15
7 Aug 1971
15.Apollo 16
27 Apr 1972
16.Apollo 17
11 Dec 1972
Mare Imbrium
Mare Serenitatis
Mare Crisium
Mare Tranquillitatis
Mare Fecunditatis
Copernicus (crater)
Oceanus Procellarum
Mare Nubium
Tycho (crater)

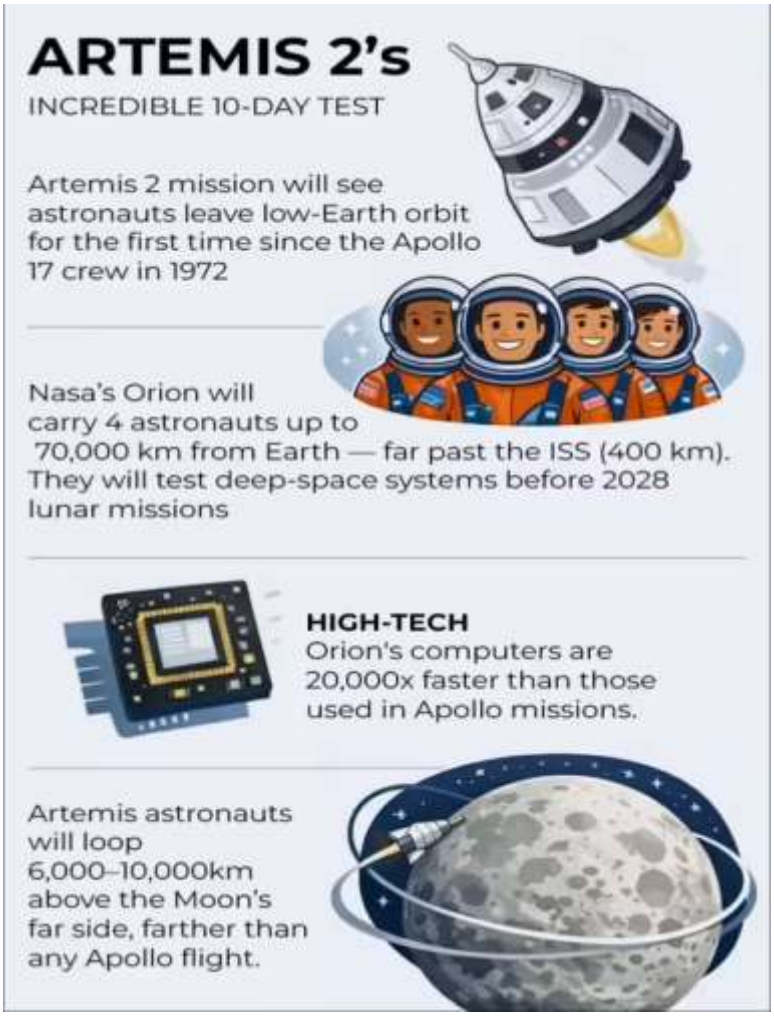

SHOOTING FOR THE MOON
Important lunar missions that contributed to our knowledge of the moon
OCT. 4, 1959
Luna 3
USSR: First pictures of the lunar farside
SEP. 12, 1959
Luna 2
USSR: First moon landing
JAN. 2, 1959
Luna 1
USSR: First moon flyby
JUL. 28, 1964
Ranger 7
USA: First U.S. close-up pictures of the Moon
JAN. 31, 1966
Luna 9
USSR: First lunar soft landing
APR. 3, 1966
Luna 10
USSR: First lunar orbiter
JUL. 20, 1969
Apollo 11
USA: Neil Armstrong walks on the Moon
SEP. 15, 1968
Zond 5
USSR: Takes first living creatures near the moon
DEC. 7, 1972
Apollo 17
USA: Harrison Schmitt, first scientist on the Moon
JAN. 24, 1990
Hiten
Japan: First Japanese moon mission
DEC. 7, 2018
Chang'e 4 & Yutu 2
China: First lunar farside landing
OCT. 22, 2008
Chandrayaan-1
India: Recorded first evidence of water molecules
SEP. 27, 2003
SMART-1
Europe: First European Moon mission



20. Do other countries plan to send astronauts to the Moon?

Country	Plan
Europe (ESA)	• **European Space Agency** does **not have an** independent **crewed Moon mission.** • Participates in **NASA's Artemis program** (e.g., Orion service module). • **European astronauts** may **fly on Artemis missions.**
China	• Led by **China National Space Administration.** • Plans a **crewed lunar landing by ~2030.** • Building on **robotic successes like Chang'e 5.** • Working toward a **joint lunar base with Russia.**
India(ISRO)	• India has also **expressed ambitions to one day** see its **own astronauts walking on the Moon.** • Following the **success of Chandrayaan 3's landing** near the **lunar south pole in August 2023,** India's space agency set out a **goal of sending astronauts to the Moon by about 2040.** • This would be part of a push to move its human spaceflight programme beyond low Earth orbit.
Russia (Roscosmos)	• **Russia continues to talk about flying cosmonauts** to the **surface and building** a small base sometime between about **2030 and 2035.** • However, **sanctions, funding pressures and technical setbacks** mean its timetable is **highly optimistic.**

21. How Chandrayaan-3 is supporting the Artemis program?



- While **Chandrayaan-3 is not directly part of Arte**mis, it plays a **crucial enabling role for future human missions like the Artemis II mission and Artemis III**.

Aspects	Description
Validating the lunar south pole region	• **Chandrayaan-3 achieved** the **first successful landing near the Moon's south pole.** • **Artemis missions** aim to land in the same region. • India's data helps in confirming the following: ▪ **Surface conditions** ▪ **Terrain safety** ▪ **Feasibility of landing sites**
Strengthening evidence of water ice	• **Chandrayaan-1 first detected the presence of water molecules on the Moon, and Chandrayaan-3** further strengthened this finding through on-ground observations.

	• This is highly significant for **Artemis missions, as water on the Moon** can serve as a vital resource for astronauts, **both as a drinking supply and as a raw material** that can be split into **hydrogen and oxygen to produce rocket fuel.** • The **availability of water supports the goal of establishing a sustainable** and **long-term human presence on the Moon.**
Demonstrating Low-Cost	• **ISRO demonstrated a cost-effective** and reliable **precision landing capability through Chandrayaan-3**, providing valuable lessons in **navigation, hazard avoidance, and overall mission efficiency.**
Boosting Global Collaboration (India–US)	• Boosting **global collaboration** between **India and the United States**, the success of ISRO has strengthened its cooperation with NASA in the field of space exploration. • India being a **signatory to the Artemis Accords enhances** prospects for deeper collaboration, including joint missions, technology sharing, and **participation in future lunar exploration initiatives.**

22. Why does everyone want the south pole of moon?

- The **South Pole's water ice** is the **reason both India and Nasa** are drawn there.
- **Water can be split into hydrogen and oxygen**, which are the **basic components of rocket fuel.**
- A supply of **water on the Moon means astronauts could drink it, grow food with it, and manufacture the fuel needed to travel further into the Solar System**.
- One geologist famously called the **lunar South Pole the most valuable piece of real estate in the Solar System.**
- **Nasa's first crewed lunar landing i**s now planned for **Artemis 4, targeting early 2028, at the South Pole**.
- That mission will **build on what Chandrayaan-3 proved: that the South Pole can be reached, and that it holds something worth going back for.**
- **Artemis 2 flew around the Moon** to prepare for that landing.
- It photographed the **far side, studied the corona during a solar eclipse, and broke a record set before most of its crew were born.**

23. What is the relevance of the topic for UPSC CSE?

- **For Prelims:** International Space Station, Outer Space Treaty of 1967, United Nations, Space Launch System, Chandrayaan-3 mission, Gaganyaan.
- **For Mains:** Various space missions of ISRO and NASA.

Some previous years prelims questions.

Q1. Which one of the following countries has its own Satellite Navigation System? (2024)

(a) Australia
(b) Canada
(c) Israel
(d) Japan

Ans: (d)

Q2. Consider the following pairs: (2023)

Objects in space	:	*Description*
1. Cepheids	:	Giant clouds of dust and gas in space
2. Nebulae	:	Stars which brighten and dim periodically
3. Pulsars	:	Neutron stars that are formed when massive stars run out of fuel and collapse

How many of the above pairs are correctly matched?

(a) Only one
(b) Only two
(c) All three
(d) None

Ans: (a)

Some previous years mains questions.

Q1. What are asteroids? How real is the threat of them causing extinction of life? What strategies have been developed to prevent such a catastrophe? (2024-15 Marks)

Q2. What is the main task of India's third moon mission that could not be achieved in its earlier mission? List the countries that have achieved this task. Introduce the subsystems in the spacecraft launched and explain the role of the Virtual Launch Control Centre' at the Vikram Sarabhai Space Centre which contributed to the successful launch from Sriharikota. (2023-15 Marks)

Q3. Launched on 25th December 2021, the James Webb Space Telescope has been much in the news since then. What are its unique features which make it superior to its predecessor Space Telescopes? What are the key goals of this mission? What potential benefits does it hold for the human race? (2022-15 Marks)

Some questions from this year and previous years interview transcripts.

Board Sheel Vardhan sir:

- Tell me something about India's successful space mission?
- What Changes have we made in Chandrayaan 3?
- Tell me any special mission conducted by nasa recently?
- What are your views on space privatisation?

Board Sheel Vardhan sir:

- Mention various areas in which ISRO excels NASA?
- What is the purpose Artemis mission?

Board Suman Sharma mam:

- What do you think about commercialisation of the space sector?
- What comes to your mind when I say space?
- What is the global space sector?
- What about privatisation in space?
- Tell its pros and cons
- What is the recent Artemis Mission?

Some questions for QUIZ.

Q1. Consider the following wrt Artemis2 Mission.

1. It will be the first mission to carry humans to the moon's vicinity since 1972.
2. The mission will include three NASA astronauts and one astronaut from the Canadian Space Agency (CSA).

3. Artemis 2 is the second scheduled flight of the Artemis programe.

How many of the above statements is/are incorrect?

(a) Only one
(b) Only two
(c) All three
(d) None

Ans: (d)

Q2. Consider the following Countries:

1. US
2. Thailand
3. UAE
4. India
5. Saudi Arabia

How many of the above countries are part of the ARTEMIS ACCORD?

(a) Only two
(b) Only three
(c) Only four
(d) All five

Ans: (d)

Some questions for POLL.

Q1. Do you think Artemis II will successfully pave the way for human return to the Moon?

(a) YES
(b) NO
(c) Can't say.

Q2. Should international collaboration (like NASA–ISRO) be expanded through missions like Artemis II?

(a) YES
(b) NO
(c) Can't say.

Q3. Is investing in crewed lunar missions like Artemis II worth the high cost?

(a) YES
(b) NO
(c) Can't say.

Q4. Will Artemis II significantly boost technological advancements on Earth?

(a) YES
(b) NO
(c) Can't say.

Q5. Do you believe Artemis II will inspire a new generation towards space exploration?

(a) YES
(b) NO
(c) Can't say.

Q6. Should India play a larger role in future Artemis missions?

(a) YES
(b) NO
(c) Can't say.

Q7. Is Artemis II a crucial step toward future Mars missions?

(a) YES
(b) NO
(c) Can't say.

■■■■