

Galactica

Astronomy and Space Science Magazine

Antares

M19



M24



M8



M6



M7



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Train Your Brain

GALACTICA

Galactica is a monthly magazine about astronomy & space science published by SPACE India targeting amateur astronomers. Each monthly issue includes astronomy news, space launches, what's up in the sky every month, events and announcements done by the space team, Astrophotographs and articles on astronomy & astrophysics submitted by the readers for the general audience, and the article about historical missions & events of astronomy and more. All of this comes in an easy-to-understand user-friendly style that's perfect for astronomers at any level.

Team

Editor in Chief

Sachin Bahmba

Managing Editor

Ranjith Kumar E

Editors

Priyadharshini D

Contributors

Space Students

Assistant Editors

Shanawaz Khan

Sadaf Iqbal Ansari

Gowri Priya P R

Sebin Sebastian

Section Contributors

Ashi Seth

Aditi Mishra

Cover Photo: Milkyway Arm with Scorpius Constellation captured by Mr. Sebin Sebastian

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ABOUT SPACE



SPACE is the pioneer organization working towards the development of science and astronomy in India. It aims to create a scientifically aware society and contribute to the technological and social development of the country, SPACE organization belongs to an astronomical league. Diligently working towards development in astronomy and space science through astronomical tutorials, modules, and curriculum for education requirements of schools & students in India. We constantly engage in offering introductory astronomy, science about space, astrophysics, telescopes, and internet astronomy to the masses.

Vision: To popularize hands-on space science & STEM Education through various fun-filled pioneering concepts, services, and programs.

Mission: To develop and popularize space science & STEM Education In India and establish a global association with national & international space science agencies, societies, amateur, and professional organizations, government agencies, and space observatories.

CMD's Message



Dr. Sachin Bahmba,
CMD, SPACE

Space and Astronomy are the future for the young generation of our country. This is a great means to inculcate scientific temperament among the masses. Such astronomy sessions will provide

a hands-on learning platform for students wherein they explore the real world of science, I wish for young students to let their ambitions soar and think big as they are the future of our country.

Co-founder's Message



Ms. Shalini Bahmba,
Co-founder, SPACE

Astronomy education is important as it builds curiosity, critical thinking, and problem-solving skills, helping young minds prepare for the future. It encourages innovation, exploration, and a scientific mindset.

Young learners build creativity and confidence through hands-on, experiential learning, preparing them for careers in space science and technology. We aim to cultivate future innovators who will lead progress, discovery, and global advancement.

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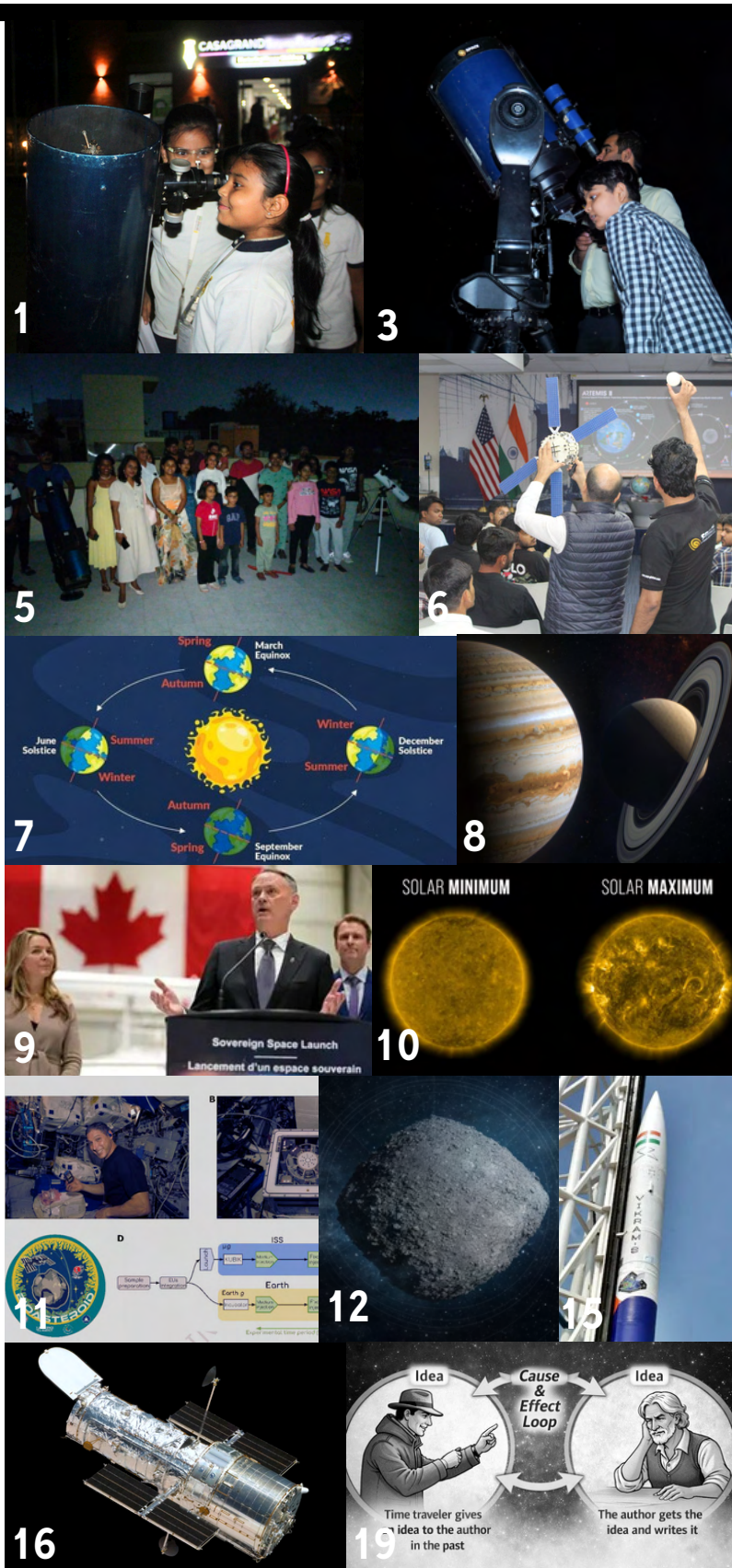
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SPACE INSIGHTS

Reaching for the Stars: Two Campuses, One Passion for Astronomy

A Night Under the Stars at Achievers Campus, Thiruvannmiyur

In a celebration of science and discovery, two schools under the Casagrand International School umbrella recently hosted captivating star parties, bringing the wonders of the universe to their students. These evening observation programs provided young learners with invaluable hands-on experience in astronomy, blending educational documentaries with direct telescope viewing to create unforgettable learning moments.

The first event was conducted at Achievers Campus in Thiruvannmiyur on March 1st, 2026. The program, held from 6:30 PM to 8:00 PM, saw an impressive turnout of 90 students from Grade 1 to Grade 8, accompanied by 60 parents. The evening began indoors with a screening of the documentary. Participants then moved outdoors for telescope observation, where they were treated to spectacular views of Jupiter and its four Galilean moons. The highlight of the night was the Moon, which appeared as a striking gibbous phase just one day before being full, offering a breathtaking sight of its craters and lunar maria. To make the experience interactive, students were given a worksheet featuring a QR code linking to NASA space games, ensuring the learning continued beyond the event.



An Evening of Discovery at Casagrand International School, Creators Campus, Kelambakkam

Building on the success of the first event, Casagrand International School's Creators Campus in Kelambakkam hosted its own star party on March 17, 2026. The program was conducted from 6:30 PM to 7:30 PM and was tailored for students in Grades VII, VIII, and IX. Similar to the first event, the evening commenced with an indoor screening of the documentary "Farther and Faster: NASA's Journey to the Moon with Artemis." This session provided students with a clear and detailed understanding of the Artemis II mission, which aims to send astronauts around the Moon as a crucial step toward long-term lunar exploration.



Following the documentary, students moved outdoors for telescope observation. The clear evening sky allowed for an excellent view of Jupiter, where students were thrilled to observe the planet's cloud bands and distinctly spot its four largest moons, Io, Europa, Ganymede, and Callisto, glimmering like celestial diamonds around the gas giant.



Both events successfully achieved their goal of providing practical exposure to astronomical observation, sparking curiosity and excitement among students. By combining insightful documentaries with real time sky gazing, the schools offered memorable educational experiences that brought classroom learning to life, inspiring the next generation of stargazers and space enthusiasts.



Antariksh Darshan – Hamirpur: A Celebration of Science Beneath Open Skies



Beneath the boundless canvas of the sky, where curiosity finds its truest expression, Antariksh Darshan – Hamirpur emerged as a radiant confluence of science, imagination, and community spirit. Set within the vibrant landscape of the Hamirpur Mahotsav in Uttar Pradesh, the five-day initiative transformed a cultural celebration into a gateway to the cosmos, inviting people to explore the universe beyond their everyday horizons.



Organised through a collaborative effort between the District Administration, Hamirpur and SPACE India, under the visionary leadership of Shri Ghanshyam Meena, IAS, District Magistrate, Hamirpur, the programme reflected a progressive approach to public science engagement.

The initiative was formally inaugurated by Hon'ble MLA Shri Manoj Kumar Prajapati, marking the beginning of an enriching journey into the realms of astronomy and discovery.



GALACTICA

At its core was an immersive planetarium experience that transported audiences across galaxies, distilling complex celestial phenomena into moments of awe and clarity. Complementing this were solar and night sky observation sessions, where telescopes brought distant celestial bodies within view, offering participants a rare and memorable connection with the universe. Interactive exhibits and hands-on demonstrations further deepened engagement, transforming learning into an active and participatory experience.



The programme witnessed enthusiastic participation from students, educators, and the wider community, reflecting a growing appetite for science beyond traditional classrooms. For many young minds, the experience served as a spark—an invitation to imagine futures shaped by curiosity, inquiry, and innovation.

By seamlessly integrating science within a cultural festival, Antariksh Darshan – Hamirpur redefined public engagement, making knowledge both accessible and inspiring. It stands as a compelling reminder that when science enters shared public spaces, it has the power to ignite minds and shape perspectives.

“The universe is not beyond our reach; it begins with the courage to look up and wonder.”

Exploring the Cosmos, Space Arcade's Monthly Observation



On February 28, 2026, SPACE ARCADE hosted its highly anticipated Monthly Telescopic Observation event, drawing astronomy enthusiasts in Delhi and Chennai for a captivating evening of celestial exploration.

Participants gathered, equipped with telescopes, binoculars, and other astronomical tools, eager to unravel the wonders of the night sky. Attendees were treated to breathtaking views of the Gibbous Moon, Jupiter and its four moons.

The SPACE ARCADE team guided participants through assembling and calibrating various telescopes, explained the features of different models, and answered an array of queries. They also introduced fundamental astrophotography techniques, inspiring many to document their cosmic discoveries.

A diverse range of telescopes was showcased during the event, including the Space Voyage 8" F/6 Dobsonian telescope, 200mm SCT on a Computerized EQ5 Mount, Space Launcher 76mm. Each offered participants a unique perspective of the celestial wonders.

With a strong emphasis on interactive learning and shared discovery, the event left a lasting impression on all attendees. SPACE ARCADE eagerly anticipates hosting future sessions, inviting more enthusiasts to experience the magic and marvels of astronomy.

Follow SPACE ARCADE on Instagram (@SpaceArcadeInd) for updates about upcoming events!



Return to the Moon: Artemis Rising

Under the glow of inquisitive minds and the spirit of exploration, the Masterclass held on 31st March was conducted as a collaborative initiative between the American Center, the cultural center of the U.S. Embassy in India and Space India—unfolded as an inspiring confluence of science, vision, and aspiration. The session commenced with an invigorating keynote by Ms. Miquela Burke, Regional Public Engagement Specialist, whose words encouraged young learners to think beyond borders and embrace the boundless possibilities of global scientific engagement.

The momentum deepened as Mr. Vikrant Narang, Chief Technology Officer, SPACE Group led the masterclass “Return to the Moon: A New Era of Human Exploration.” With clarity and passion, he brought the Artemis Program to life—transforming it from a distant mission into a living narrative of humanity’s return to the Moon after nearly half a century.

The event brought together a vibrant mix of participants—college students from Hansraj College, Kirori Mal College, Hindu College, and Miranda House, alongside learners from DAV School and St. Martin Diocesan School, as well as parents and teachers. This diverse, multi-generational crowd infused the space with energy, dialogue, and a collective enthusiasm for exploring the unknown.



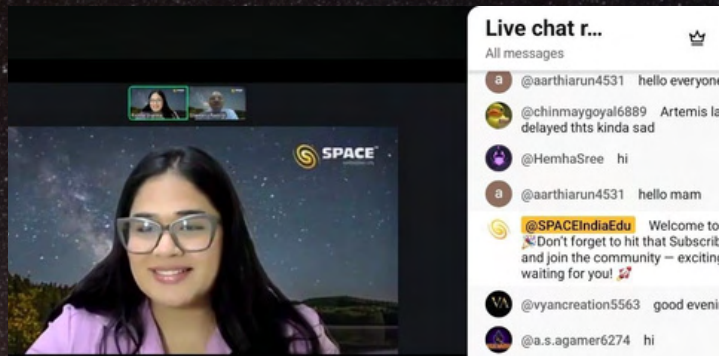
As deliberations advanced, the lunar surface was engaged not merely as an object of observation but as a domain of analytical significance. Cratered formations, distributed across its terrain, were interpreted as critical determinants in the identification of viable landing sites and the strategic planning of future missions. Through structured engagement with lunar cartography, coordinate systems, and site evaluation, the exercise transcended theoretical exposition, assuming the character of applied, methodical inquiry.

In that moment, the distance between Earth and the Moon no longer felt infinite. It felt measurable. Reachable.

And perhaps, what the learners carried back was not merely an experience, but a shift in perspective where the vastness of the Moon could be understood, mapped, and approached with intent. As Artemis II prepares to circle the Moon once again, the journey ahead feels not distant, but already in motion—waiting for the next generation to follow its path.

A Celestial Pause: Understanding Earth's Perfect Balance

There are moments in the cosmic calendar when the universe seems to pause when light and darkness find perfect equilibrium, and the rhythm of our planet reveals its quiet precision. The March Equinox is one such moment. On 20 March 2026 at 14:45, Earth arrived at a point in its orbit where day and night stood in near-perfect balance across the globe a phenomenon as poetic as it is scientific.



This delicate harmony took center stage in the webinar "Cosmic Balance: Science of the March Equinox", organized by SPACE India and streamed live on YouTube. Bringing together nearly a thousand learners, enthusiasts, and curious minds from across the country.

At the heart of the session was Prof. Shantanu Rastogi, Department of Physics, Deen Dayal Upadhyaya Gorakhpur University, whose deep expertise and engaging narrative guided participants through the science behind the equinox. Anchoring this journey was Ms. Rishita Sharma, Educator at SPACE India, whose vibrant presence infused the session with energy and accessibility.



What appears, at first glance, to be a simple seasonal transition unfolded into a deeper narrative of cosmic geometry. During the equinox, the Sun shines directly over Earth's equator, and the planet's axis is neither tilted toward nor away from it. The result is a near-equal distribution of sunlight across both hemispheres a fleeting yet profound reminder of balance embedded within motion.

Yet, what truly set the session apart was not just the science but the curiosity it sparked. Questions flowed freely from students: Why do shadows disappear in certain regions? How do eclipses occur? What governs the shifting patterns of light across Earth's surface? Each query, whether simple or complex, was met with patience and enthusiasm. Prof. Rastogi's responses transformed textbook concepts into living ideas, bridging the gap between theory and the sky above.

The webinar became more than an academic exercise, it echoed SPACE India's enduring vision to nurture scientific curiosity and inspire young minds to explore the universe with both imagination and understanding.

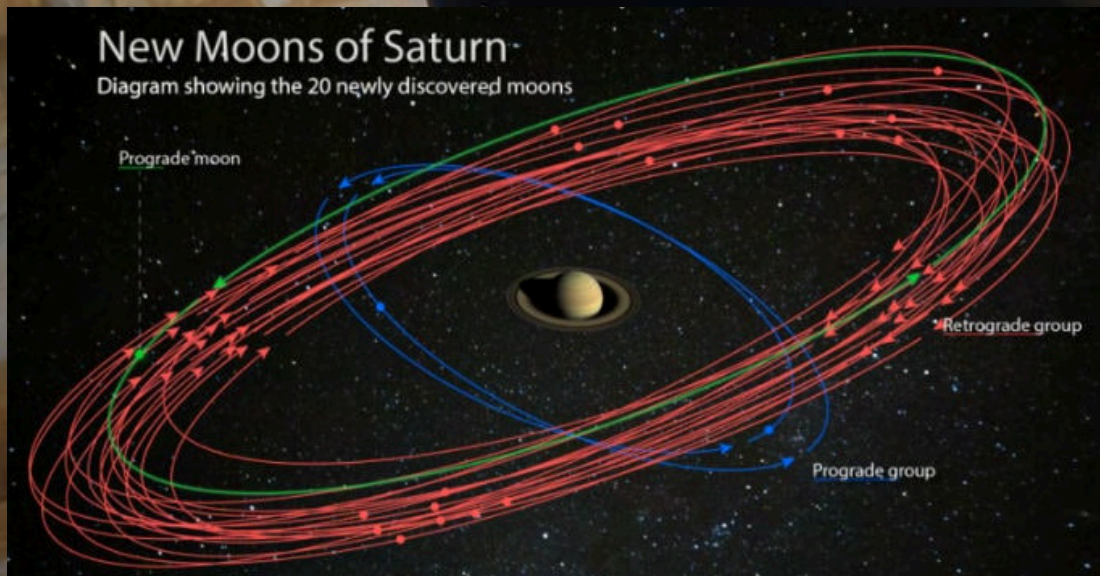
In the end, the equinox is more than an astronomical event. It is a quiet reminder of our place in the universe a moment to pause, to observe, and perhaps, to appreciate the delicate balance that governs our world.

HIGHLIGHTS OF MARCH 2026

Moons Multiply: Jupiter and Saturn's Ever-Growing Families

The outer solar system continues to reveal new secrets as astronomers discover more moons orbiting Jupiter and Saturn. On 16 March 2026, the Minor Planet Center officially announced the discovery of 4 new moons around Jupiter and 11 new moons around Saturn. With these additions, Jupiter's total number of known moons has reached 101, while Saturn's count has grown to an incredible 285, maintaining its lead as the planet with the most moons in our solar system.

These newly identified moons are extremely small, each measuring only about 3 kilometers (2 miles) in diameter. Their faint brightness, ranging from magnitude +25 to +27, makes them exceptionally difficult to observe. To put this into perspective, brighter celestial objects have lower or even negative magnitudes, such as the Sun at -26 and Venus at around -4. Because of their tiny size and distant orbits, these moons remained undetected until recently.



Saturn's moon system is especially vast. From our viewpoint on Earth, its moons spread across a region nearly five times wider than the apparent size of our Moon in the sky. This highlights how widely distributed and complex its satellite system is.

Astronomers discovered these moons by combining older observational data with new telescope observations, carefully tracking faint objects that move against the background stars. Advanced facilities like the Vera C. Rubin Observatory, which began operations in 2025, have significantly improved the ability to detect such dim and distant objects.

Despite their discovery, most of these moons will not receive official names. According to the International Astronomical Union, only moons with significant brightness or scientific importance are named. As a result, these newly found moons are currently identified by technical designations.

These discoveries show that even in our own solar system, there are still many hidden worlds waiting to be found as technology continues to advance.

Canada's First Spaceport: A New Era in Space Exploration

Canada has announced an investment of \$200 million toward developing the nation's first commercial spaceport, marking a major milestone in its growing space sector. This initiative aims to strengthen Canada's position in the global space industry while supporting satellite launches, research, and innovation in aerospace technologies.

The proposed spaceport is expected to be located in Nova Scotia, a region well-suited for launches into polar and sun-synchronous orbits. These orbits are essential for Earth observation, climate monitoring, and communication satellites, making the location strategically important for future missions.



Minister of National Defence David McGuinty announced on March 16th, that the Canadian government is committing \$200 million to develop Canada's first commercial spaceport in Nova Scotia, which will be run by Maritime Launch Services. Credits: Justin Tang/The Canadian Press

The project is being developed in collaboration with Maritime Launch Services, reflecting the increasing role of public-private partnerships in advancing space infrastructure. This effort will help Canada reduce its dependence on foreign launch providers and build independent launch capabilities within the country.

Beyond technological advancement, the spaceport is expected to generate economic benefits, including job creation, regional development, and increased investment in aerospace research. Overall, this initiative represents a forward-looking step in Canada's space ambitions, positioning the country as an emerging player in the global space economy.

Overall, this initiative represents a forward-looking step in Canada's space ambitions, combining innovation, economic growth, and global collaboration to shape the country's future in space exploration.

The Sun That Never Flips: A Stellar Mystery

The Sun may appear calm and unchanging in our sky, but beneath its glowing surface lies a dynamic and ever-evolving star. Unlike planets such as Earth, which experience a clear “flip” in seasons due to axial tilt, the Sun does not flip in the same way. Instead, it maintains a stable orientation while rotating steadily on its axis, giving the impression of constancy.

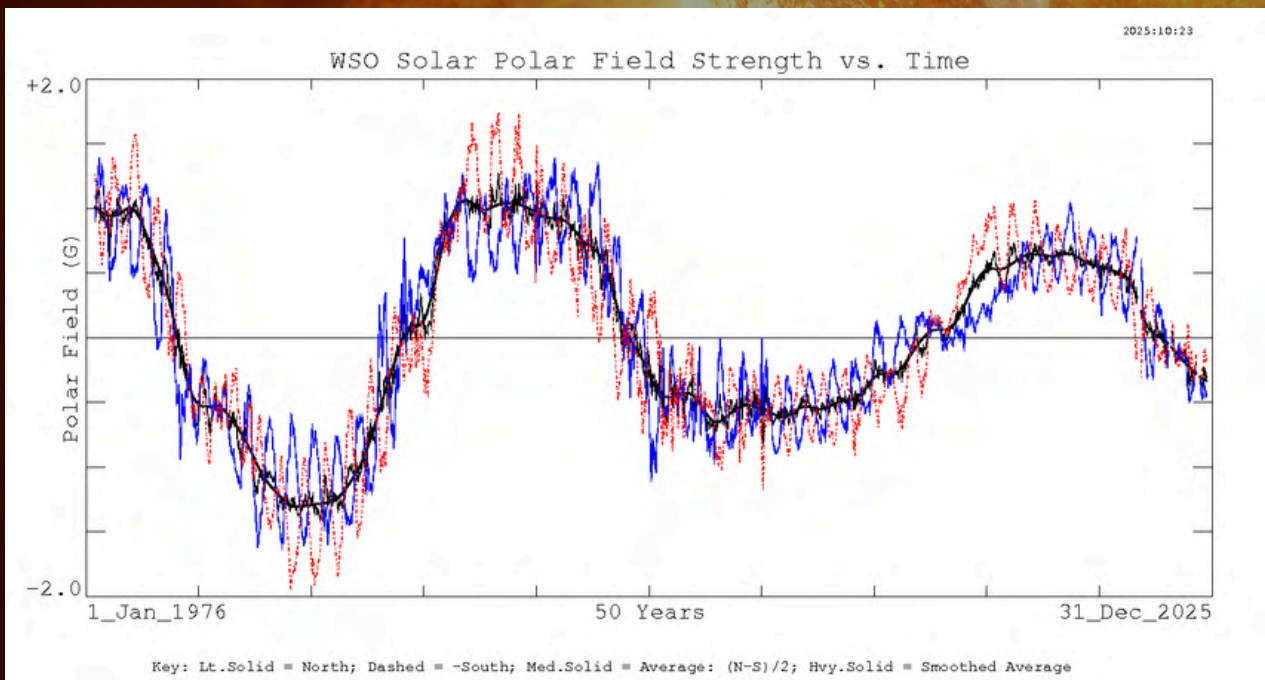
However, the Sun is far from static. It rotates once approximately every 27 days, but this rotation is not uniform. The equator spins faster than the poles, a phenomenon known as differential rotation. This uneven motion plays a key role in shaping the Sun’s magnetic field and driving solar activity such as sunspots and solar flares.

Interestingly, while the Sun itself does not physically flip, its magnetic field does reverse polarity roughly every 11 years. During this solar cycle, the north and south magnetic poles gradually weaken, flip, and rebuild in opposite orientations. This process influences space weather and can affect satellites, communication systems, and even power grids on Earth.

Thus, the idea of “the Sun that never flips” highlights an important distinction – while its structure remains stable, its internal magnetic dynamics are constantly changing. This balance between stability and activity makes the Sun a fascinating object of study, reminding us that even the most familiar star holds deep and complex secrets.

Another intriguing aspect of the Sun is how its activity varies over time. Periods of high activity, known as solar maximum, are marked by numerous sunspots, solar flares, and coronal mass ejections. In contrast, during solar minimum, the Sun appears quieter with fewer visible disturbances. These cycles show that even without flipping physically, the Sun undergoes continuous transformation.

Understanding these processes is essential, as the Sun’s behavior influences space weather, affecting satellites, GPS and astronauts. Studying solar cycles helps scientists predict these effects and protect modern technology.



The Sun’s polar magnetic field strength of the last 50 years. Image Credit: WSO

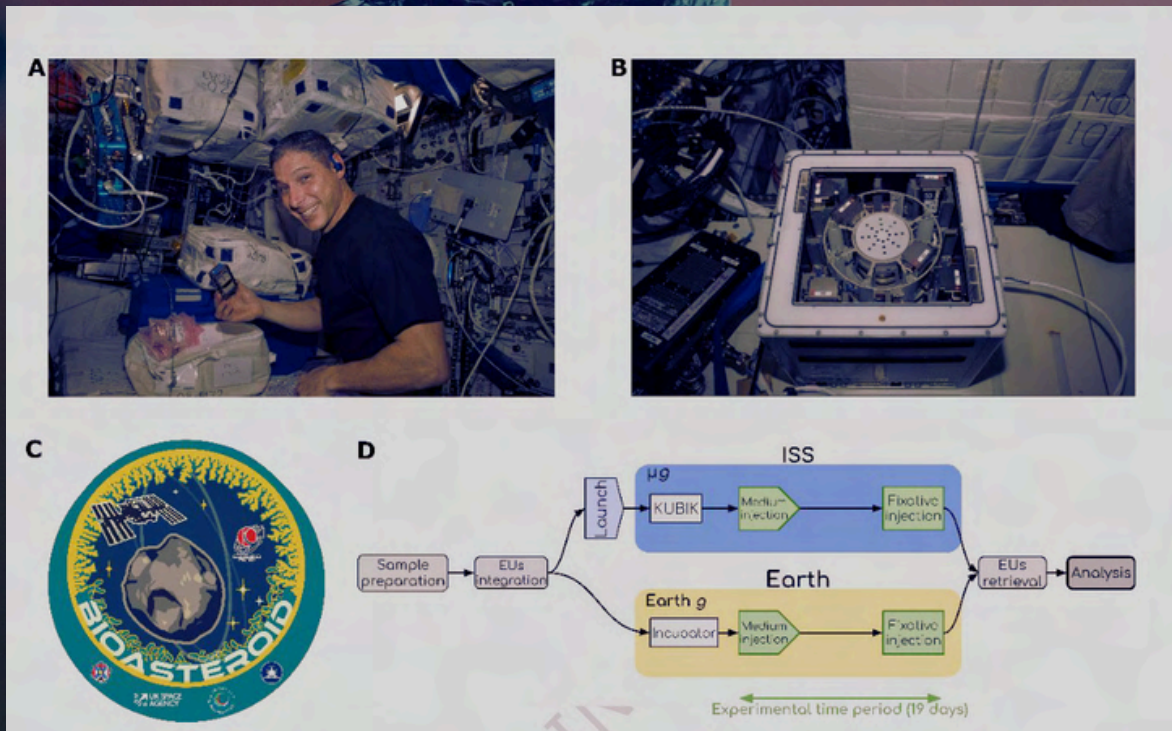
Mining the Cosmos: Astronauts Use Microbes to Harvest Metals in Space

As humanity prepares for long-duration space missions, scientists are exploring innovative ways to obtain essential resources beyond Earth. One promising approach involves using bacteria and fungi to extract valuable metals from rocks in space, a process known as biomining. This technique could reduce the need to transport heavy materials from Earth, making missions more efficient and sustainable.

Biomining relies on microorganisms that naturally break down minerals and release metals such as iron, copper, and rare elements. Experiments conducted on the International Space Station (ISS) have shown that certain bacteria can survive and function in microgravity, successfully extracting metals from basalt-like rocks. This proves that biological systems can operate effectively even in the harsh conditions of space.

Fungi also play a significant role in this process. Their root-like structures, called hyphae, can penetrate rocks and help dissolve minerals, enhancing metal extraction. Scientists are studying how fungi interact with different materials in space environments, as they may provide a stable and efficient method for resource extraction on the Moon or Mars.

In the future, biomining could support the construction of habitats, production of tools, and maintenance of equipment using locally available materials. By combining biology with space technology, astronauts may one day rely on living systems to sustain exploration, turning distant worlds into resource-rich environments for human survival. This innovative approach could significantly reduce mission costs and make deep-space exploration more practical.



NASA astronaut Michael Scott Hopkins performs the insertion of the experiment containers in KUBIK (left) and the six hardware units inserted into the KUBIK onboard the ISS (right). Credits: ESA/NASA

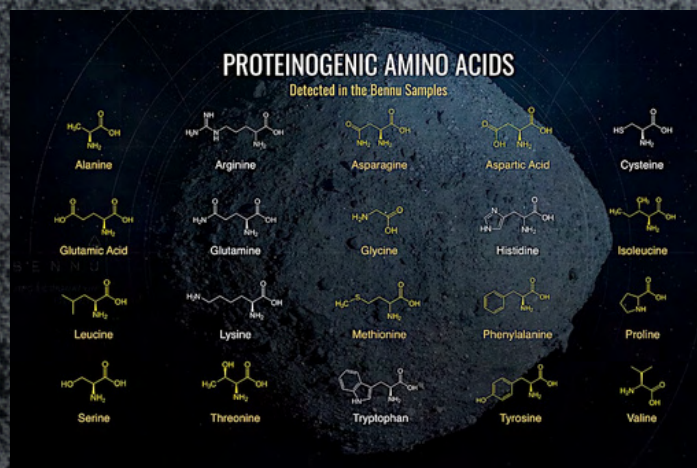
Asteroid Bennu and the Chemical Blueprint of Life

The return of samples from the asteroid OSIRIS-REx has opened an exciting new chapter in our understanding of life's origins. Collected from the near-Earth asteroid Bennu, these pristine materials have revealed something extraordinary—key chemical building blocks essential for life as we know it.

In early 2025, scientists confirmed that the Bennu samples contain all five canonical nucleobases: adenine, guanine, cytosine, thymine and uracil. These molecules are fundamental components of DNA and RNA, the genetic blueprints that store and transmit information in living organisms. While some nucleobases have been detected in meteorites before, finding all five together—especially cytosine and thymine, which are typically fragile and rarely preserved—is a major scientific breakthrough.

Alongside nucleobases, researchers also identified 14 of the 20 amino acids required to build proteins. Proteins are essential for nearly every biological function, from catalyzing chemical reactions to forming cellular structures. The presence of these amino acids, along with other organic compounds such as carboxylic acids and amines, highlights the rich chemical complexity of Bennu's material.

One of the most intriguing aspects of this discovery is the evidence suggesting that these compounds formed through aqueous alteration. This means that Bennu's parent asteroid once contained liquid water, allowing chemical reactions to occur over long periods. Such environments are ideal for synthesizing complex organic molecules, hinting that the building blocks of life can form naturally in space under the right conditions.



These findings strongly support the long-standing theory of panspermia-related chemistry, which proposes that asteroids and comets may have delivered essential organic ingredients to early Earth. During the chaotic early history of our planet, frequent impacts from such space objects could have deposited a "prebiotic cocktail," setting the stage for life to emerge.

The implications of this research go far beyond Earth. If asteroids like Bennu can carry and preserve life's building blocks, similar processes may be occurring throughout the universe. This raises the possibility that the ingredients for life are widespread, increasing the chances that life could exist elsewhere.

In conclusion, the Bennu samples provide compelling evidence that the seeds of life may have cosmic origins. Rather than being unique to Earth, the fundamental components of life might be a natural outcome of chemical evolution in space, waiting for the right conditions to come alive.

WHAT'S UP IN THE SKY - APRIL 2026

LUNAR CALENDAR

IMPORTANCE OF MOON PHASES FOR STARGAZERS

One might wonder why it is important to refer to moon phases for star gazing. The reason is that the phases of the Moon reflect a great deal of illumination, and because the Moon is so close to us, it overrides the brightness of other celestial objects.

So, What Moon phase is best for stargazing? "The New Moon and the days immediately before and after the new moon (Crescent phases)" are among the best times for stargazing. Whereas the Remaining phases like Full Moon, waxing or waning gibbous, the first or third quarter Moon offers a time to zoom in and witness the features of the Moon.

Monthly Lunar Calendar

APRIL

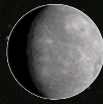
2026

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			01 FULL MOON	02	03	04
05	06	07	08	09	10 LAST QUARTER	11
12	13	14	15	16	17 NEW MOON	18
19	20	21	22	23	24 FIRST QUARTER	25
26	27	28	29	30	31	

PLANETS VISIBILITY

Mercury

Too close to the Sun this month, so it's hard to spot in the bright morning sky.



Venus

Easily visible in the evening sky after sunset, shining very brightly in the west.



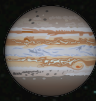
Mars

Located in the morning sky but very faint and close to the horizon.



Jupiter

Visible in the early evening sky, but sets soon after sunset.



Saturn

Appears in the early morning sky but remains low and difficult to observe.



Uranus

Visible with binoculars in the evening sky, but the observing window is short.



Neptune

Too faint and too close to the Sun to be seen this month.



BRIGHT DEEP SKY OBJECTS

Omega Centauri, a globular star cluster in the constellation Centaurus, has an apparent magnitude of 3.9. Visible to the naked eye as a hazy star, it is best seen from the southern hemisphere and contains about 10 million stars, making it the largest in the Milky Way.



Messier 83 (M83), located in the Hydra constellation, has an apparent magnitude of 7.6. Known as the Southern Pinwheel Galaxy, it appears as a faint glow with a bright core in binoculars and is among the closest, brightest barred spiral galaxies visible.



Sombreo Galaxy or M104 is located in Virgo constellation and is best observed from Northern Hemisphere. It has an apparent magnitude of 8. It is one of the galaxies which can be easily found by binoculars. It is slightly bigger than the size of Milky way.



M42 also known as Orion Nebula, is best observed from the Northern hemisphere. It has an apparent magnitude of 4. It can be easily observed through binocular or a small telescope. The cluster contains over 3000 stars and is roughly 2 to 3 million years old.



Rocket launches in April 2026

CYGNUS CRS-2 NG-24

Scheduled for launch in April 2026, SpaceX's Falcon 9 Block 5 will deploy the Cygnus CRS-2 NG-24 cargo spacecraft from Cape Canaveral Space Force Station, Florida. The mission will deliver essential supplies, scientific experiments, crew provisions, and station hardware to the International Space Station (ISS) under NASA's Commercial Resupply Services programme.

Cygnus NG-24 will support a wide range of microgravity research, technology demonstrations, and routine station maintenance, enabling continued scientific advancements in low Earth orbit. After docking, the spacecraft will remain attached for several months before conducting waste disposal operations during its re entry. The mission highlights strong collaboration between NASA, Northrop Grumman, and SpaceX, ensuring reliable logistics and sustained human presence aboard the ISS.



Falcon 9 Block 5 Rocket
(Credit: ISRO)

EOS-10 (OCEANSAT-3A)



Vega-C Rocket
(Credit: ESA)

Scheduled for launch in April 2026, Avio S.p.A's Vega-C rocket will deploy the Solar Wind Magnetosphere Ionosphere Link Explorer (SMILE) from Kourou, French Guiana. This joint mission between the European Space Agency (ESA) and the Chinese Academy of Sciences (CAS) is designed to study the complex interaction between the solar wind and Earth's magnetosphere.

SMILE carries advanced instruments, including a Soft X-ray imager, ultraviolet imager, and in situ plasma analyzers, enabling it to capture the first ever global images of the magnetosphere. Operating in a highly elliptical orbit, the spacecraft will observe large scale space weather processes over extended periods.

The mission aims to improve understanding of geomagnetic storms, auroras, and energy transfer in near Earth space, which can impact satellites, communication systems, and power grids. By combining imaging and direct measurements, SMILE will provide new insights into Sun Earth interactions, advancing both space weather forecasting and fundamental plasma physics research.

VIKRAM-1 DEMO FLIGHT

Scheduled for launch in April 2026, Skyroot Aerospace's Vikram-1 Demo Flight will lift off from the Satish Dhawan Space Centre, Sriharikota. The mission marks the first orbital test flight of India's first privately developed rocket, designed to carry small satellites into low Earth orbit.

The Demo Flight will validate key systems, including propulsion, stage separation, and guidance, while deploying initial payloads such as cubesats. As a milestone mission, it highlights India's growing private space sector and Skyroot's vision of affordable, responsive launch services for the global small satellite market.



Vikram I Rocket
(Credit: Skyroot Aerospace)

ARTEMIS II

Scheduled for launch in April 2nd 2026, NASA's Space Launch System (SLS) Block 1 will carry the Artemis II mission from Kennedy Space Center. The mission will send four astronauts aboard the Orion spacecraft on a 10 day crewed lunar flyby, traveling around the Moon and returning safely to Earth.

Artemis II will be the first human spaceflight beyond low Earth orbit since Apollo 17, testing life support systems, navigation, guidance controls, and deep space communication technologies required for future lunar missions.

The crew includes Reid Wiseman, Victor Glover, Christina Koch, and Jeremy Hansen. During the mission, astronauts will evaluate spacecraft performance in deep space, practice manual spacecraft operations, and conduct imaging and Earth Moon observations.

Artemis II will also demonstrate international cooperation between NASA and the Canadian Space Agency. The mission is a crucial step toward future Artemis missions that aim to land astronauts near the Moon's south pole and establish a long term human presence for scientific research and preparation for eventual missions to Mars.



SLS Block 1 Rocket
(Credit: NASA)

****Note: Launch dates of the missions are scheduled to be launched in April 2026, but may be subject to change.**

Setbacks That Built Space Success

HUBBLE'S JOURNEY: FROM BLURRED DREAMS TO COSMIC MASTERPIECES

Thirty-five years ago, On April 24, 1990, the Hubble Space Telescope began its journey into space, carrying humanity's hope of seeing the universe more clearly than ever before. Built to observe distant galaxies, stars, and cosmic events, Hubble was expected to last around fifteen years. Yet more than three decades later, it continues to function, capturing breathtaking images and transforming our understanding of the cosmos.

This extraordinary success, however, did not begin smoothly. Just two months after launch, NASA announced a serious problem. The images being sent back were blurred instead of sharp. Scientists soon identified the cause as spherical aberration, a flaw that prevented light from focusing at a single point. Instead, multiple focal points were formed, leading to unclear images.



Hubble's primary mirror polishing before flaw discovery. (Credit: NASA)

The issue lay in Hubble's primary mirror, the heart of the telescope. This large, precisely engineered mirror had been shaped incorrectly. It was slightly too flat near its outer edge, with an error of only about 1.3 millimeters. Despite being so small, this mistake was enough to affect the telescope's entire performance. Investigations later revealed that a testing device used during the mirror's construction had been set up incorrectly.

Hubble uses mirrors rather than lenses to collect and focus light. Its design, known as the Ritchey-Chrétien Cassegrain, is ideal for observing distant objects. But because of the incorrect curvature, light from stars and galaxies did not meet at a single focus, causing the images to lose clarity.

This problem is similar to human vision. When the shape of the eye is not perfect, light does not focus properly, resulting in blurred sight. We correct this using glasses or contact lenses. In a similar way, NASA chose not to replace Hubble's mirror but to correct its vision.

Engineers developed special instruments to fix the flaw. The Wide Field and Planetary Camera 2 included built-in corrections, while COSTAR acted like a pair of glasses for the telescope's other instruments. In December 1993, astronauts installed these systems during a servicing mission in space.

The results were remarkable. Hubble began capturing clear, detailed images that amazed scientists and the world. It has since helped determine the age of the universe, revealed the presence of black holes, and expanded our understanding of galaxies. Its discoveries have even contributed to Nobel Prize-winning research.

Today, Hubble stands as a powerful symbol of perseverance and human ingenuity. What began as a flaw became one of the greatest scientific success stories.

You can check if Hubble captured something amazing on your birthday. Go take a look:

<https://science.nasa.gov/mission/hubble/multimedia/what-did-hubble-see-on-your-birthday/>

Happy Birthday



April 14, 1629

Christiaan Huygens

Christiaan Huygens was a Dutch mathematician, astronomer, and physicist known for his major contributions to optics and mechanics. Born on April 14, 1629, he discovered Titan, Saturn's largest moon, and correctly explained the structure of Saturn's rings. He also invented the pendulum clock, improving timekeeping accuracy. Huygens developed the wave theory of light, which later became fundamental in physics. His work laid the foundation for modern astronomy and physics, making him one of the most influential scientists of the 17th century. Credits: ESA

Kailasavadivu Sivan

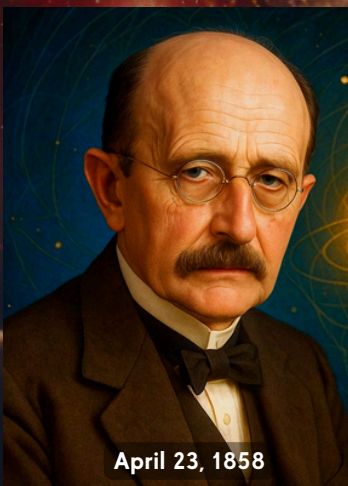
Kailasavadivu Sivan, born on April 14, 1957, is a respected Indian space scientist associated with ISRO. He has contributed significantly to India's satellite communication and space technology development. His work has supported advancements in remote sensing and communication systems, which are essential for weather forecasting, disaster management, and national development. Scientists like Sivan K represent the strength of India's growing space program, continuing the legacy of innovation and dedication in the field of space research. Credits: Wionews



April 14, 1957

Max Planck

Max Planck, born on April 23, 1858, was a German physicist known as the father of quantum theory. His discovery that energy is emitted in small units called quanta revolutionized physics. This idea led to the development of modern quantum mechanics, changing how scientists understand atoms and light. Planck received the Nobel Prize in Physics in 1918 for his groundbreaking work. His contributions continue to influence fields like astronomy, electronics, and modern technology. Credits: Aydemperakende



April 23, 1858

Happy Birthday

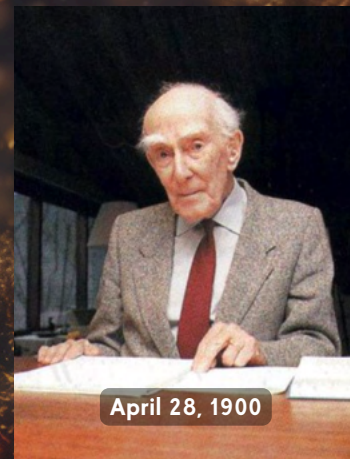


Jim Peebles

Jim Peebles, born on April 25, 1935, is a renowned cosmologist who made major contributions to our understanding of the universe. His work on the Big Bang theory, dark matter, and cosmic background radiation helped shape modern cosmology. He was awarded the Nobel Prize in Physics in 2019 for his discoveries in physical cosmology. Peebles' research has helped scientists better understand how the universe formed and evolved over billions of years. Credits: ESA

Jan Hendrik Oort

Jan Hendrik Oort, born on April 28, 1900, was a Dutch astronomer who made significant contributions to the study of our galaxy. He is best known for proposing the existence of the Oort Cloud, a distant region filled with icy objects surrounding the solar system. His work helped scientists understand the structure and rotation of the Milky Way. Oort's research remains important in studying comets and the outer regions of our solar system. Credits: ESA



Carl Friedrich Gauss

Carl Friedrich Gauss, born on April 30, 1777, was a German mathematician and scientist known as the "Prince of Mathematicians." His work influenced many fields, including astronomy, physics, and mathematics. He helped calculate the orbit of the asteroid Ceres and contributed to number theory and electromagnetism. Gauss's discoveries continue to play a vital role in modern science and technology. Credits: Hgss.copernicus.org

Space Paradoxes: Glitches in the Cosmos

TRAPPED IN TIME'S CIRCLE THE BOOTSTRAP PARADOX

Time travel has fascinated us for centuries, explored widely in the genre of science fiction. But beyond the curiosity lies a deeper question: what if nothing truly has a beginning? What if the past and future continuously shape each other? In such a reality, cause and effect blur, and even free will begins to feel uncertain.

Imagine you travel back in time and give Rabindranath Tagore a complete collection of his own works before he has written anything. Inspired, he published those works. Years later, you study them and go back in time to give them to the author. So, who actually wrote them?

This is the Bootstrap Paradox. It describes a situation where information or an object exists in a time loop with no clear origin, existing only because it is passed between the past and the future.

The paradox appears in different forms:

Information loops involve knowledge that seems to come from nowhere.

Object loops involve physical items moving endlessly through time without ageing as expected.

In extreme cases, person loops emerge, where someone becomes their own origin.

Despite their strangeness, these loops are internally consistent; everything makes sense, yet nothing truly begins.

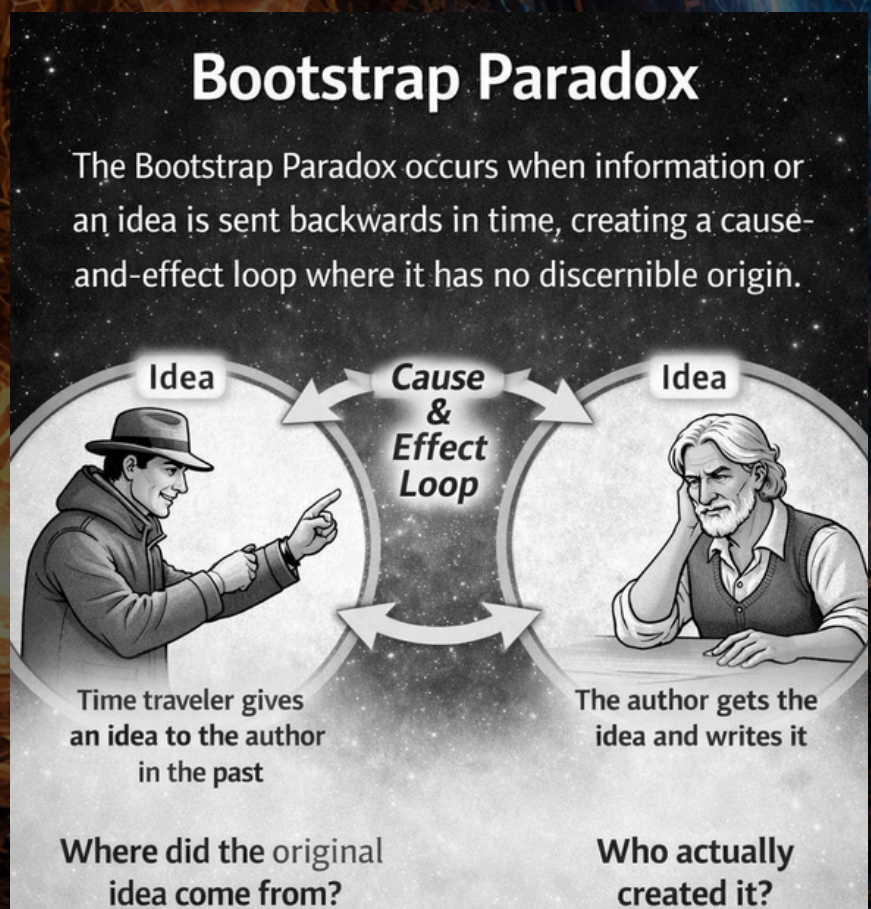
To make sense of this, several explanations have been proposed:

The Self-consistency Principle suggests that events in a time loop must always remain logically consistent, meaning reality itself prevents contradictions.

The Many-Worlds Interpretation proposes that each loop could exist in a different timeline, avoiding paradoxes altogether.

And, the Block Universe Theory argues that time does not actually flow, that past, present, and future all exist simultaneously.

Ultimately, the bootstrap paradox forces us to rethink our understanding of reality and challenges the idea that everything must have a beginning



ASTRONOMICAL EVENTS

A MORNING SKY SPECTACLE: THE APRIL PLANETARY PARADE

A beautiful planetary parade will be visible on April 13, 2026, in the early morning sky, where multiple planets appear arranged along a gentle arc. This rare alignment offers skywatchers a chance to observe several planets together, creating a striking and memorable celestial display before sunrise. These planets follow the same path across the sky, known as the ecliptic, making the alignment easier to trace. It is a perfect opportunity for both beginners and experienced observers to witness multiple worlds in a single glance.

During this event, Mercury, Mars, and Saturn will be visible to the naked eye, while Neptune will require a telescope due to its faint magnitude of about +7.8. Mercury will shine brightest at around -0.5 magnitude, followed by Saturn (~+0.9) and Mars (~+1.1). These planets will appear spread along the ecliptic, forming a subtle yet beautiful alignment.



Where & When to Observe?

To observe this event, look toward the eastern horizon before sunrise, ideally between 5:00 AM to 6:00 AM IST. The planets will appear low in the sky, about 10–20° above the horizon, so a clear and unobstructed view is essential. Binoculars can enhance the view, especially for spotting Neptune.

This planetary alignment is not limited to a single day. It begins in mid-April, becomes most noticeable between April 18 and 22, and continues into early May. Over time, Mercury gradually moves closer to the Sun and fades into its glare, bringing the alignment to an end.

The April planetary parade is a beautiful reminder of the orderly motion of planets in our Solar System. Observing multiple worlds at once offers both a scientific and visual experience, connecting us to the dynamic nature of the cosmos. Each planet follows its own path and speed, yet together they create a moment of harmony in the sky. Such events inspire curiosity and deepen our understanding of how our Solar System is structured and constantly in motion.

LYRID METEOR SHOWER 2026: A TIMELESS CELESTIAL DISPLAY

As April nights grow quieter and clearer, the sky prepares to host one of its oldest and most beautiful displays—the Lyrid meteor shower, peaking on the night of April 22 and the early hours of April 23, 2026.

This annual event has been observed for more than 2,700 years, making it one of the longest-recorded meteor showers in human history. Each streak of light carries a story from deep space, offering a calm yet mesmerising celestial experience.

A Shower with a Story to Tell

Unlike many meteor showers with extended peaks, the Lyrids are known for their brief yet intense bursts of activity. Typically producing 10–20 meteors per hour, they occasionally surprise observers with sudden outbursts, sometimes far exceeding expectations. These meteors are swift and bright, often leaving glowing trails that linger momentarily in the night sky.

In 2026, a waxing Moon may slightly affect early-night viewing, but conditions improve significantly after midnight, offering clearer skies for meteor observation.



Position of the radiant in the constellation Lyra.
Credit: Accuweather.com

The Lyrids are one of the oldest recorded meteor showers, with observations dating back to 687 BCE. Ancient astronomers described them as “stars falling like rain,” capturing the same wonder we experience today.

This long history makes the Lyrids not just a sky event, but a connection across generations.

Finding the Falling Stars.

The Lyrids originate from debris left behind by Comet C/1861 G1 (Thatcher), with their radiant located in the constellation Lyra, near the bright star Vega.

- **Best Time:** After midnight to dawn (12:00–5:00 AM IST)
- **Peak Viewing:** Around 3:00–5:00 AM IST
- **Direction:** Face the northeastern sky, though meteors can appear anywhere
- **Best Viewing Angle:** About 40–60° away from the radiant
- **Ideal Location:** Dark, open areas away from city lights

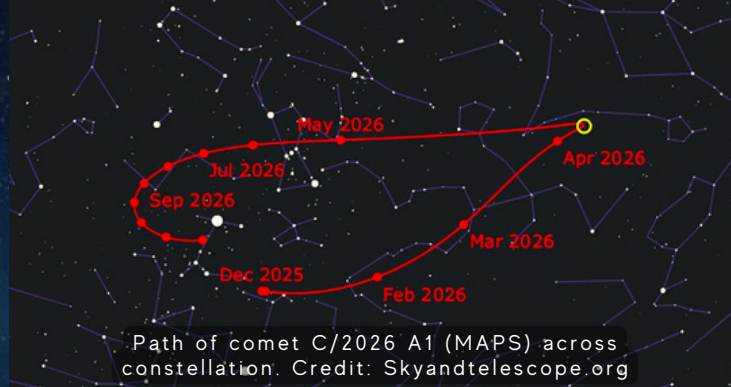
In India, the radiant climbs high in the sky before dawn, making early morning the best time to observe.

The Lyrids offer a quiet yet powerful reminder of our place in the universe. Each meteor is a tiny fragment of a comet, burning brightly as it enters Earth’s atmosphere. With patience and clear skies, this celestial event becomes a peaceful and unforgettable experience. Let the night sky tell its story as streaks of light trace the path of time across the heavens.

COMETS IN FOCUS: APRIL 2026

MAPS: A New Comet Appears

On April 4, 2026, Comet C/2026 A1 (MAPS) reaches perihelion, its closest point to the Sun, when its activity is expected to increase. As the comet approaches the Sun, solar heating causes its icy surface to release gas and dust, forming a faint glowing coma and possibly a delicate tail. Although not visible to the naked eye, it becomes a suitable target for binoculars and small telescopes under clear, dark skies. The best viewing time is during the early morning hours (4:30–5:30 AM IST), just before sunrise.



Observers should look toward the eastern sky, about 10–20° above the horizon, where the comet may appear as a dim, hazy patch of light. A clear, unobstructed horizon and patience will improve visibility. Tracking this comet offers a valuable opportunity to observe a newly discovered visitor as it brightens during its journey through the inner Solar System.

Returning Traveler: 141P/Machholz

On April 23, 2026, Comet 141P/Machholz reaches perihelion, the point in its orbit closest to the Sun, where its activity increases due to solar heating. As sunlight warms the comet's surface, gases and dust are released, forming a faint coma and sometimes a short tail.



This short-period comet is not visible to the naked eye but can be observed using small telescopes under dark sky conditions. The best time to observe is during the pre-dawn hours (around 4:30–5:30 AM IST).

Observers should look toward the eastern to southeastern sky, about 15–25° above the horizon before sunrise. Since the comet moves gradually against the background stars, using updated sky charts or astronomy apps will help in locating it accurately. Though faint, Machholz provides an excellent opportunity to follow a returning comet and observe its subtle changes over time.

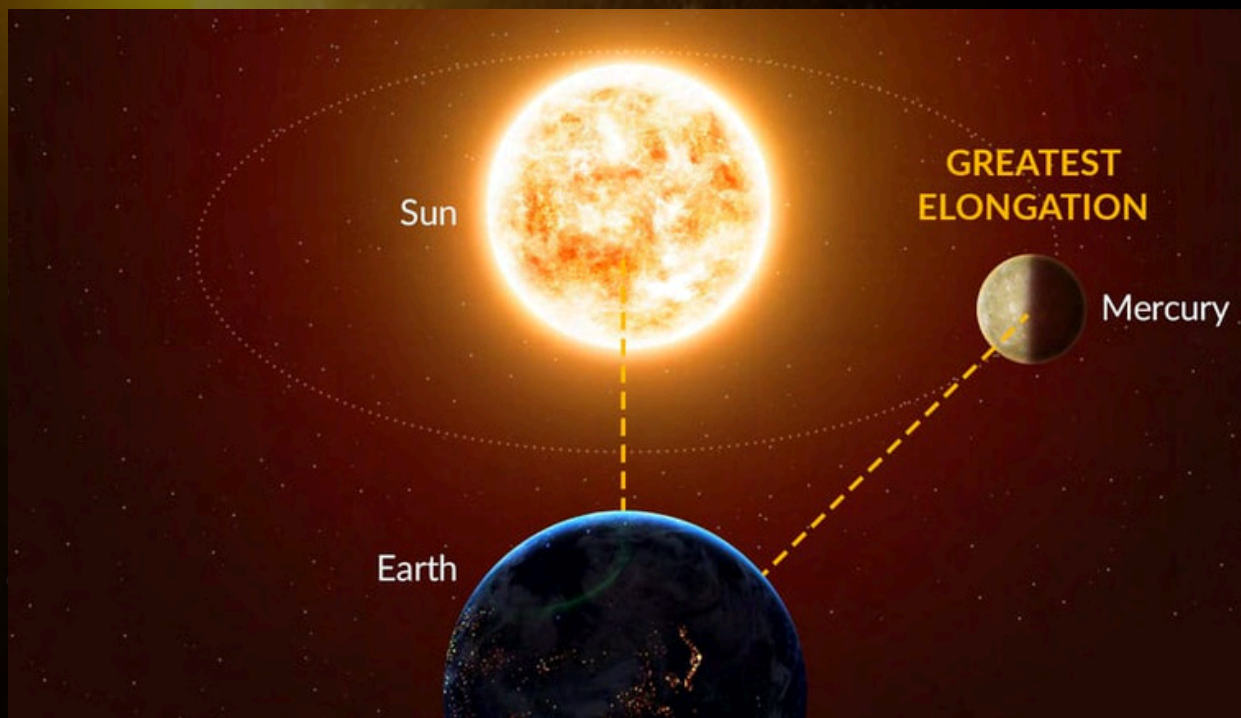
MERCURY AT GREATEST WESTERN ELONGATION

Mercury reaches its greatest western elongation on April 3, 2026, making it one of the best times to observe this fast-moving planet in the morning sky. During this event, Mercury appears at its maximum separation from the Sun as seen from Earth, allowing it to shine more clearly before sunrise. Since Mercury orbits the Sun in just 88 days, such elongations occur several times a year.

What is an Elongation?

An elongation refers to the angle between a planet and the Sun in the sky. For Mercury, this angle never becomes very large because it orbits closer to the Sun than Earth. At greatest western elongation, Mercury is positioned to the west of the Sun, which means it rises before sunrise and is visible in the early morning sky.

As an inferior planet, Mercury is often hidden in the Sun's glare and can be difficult to observe. However, at elongation, it moves far enough away from the Sun's brightness to become visible for a short time. On April 3, Mercury will be about 27° away from the Sun, making it easier to spot than usual.



How to Observe ?

To observe Mercury, look toward the eastern horizon before sunrise, ideally between 5:15 and 6:00 AM IST. The planet will appear about $10\text{--}15^\circ$ above the horizon as a bright, steady point of light. Choosing a location with a clear, unobstructed view of the horizon greatly improves visibility.

Using binoculars or a small telescope, observers may notice that Mercury shows phases, similar to the Moon. This event offers a brief yet rewarding opportunity to observe one of the most elusive planets and appreciate the dynamic motion of the Solar System.

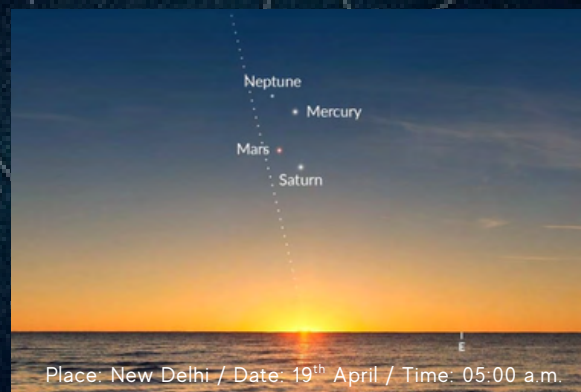
CONJUNCTIONS FOR THE MONTH

A phenomenon grabs the imagination of scientists and stargazers alike in the vast panorama of the night sky, where stars shine as distant diamonds and planets roam over the cosmic canvas. Conjunctions, those ethereal moments in the heavens when heavenly bodies appear to collide, provide a mesmerising sight that connects us to the beauty of the cosmos. The word "Conjunction" comes from Latin, meaning to join together.

From Earth's perspective, a conjunction occurs when two planets or a planet and the Moon or Sun align. Solar conjunctions are invisible to us. Moon-planet conjunctions occur throughout the month, every month, as the Moon passes past each planet. The planets in The Great Conjunction and when multiple align are rare and captivating conjunctions. Technically speaking, objects are said to be in conjunction in that instant when they have the same right ascension on our sky's dome. Practically speaking, objects in conjunction will likely be visible near each other for some days.

Conjunction of Mercury, Saturn, Mars & Neptune

On April 19, Mercury, Saturn, Mars and Neptune will gather in a compact conjunction low in the eastern sky just before sunrise, creating a rare multi-planet alignment. Mars will shine at around magnitude 1.1, while Saturn appears near 0.9, and Mercury around 0.5, depending on conditions. Neptune, much fainter at magnitude 7.8, requires a telescope to observe. The best viewing time is 5:00–5:30 AM IST, and binoculars will help reveal the grouping in the brightening dawn.



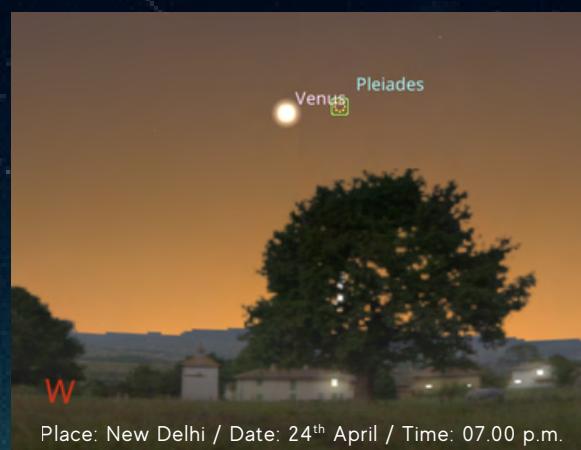
Conjunction of Moon and Jupiter

On April 22, the Moon will pass close to Jupiter in the evening sky, forming a bright and easily noticeable conjunction. The pair will be visible in the eastern sky after sunset, with the best viewing time between 7:00 and 10:00 PM IST. Jupiter will shine brilliantly at about magnitude -2.2, outshining nearby stars, while the Moon enhances the visual display. The event is easily visible to the naked eye, and binoculars will reveal Jupiter's Galilean moons.



Conjunction of Venus and Pleiades

On April 24, the bright planet Venus will appear close to the Pleiades star cluster (M45) in the evening sky, creating a beautiful contrast between a brilliant planet and a delicate star cluster. Venus will shine at around magnitude -4.0, making it the brightest object after the Moon. The conjunction will be visible in the western sky after sunset, best seen between 7:00 and 8:30 PM IST. While the Pleiades may appear faint to the naked eye, binoculars will reveal the cluster clearly beside Venus.



STUDENTS CORNER

ALL ABOUT GALAXIES

VETRIVEL. T, IASTRONOMER

Introduction

Galaxies are the home to stars and other celestial objects. It was only in the early 20th century that the existence of the galaxies other than the Milky Way was recognized. Before that, early astronomers labelled them as Nebulas, since they appeared to look like hazy cloud. Galaxies are present in every part of space, as observed through powerful telescope. They differ in shape, structure and the level of activity within them.

What is a Galaxy?

A galaxy comprises a large group of hundreds of billions of stars and interstellar matter bound together by gravity. Almost all the large galaxies are also believed to have gigantic black holes at their centers. Galaxies exist in variety of shapes and size ranging from dim-dwarf sized object to bright, massive spiral-shaped ones. Almost all the galaxies seem to have been formed immediately after the universe came into existence. These beautiful formations are generally found in clusters, some of which forms a large cluster and span hundreds of millions of light years across the universe. A light year is the distance travelled by the light in one year, at the speed of 3,00,000 kmph.

Types of Galaxies

There are three main classifications of galaxies – elliptical, spiral and irregular. Some spiral galaxies are called barred galaxies.

Elliptical Galaxies

These galaxies are round, oval or more like elongated sphere. Sometimes they may be more stretched than they look like cigar. These galaxies generally contain many old stars, but not much dust and interstellar matter. Like stars in the disk of spiral galaxies. The largest known galaxies in the universe are giant elliptical ones which can be as big as two million light year long. The smaller these galaxies are known as dwarf elliptical galaxies. Virgo A / M87 is an example of a giant elliptical galaxy found close to the center of the Virgo cluster of galaxies.

Spiral Galaxies

Spiral galaxies comprise a flat disk, with a bulging center. These galaxies have long spiral arms that wind towards the center. The disk comprises stars, planets, dust and the gas, which rotates or spin around the galactic center in a regular manner.

The spinning motion may result in matter in the disc taking the shape of the spiral, like a pinwheel.

While many new stars are born in spiral galaxies, the older stars are generally located in the bulging center of the galactic disc. These discs have a halo around them and astronomers believe that they comprise unknown dark matter. The Milky Way is a spiral galaxy and is home to our solar system. It is one form a group of galaxies known as the Local Group.

Irregular Galaxies

Galaxies which do not have any distinct shape, such as spiral, elliptical or lenticular, are irregular galaxies. Irregular galaxies like the Large and Small Magellanic Clouds are uneven or out of shape as they are generally under the gravitational influence of other nearby galaxies. Since they are packed with lots of gas and dust, irregular galaxies are a fertile ground for the formation of new star.

THE BIG BANG THEORY

SUGANDHA VASHIST

Think of the Big Bang as the ultimate "White Hole" moment. If a white hole is a sudden burst of matter and light from a single point, that sounds exactly like how our universe began!

Here is how the Big Bang and a white hole are similar:

The Big Bang "Fountain"

Imagine the entire universe—all the stars, planets, and even the atoms in your body—trapped inside a tiny, microscopic dot. Suddenly, that dot "opened up" and sprayed everything outward.

Why it looks like a White Hole:

One-Way Street: Just like a white hole, the Big Bang only goes outward. You can't travel back in time to the moment it started.

Pure Energy: Both theories describe a massive amount of energy appearing and expanding into space.

Mathematical Connection: Some scientists believe our universe was born when a black hole in a different universe collapsed and "poured" its contents into ours through a white hole.

The "Bounce" Theory

Some scientists have a theory called the Big Bounce. They think the universe works like a giant heart beating:

The Crunch: An old universe collapses into a giant black hole.

The Bounce: The black hole gets so small and tight that it can't hold any more, so it "bounces" and turns into a white hole.

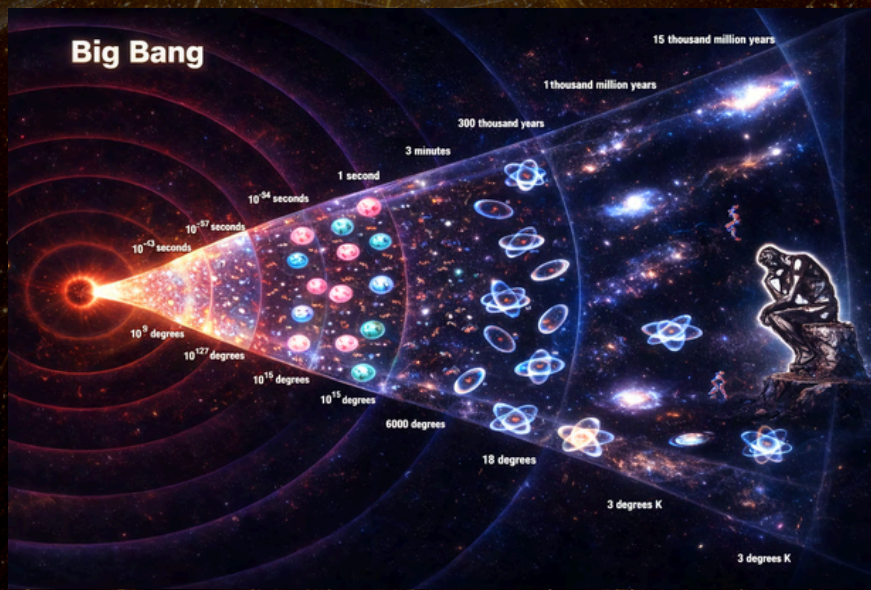
The Bang: That white hole is our Big Bang!

Important Reminder: Still a Theory!

Even though this idea is really cool, remember:

We know the Big Bang happened because we can see the universe still moving outward today.

We don't know if a white hole caused it. It is one of the biggest mysteries in science!



ASK THE UNIVERSE

Was the Big Bang a White hole? (Question from Rudraksha Sharma)

The Big Bang was not a white hole, though they may sound similar. A white hole is a hypothetical object that ejects matter and energy, the opposite of a black hole. The Big Bang describes the expansion of space itself from an extremely hot, dense state about 13.8 billion years ago. It did not occur at a point in space—it happened everywhere at once. While some theories explore connections between black holes and white holes, there is no scientific evidence that the Big Bang was a white hole. It remains a separate cosmological event explained by general relativity and observations.

Is there a multiverse? What is it? (Question from Harshan)

The multiverse is a theoretical idea that suggests our universe may be one of many universes. These universes could have different physical laws, constants, or structures. The concept arises from theories like cosmic inflation and quantum mechanics, where multiple universes could form naturally. However, there is currently no direct observational evidence to prove the existence of a multiverse. It remains a scientific hypothesis being explored by physicists to explain questions like why our universe has its specific properties.

A) Can we find any civilization in the universe? Are there unexplored observations?

B) Is the existence of a multiverse possible? (Questions from Rajvardhan Verma)

A) It is scientifically possible that other civilizations exist because the universe contains billions of galaxies, each with billions of stars and planets. Scientists use programs like SETI to search for artificial signals, but no confirmed evidence has been found so far. Telescopes have captured many unusual phenomena, such as fast radio bursts and unknown signals. While most are later explained as natural cosmic events, some remain not fully understood and are still being studied. The main challenge is distance, as signals weaken over vast space. So, while possible, discovering extraterrestrial civilization requires more advanced technology and evidence.

B) The multiverse is a theoretical concept suggesting that our universe may be one among many universes. It arises from scientific theories like cosmic inflation and quantum mechanics, where multiple universes could form with different physical laws and constants. However, there is currently no direct observational evidence to confirm this idea. Since we cannot detect or interact with other universes, the multiverse remains a hypothesis. Scientists continue to explore it to explain questions like why our universe has specific properties, but as of now, it is not proven.

Is this true time spends much slow in space (less gravity) (Question from Karan Vishva)

Yes, it's true time passes slightly faster in regions of lower gravity, such as space, compared to stronger gravity environments like Earth. This effect comes from Einstein's Theory of General Relativity. Gravity warps spacetime, so clocks closer to massive objects tick more slowly. For example, astronauts on the International Space Station experience time a tiny bit faster than people on Earth due to weaker gravity, though their high speed slightly offsets this. The difference is extremely small but measurable with precise atomic clocks.

Who Invented Gnomon? (Question from Yuvaan Singh)

A gnomon rod is the upright stick or pointer used in a sundial to cast a shadow. As the Sun moves across the sky, the shadow of the rod changes position, allowing us to tell time or study the Sun's motion.

This simple idea was used in ancient civilizations like the Ancient Egyptians and later improved by thinkers such as Anaximander.

The rod is usually aligned with Earth's axis (tilted toward the North Star) for accuracy. Even today, a basic gnomon rod is used in sundials and astronomy activities to understand shadows, directions, and time.

Could we harness the energy of a black hole's ergosphere to power interstellar travel (Questions from S Sanshiya)

Yes, but only in theory, not in real life (yet).

Around a spinning black hole, there's a region called the ergosphere where space itself is dragged along. In the Penrose process, you could send an object into this region and split it into two parts. One part falls into the black hole, and the other escapes with extra energy almost like getting a "boost" for free.

In a simple way: it's like throwing a ball into a powerful whirlpool and somehow getting another ball shot out faster than you threw it.

If we could control this, we might use that extra energy to power spacecraft. But the environment near a black hole is extremely dangerous, so this idea is still science fiction for now.

Is there any other planet inside earth? If there is name it. (Questions from Gaurish dhawan)

No, there is no planet inside Earth.

Sometimes people misunderstand this because of scientific discoveries about Earth's deep interior. Inside our planet, we have layers like the crust, mantle, and core not another world. The center contains an extremely hot, dense core made mostly of iron and nickel.

There was once a hypothetical idea called Planet V, but it was never inside Earth it was thought to have existed separately in the early solar system.

So, scientifically speaking, Earth does not contain any hidden or separate planet inside it only its own internal layers.

STORIES OF INDIA'S GREATEST MINDS

Subrahmanyan Chandrasekhar A Man of Stellar Wisdom

Who was Subrahmanyan Chandrasekhar?

Subrahmanyan Chandrasekhar was a brilliant Indian astrophysicist known for his groundbreaking work on the life cycle of stars. He is one of the most respected scientists in the field of astrophysics and made discoveries that changed how we understand the universe.

What is he famous for?

He is best known for discovering the Chandrasekhar Limit, which explains the maximum mass a star can have before it collapses. This discovery helped scientists understand how stars evolve and what happens when they die leading to concepts like white dwarfs, neutron stars, and black holes.

Where did he work and contribute?

Chandrasekhar carried out much of his research at the University of Chicago, where he spent several years studying stars, radiation, and the structure of the universe. His work gained global recognition and influenced generations of scientists.

Why is his work important?

Before his discovery, scientists did not fully understand how stars end their life cycle. His research provided a scientific explanation for stellar collapse and played a key role in the study of black holes and modern astrophysics.

What awards did he receive?

For his outstanding contribution to science, Chandrasekhar was awarded the Nobel Prize in Physics in 1983. This made him one of the few Indian origin scientists to receive this prestigious honor.

Why do we remember him today?

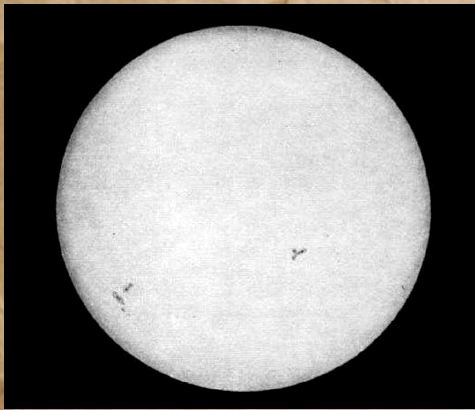
We remember Subrahmanyan Chandrasekhar for his dedication to science and his curiosity about the universe. His work continues to guide astronomers and scientists even today. He showed that deep thinking, patience, and passion for learning can unlock the secrets of the cosmos.



HISTORICAL EVENTS OF APRIL

Comet Hale-Bopp Closest to Earth

On April 1, 1997, Comet Hale-Bopp made its closest approach to Earth, becoming one of the brightest comets of the 20th century. Discovered in 1995, it remained visible to the naked eye for an unusually long time, captivating skywatchers worldwide. Its glowing coma and twin tails one of dust and the other of ionized gas created a stunning night-sky display. The comet's brightness enabled detailed studies, revealing complex organic molecules and providing insights into ancient icy bodies and the early Solar System. (image credits: www.nasa.gov)



Hippolyte Fizeau and Léon Foucault Photograph the Sun

On April 2, 1845, French physicists Hippolyte Fizeau and Léon Foucault captured one of the first successful photographs of the Sun using the emerging technology of daguerreotype photography. Their work marked a major step forward in solar observation, as it allowed astronomers to record the Sun's appearance permanently rather than relying only on sketches and drawings. The photograph revealed details such as sunspots and surface structure, helping scientists better understand solar activity. (image credits: www.bnf.fr)

Luna 10 Enters Lunar Orbit

On April 3, 1966, the Soviet spacecraft Luna 10 became the first artificial satellite to successfully orbit the Moon. Launched by the Soviet Union as part of the Luna program, the spacecraft conducted important scientific measurements while circling the Moon. It studied the Moon's gravitational field, radiation environment, and magnetic properties. Luna 10 completed hundreds of orbits and transmitted valuable data back to Earth. (image credits: www.roscosmos.ru)



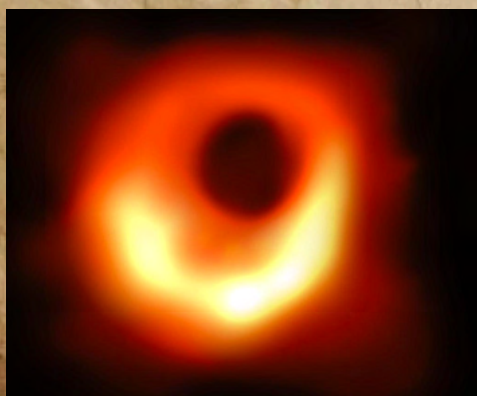
InSight Detects a Marsquake

On April 6, 2021, NASA's InSight detected one of the strongest "marsquakes" ever recorded on the Red Planet. Using its highly sensitive seismometer, the lander measured seismic waves originating deep within Mars. These vibrations allowed scientists to study the planet's internal structure, including its crust, mantle, and core. By carefully analyzing the seismic data, researchers gained valuable insights into Mars's formation and its geological evolution over billions of years, improving our understanding of rocky planets. (image credits: www.jpl.nasa.gov)

HISTORICAL EVENTS OF APRIL

Gemini 1 Test Flight

On April 8, 1964, NASA launched Gemini 1, marking the beginning of the Gemini program. Although it was an uncrewed test flight, the mission played a crucial role in evaluating the spacecraft's structural integrity and systems. Gemini 1 orbited Earth successfully, allowing engineers to study its performance under real space conditions. The data collected helped improve future spacecraft design and mission planning. This successful test paved the way for subsequent crewed Gemini missions, which advanced human spaceflight and prepared for the Apollo Moon missions. (image credits: www.nasa.gov)



First Image of a Black Hole Announced by the Event Horizon Telescope

On April 10, 2019, the Event Horizon Telescope (EHT) collaboration revealed the first-ever image of a black hole. The image showed the supermassive black hole at the center of the galaxy Messier 87, located about 55 million light-years from Earth. The picture displayed a glowing ring of hot gas surrounding a dark central shadow, created by the black hole's powerful gravity. The historic image confirmed predictions from Einstein's theory of general relativity and represented a major milestone in modern astrophysics. (image credits: www.eventhorizontelescope.org)

Apollo 13 Launch

On April 11, 1970, NASA launched Apollo 13 toward the Moon with astronauts James Lovell, Jack Swigert, and Fred Haise. During the journey, a critical oxygen tank explosion forced the crew to abort the lunar landing. Facing life-threatening conditions, they worked closely with mission control to conserve resources and navigate safely. Through precise planning and problem-solving, the astronauts successfully returned to Earth, making Apollo 13 a remarkable example of teamwork, innovation, and survival in space exploration history. (image credits: fity.club)



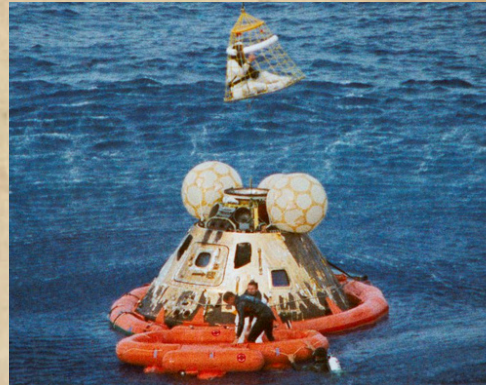
First Human in Space - Yuri Gagarin

On April 12, 1961, Soviet cosmonaut Yuri Gagarin became the first human to travel into space aboard the spacecraft Vostok 1. During his historic mission, he completed one orbit around Earth in about 108 minutes. Gagarin's flight marked a defining moment in the Space Race and demonstrated that humans could survive spaceflight. The mission demonstrated that humans could survive and function in space, paving the way for future crewed missions and space stations. (image credits: outplnt.com)

HISTORICAL EVENTS OF APRIL

Apollo 13 Safe Return

On April 17, 1970, the crew of Apollo 13 safely splashed down in the Pacific Ocean after surviving a critical spacecraft malfunction during their journey to the Moon. An oxygen tank explosion forced the astronauts to abort their mission and rely on the lunar module for survival. Through constant communication and problem-solving, NASA engineers and the crew worked together to overcome life-threatening challenges. The mission became a powerful example of teamwork, resilience, and engineering ingenuity, marking one of the most dramatic and inspiring moments in space exploration history. (image credits: www.grunge.com)

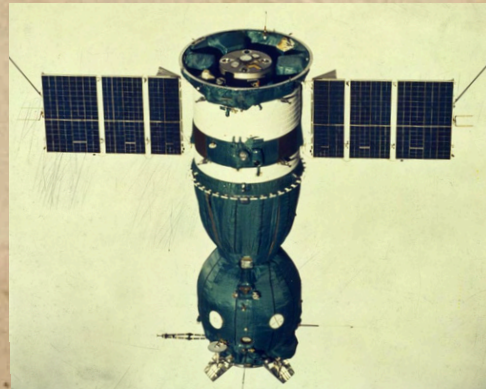


Launch of Salyut 1

On April 19, 1971, the Soviet Union launched Salyut 1, the world's first space station. It was designed to allow astronauts to live and work in orbit for extended periods. Several missions visited the station, including Soyuz 11, whose crew spent over three weeks aboard conducting scientific experiments. Salyut 1 helped scientists study the effects of long-duration spaceflight on the human body and provided valuable experience in operating space laboratories, shaping the future of space station missions. (image credits: www.roscosmos.ru)

Soyuz 1 Mission

On April 23, 1967, the Soviet Union launched Soyuz 1, the first crewed flight of the Soyuz spacecraft series. Cosmonaut Vladimir Komarov piloted the mission, which aimed to test new spacecraft systems in orbit. During the flight, several technical problems arose, including issues with solar panels and navigation. Despite efforts to manage the situation, the mission ended tragically during reentry. However, the data gathered revealed critical design flaws and led to significant improvements in later Soyuz missions, enhancing spacecraft safety and reliability. (image credits: www.roscosmos.ru)



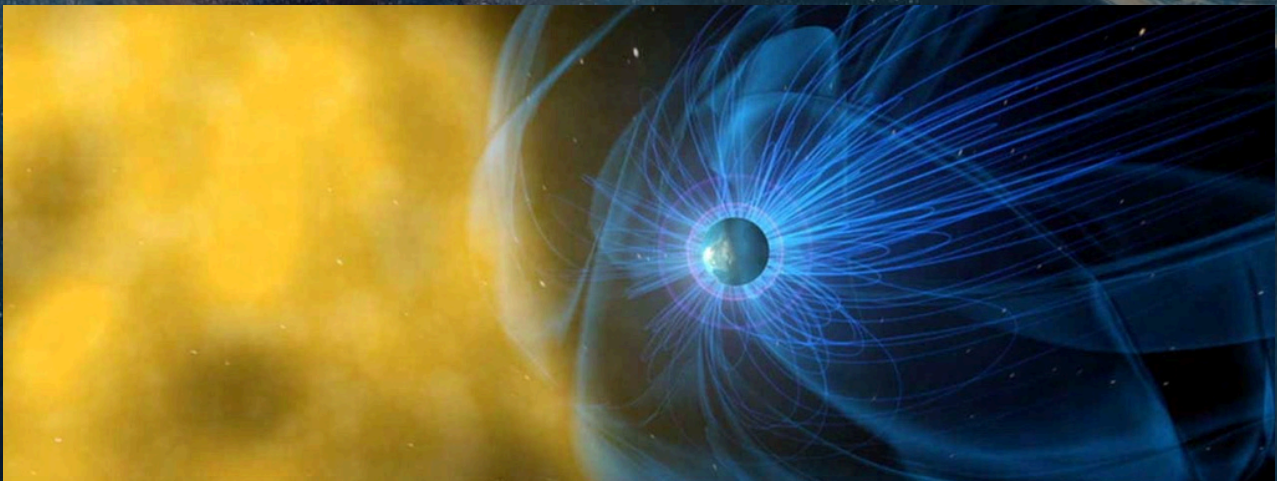
Hubble Space Telescope Launched

On April 24, 1990, NASA launched the Hubble Space Telescope aboard the Space Shuttle Discovery. Placed in orbit above Earth's atmosphere, Hubble avoided atmospheric distortion, allowing it to capture exceptionally clear images of the universe. Over the years, it has observed distant galaxies, nebulae, and other cosmic phenomena in remarkable detail. Its discoveries have helped scientists determine the age of the universe, study black holes, and understand cosmic expansion, making Hubble one of the most important tools in modern astronomy. (image credits: www.esa.int)

ASTRONOMY & SPACE TERM

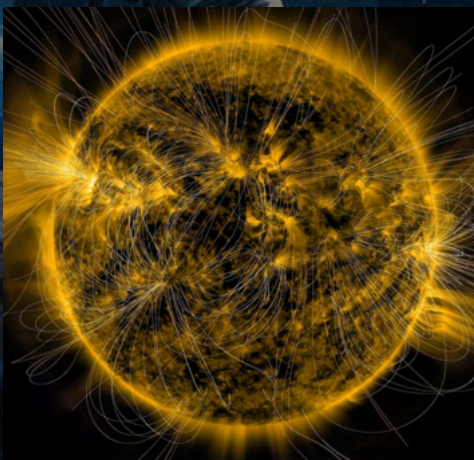
MAGNETOSPHERE

The magnetosphere is an invisible region surrounding a planet, created by its magnetic field. On Earth, it acts as a protective shield, deflecting harmful charged particles and solar wind from the Sun, thereby safeguarding our atmosphere and life. Magnetospheres are not unique to Earth. Several other planets, such as Jupiter and Saturn, possess strong and extensive magnetospheres, while planets like Mars and Venus have weak or no global magnetic protection. The presence and strength of a magnetosphere depend largely on a planet's internal structure, especially the motion of molten materials in its core.



When charged particles are trapped and guided toward the polar regions, they interact with atmospheric gases to produce beautiful auroras. The magnetosphere is essential to Earth's habitability by preserving the atmosphere and protecting life from intense radiation. Without the magnetosphere, conditions on our planet would resemble those on planets with weak or no magnetic fields, making them far more hostile.

MAGNETIC RECONNECTION



Magnetic reconnection is a powerful process in space where magnetic field lines break and reconnect, releasing a huge amount of energy. This phenomenon commonly occurs in the magnetosphere of Earth and in the atmosphere of the Sun.

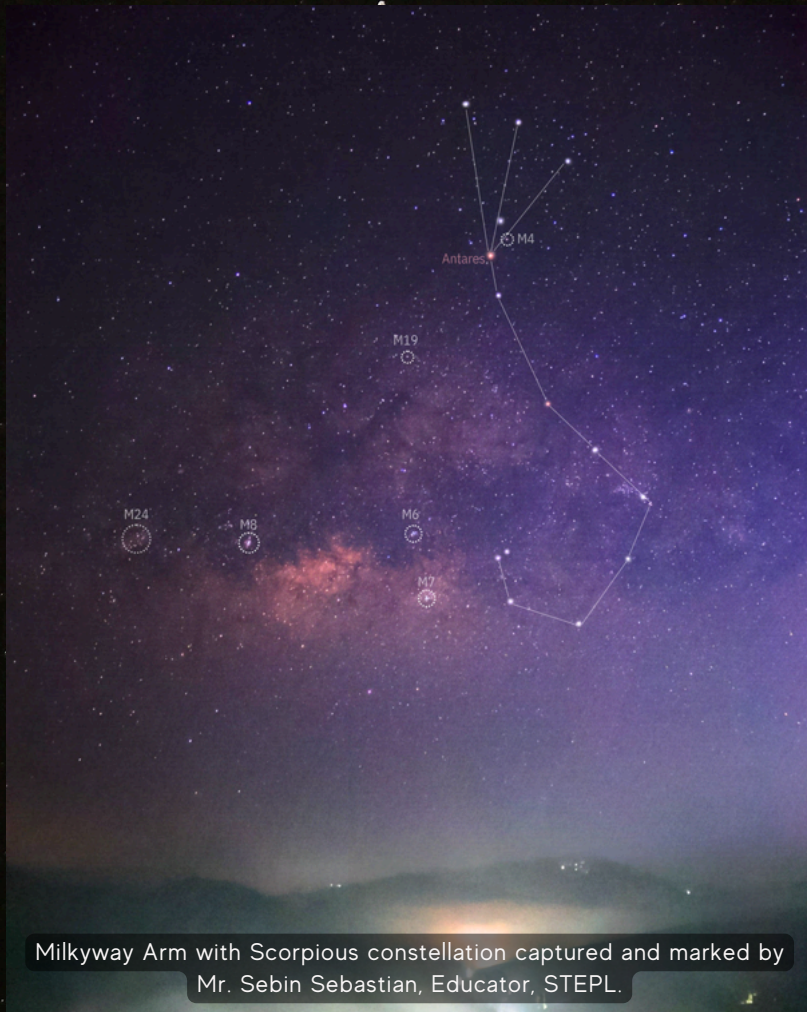
When oppositely directed magnetic fields come close to each other, they rearrange and snap into a new configuration. During this process, stored magnetic energy is rapidly converted into heat, light, and the motion of charged particles. Magnetic reconnection is responsible for dramatic space events such as solar flares and geomagnetic storms.

It also plays a key role in creating auroras near Earth's poles, as energetic particles are funneled into the atmosphere. This fascinating process helps scientists understand space weather and its impact on satellites, communication systems, and even power grids on Earth.

ASTROPHOTOGRAPHY BY SPACE TEAM



Orion Star trail captured from Sun Temple, Mahoba by Mr. Ranjith Kumar E, Regional Manager, STEPL.



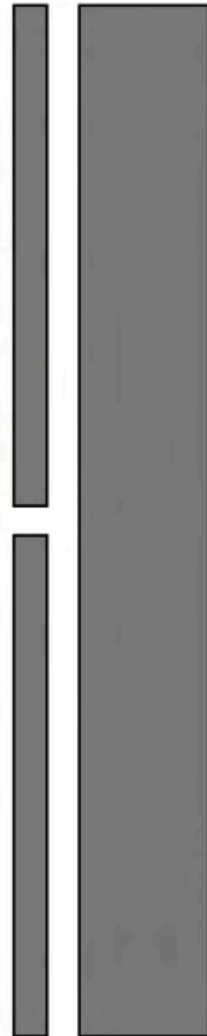
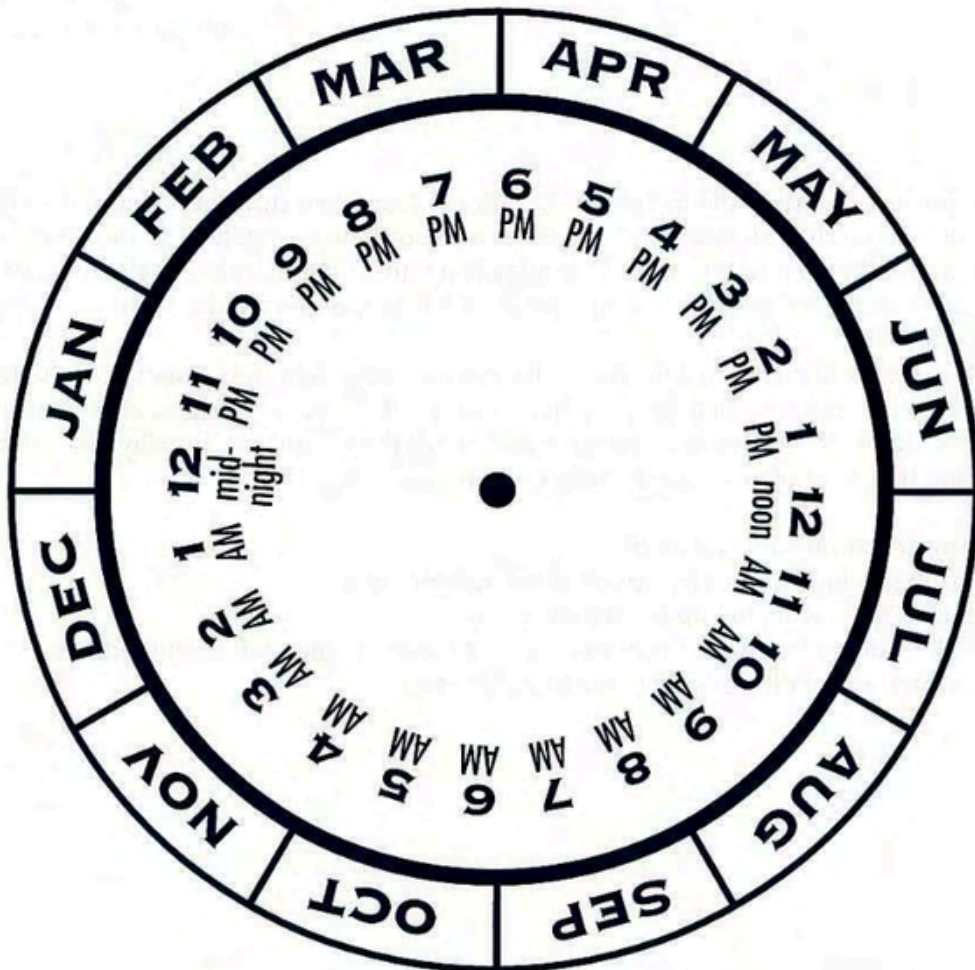
Milkyway Arm with Scorpius constellation captured and marked by Mr. Sebin Sebastian, Educator, STEPL.

COSMIC JOURNEY- THE HEART OF FIRE



MISSION: DO IT YOURSELF

STAR CLOCK

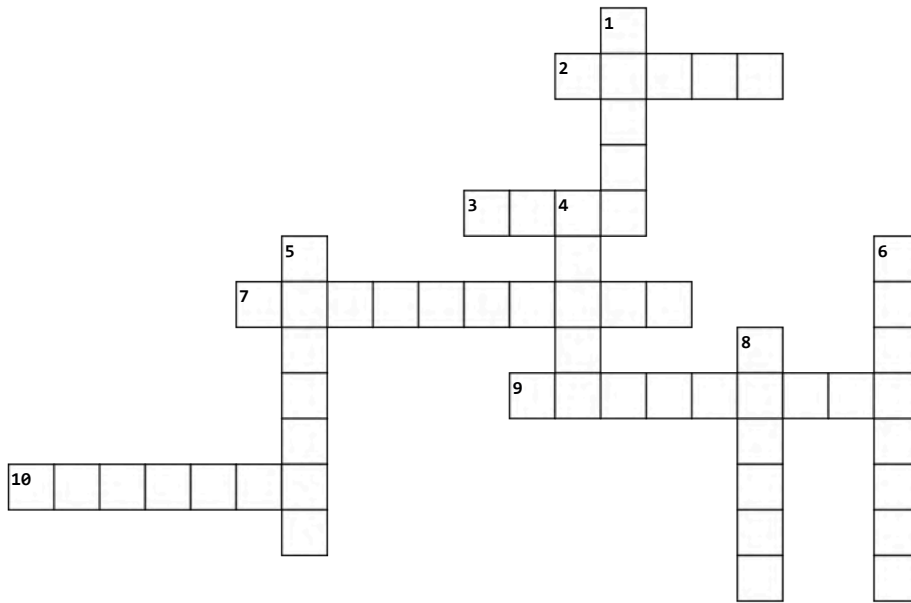


INSTRUCTIONS

- Cut out all the pieces.
- Make a small hole at the centre of both disks.
- Roll and paste the longest strip into a tube that fits through the holes.
- Add a rolled thin strip at one end as a stopper.
- Insert the disks (black disk on top).
- Add another stopper on the other end.
- Do not glue the disks—they should rotate freely.

TRAIN YOUR BRAIN

CROSSWORD



Across

2. Which planet was explored in the Venera program?
3. Which missile system did Dr. Kalam help develop?
7. In which place Dr. A.P.J. Abdul Kalam was born?
9. ISRO's TV-D2 is part of which programme?
10. Name one crop already grown in space.

Down

1. Who asked the famous question "Where is everybody?" about alien life?
4. Constellation from which the Gamma Normids meteors radiate?
5. Who published Sidereus Nuncius?
6. What was the source of GRB 790305b later identified as?
8. What process creates a planetary magnetic field?

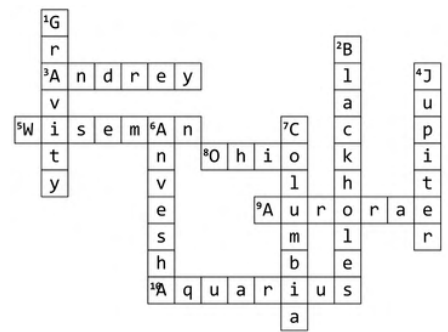
Astronomy Word Puzzle

Communication Satellites

U	R	A	S	Y	M	P	H	O	N	I	E	N	R
C	O	T	I	K	U	B	Y	A	L	E	R	O	A
B	N	M	M	P	I	I	S	N	E	S	I	S	T
O	R	B	I	T	A	I	O	T	U	K	M	S	S
Y	O	A	B	N	P	I	R	A	E	I	K	S	L
U	R	A	C	S	O	E	I	S	A	N	E	I	E
R	E	I	R	U	O	C	T	L	N	A	I	N	T
E	S	I	K	E	U	T	S	E	R	E	R	I	T
C	I	E	I	M	D	O	P	T	N	N	K	R	C
E	E	U	R	O	H	N	U	N	I	N	E	I	E
K	S	U	O	C	C	S	T	I	M	R	U	D	T
R	L	Y	E	N	A	U	N	S	B	T	M	I	C
A	T	R	O	Y	R	M	I	I	U	A	O	U	S
N	N	I	E	S	D	A	K	S	S	O	M	M	S

- RELAY
- SYNCOM
- ANIK
- INTELSAT
- TIROS
- COURIER
- NIMBUS
- OSCAR
- ORBITA
- SYMPHONIE
- ECHO
- SPUTNIK
- IRIDIUM
- TELSTAR
- EKRAN

Answers for last month puzzles.



**Answers for this month puzzles will be shared in next magazine.

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Plot No.3, Institutional Area, Sector 11, Dwarka, New Delhi 110075, India

www.space-global.com | info@space-global.com | +91-7402074020 | +91-11-45086320

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