

Galactica

Astronomy and Space Science Magazine



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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.

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PERIYAR SCIENCE AND TECHNOLOGY CENTRE



ABOUT SPACE



Legacy of 23 years



Pioneer Organization



1000+ Activities Developed



1000+ Schools Associated



1.5M+ Students Engaged



10K+ Outreach Events



10+ Cities Presence

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.

MD's Message

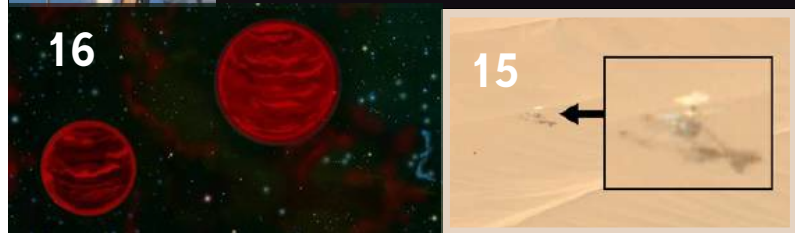
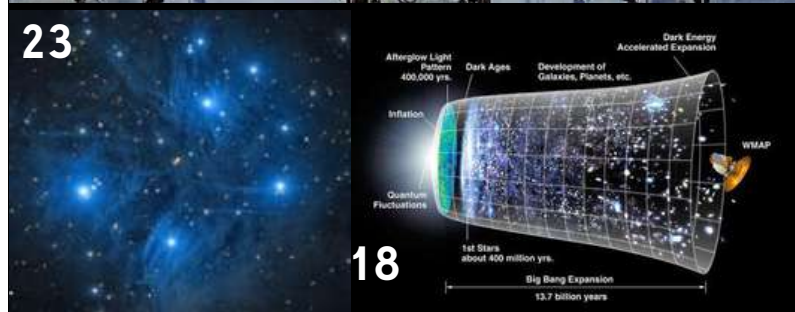


Mr. Shivam Gupta,
MD, SPACE

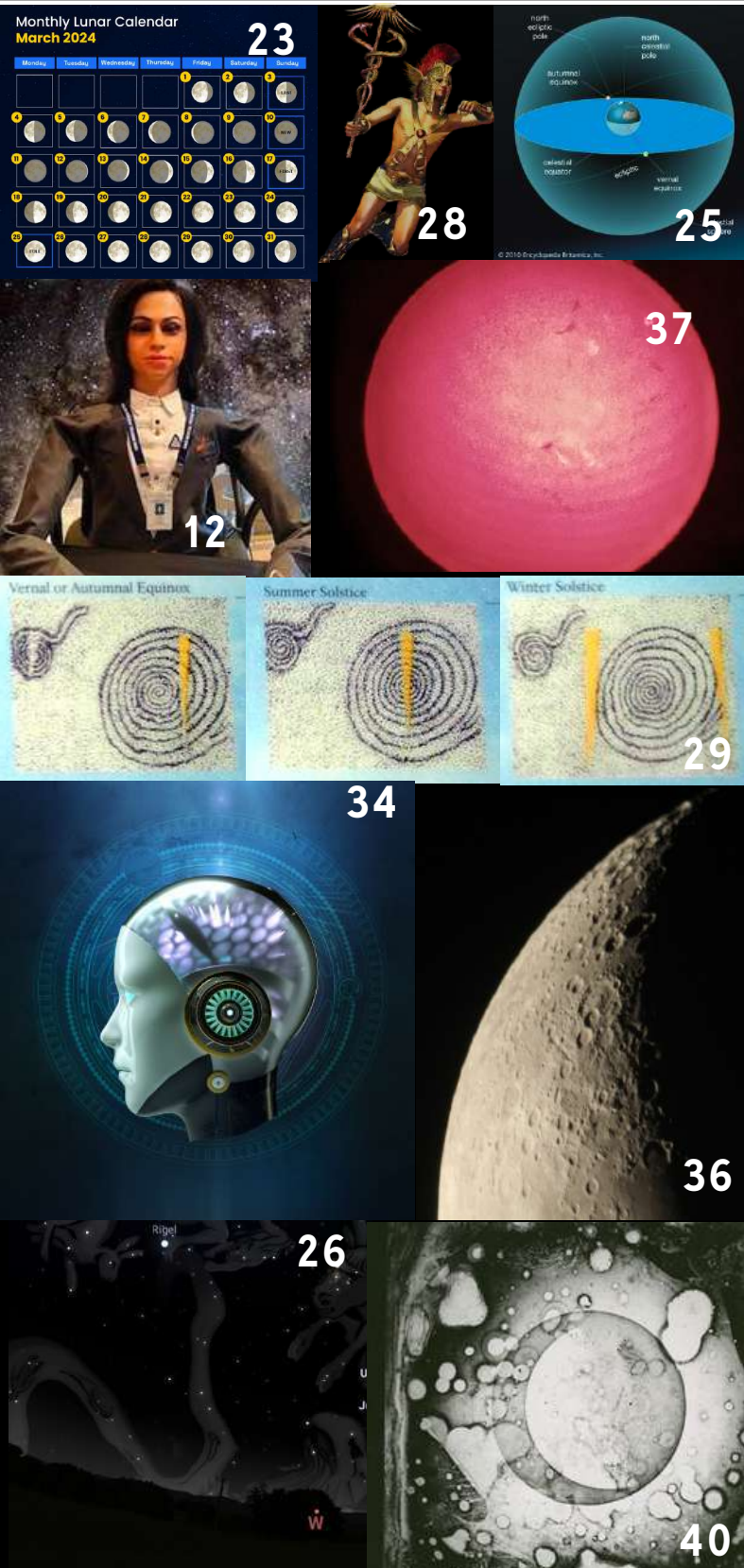
Education is integral to humankind growth and it strongly contributes towards innovation and developments. Space is transforming India to provide better learning opportunities through Experiential and Hands-on learning in the very niche field of Astronomy and Space Science. Our mission to build from the grassroots level is what drives us stronger and to inculcate scientific temperament so the next generation can be entrepreneurs, scientists, and astronauts!

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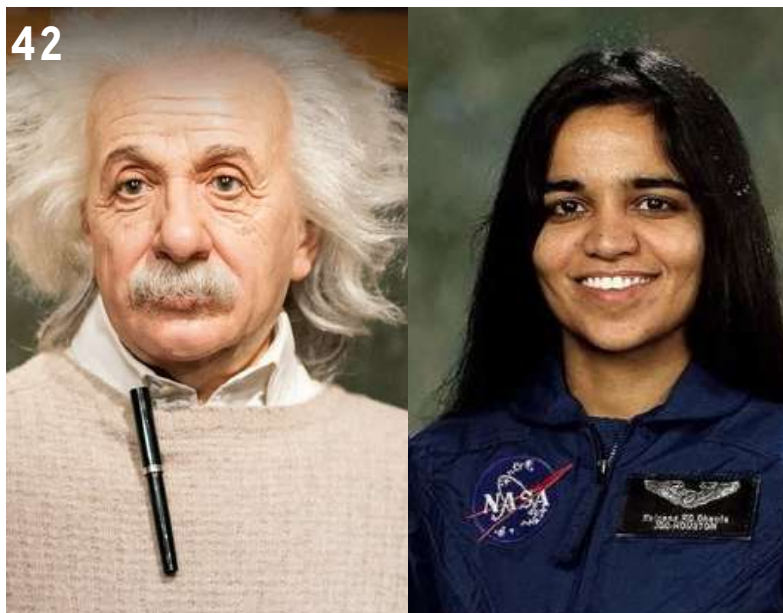
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SPACE INSIGHTS

CELEBRATING SCIENCE: IASTRONOMER CLUB'S NATIONAL SCIENCE DAY EXTRAVAGANZA

iAstronomers of all ages gathered at the iAstronomer Club's National Science Day event on 24th and 25th February, 2024 to celebrate National Science Day. National Science Day is celebrated to commemorate the discovery of the Raman Effect by the Indian physicist Sir C.V. Raman on February 28, 1928. This significant discovery marked a pivotal moment in the history of science and brought international recognition to Indian scientific research. The Raman Effect refers to the phenomenon of the scattering of light by molecules, which results in the deviation of light rays from their original path. Sir C.V. Raman's groundbreaking work in this area not only provided valuable insights into the behavior of light but also laid the foundation for the field of spectroscopy, which has wide-ranging applications in various scientific disciplines, including chemistry, physics, biology, and material science. From Astro Food Shows to Model Making and Science Monologues, iAstronomers engaged in a plethora of fun-filled activities that showcased their passion for astronomy and science.

For Kids - Astro Food Shows: The youngest members of the iAstronomer Club delighted in the Astro Food Shows, where they creatively used fruits, vegetables, and cookies to visually represent various astronomical phenomena. From crafting rainbow formations with colorful fruits to constructing rockets and galaxies with cookies and veggies, the children's imaginations soared as they explored topics such as constellations, satellites, and the solar system through edible art.

For Juniors - Model Making: Juniors at the event took on the challenge of Model Making, where they brought scientific concepts to life through visual representations. From depicting the Raman Effect and the Scattering of Light to showcasing missions of the Indian Space Research Organisation (ISRO) and the intricacies of telescopes and rockets, participants demonstrated their understanding and creativity through intricate models and dioramas.

For Seniors - Science Monologue: Seniors captivated the audience with their Science Monologues, delivering insightful presentations on a variety of topics while utilizing props and visual aids to enhance their narratives. From delving into the intricacies of the Raman Effect and the concept of Cosmic Distance and Time to highlighting the achievements of ISRO's missions, participants showcased their knowledge and communication skills in engaging and informative monologues.

One of the iAstronomer, Myraa Khattar used AI models in their science monologue, which she made all by herself using computer programming. iAstronomers were also able to have a real time conversation with AI model.

The event provided a platform for science enthusiasts of all ages to come together, share their passion for astronomy and scientific exploration, and inspire one another to delve deeper into the mysteries of the universe. Participants not only honed their scientific knowledge and skills but also fostered a sense of camaraderie and community within the iAstronomer Club.

More than 20 students participated in the activities and shared their love for astronomy and Space Science. As the curtains closed on the National Science Day celebrations, the spirit of curiosity and discovery continued to burn bright among members of the iAstronomer Club. With each activity and presentation, participants reaffirmed their commitment to exploring the wonders of science and sharing their excitement with the world. In the words of Carl Sagan, "Somewhere, something incredible is waiting to be known." And at the iAstronomer Club, that spirit of discovery thrives, guiding members on a journey of scientific exploration and wonderment.



iAstronomer Atul



iAstronomer Myraa Khattar



iAstronomer Abhisheg

CELEBRATING NATIONAL SCIENCE DAY AT UITS SCHOOLS: A DAY OF EXPLORATION AND LEARNING

On February 28, 2024, UITS Schools - DPS Greater Faridabad, KR Mangalam Vaishali, and KR Mangalam Vikipuri came alive with the spirit of scientific inquiry and discovery as they celebrated National Science Day. It was a day marked by enthusiasm, experimentation, and a deep appreciation for the wonders of science.

Students from all three schools eagerly participated in various activities aimed at fostering their curiosity and understanding of scientific concepts. From observing the sun and exploring the intricacies of convex lenses to delving into the realm of static charges and atmospheric pressure, the young scientists immersed themselves in a plethora of hands-on experiments.

One of the highlights of the day was the students' engagement with educational videos showcasing their experiments. Through these videos, they not only demonstrated their practical skills but also shared their newfound knowledge with their peers and teachers.

During school hours, students took the opportunity to educate everyone about the significance of National Science Day, honoring the legacy of Sir C.V. Raman and his groundbreaking discovery, the Raman Effect. Through presentations and discussions, they emphasized the importance of scientific research and innovation in shaping our world.

In addition to experimental demonstrations, students enjoyed a screening of the movie "My Fantastic Field Trip to the Planets," which further ignited their curiosity about the mysteries of the universe.

Creativity flourished as students crafted science-themed bookmarks, showcasing their artistic talents while reinforcing their understanding of scientific concepts. The bookmarks served as reminders of the wonders they had explored throughout the day.

As part of the celebration, students also visited the school library, where they were treated to a science book exhibition. Exploring a diverse range of scientific literature, they discovered new avenues for exploration and learning, fueling their passion for discovery.

The National Science Day celebration at UITS Schools was not just a one-day event but a testament to the school's commitment to nurturing a culture of scientific inquiry and innovation among its students. Through hands-on experimentation, educational activities, and interactive experiences, the schools empowered young minds to embrace the wonders of science and embark on a lifelong journey of exploration and discovery.



ONLINE WORKSHOP: INTERACTION WITH AN ASTRONOMER

On February 10th, 2024, a wonderful event occurred in the digital arena, bringing together young brains from many prestigious educational institutions for an intriguing online workshop. Students from classes VI to X from UITS Schools - Delhi Public School Greater Faridabad, KRM World School Vikaspuri, KRM World School Vaishali, Bal Bharti Public School Pitampura, JBM Global School Noida, and GD Goenka Model Town gathered for an interactive session with none other than Astronomer Niruj Mohan Ramanujam.

Niruj Mohan Ramanujam, a well-known astronomer, is presently the Head of Science Communication, Public Outreach, and Education (SCOPE) at the Indian Institute of Astrophysics in Bengaluru. His travels in the celestial regions have been nothing short of remarkable. Formerly a radio astronomer, he has traveled the world, assisting universities in South Africa, Pune, the Netherlands, and France.

The program began at 04:30 PM and lasted until 06:00 PM, giving students plenty of opportunity to dig into the wonders of the cosmos under the supervision of a seasoned expert. Niruj Mohan Ramanujam enthralled the audience with his vast knowledge and love for astronomy, leaving an unforgettable impression on their comprehension of the universe.

Throughout the program, students learned about numerous aspects of astronomy, including celestial bodies and their motions, the immensity of space, and the complexities of cosmology. Niruj Mohan Ramanujam's compelling graphics and engaging talks took the participants beyond the limitations of Earth, kindling their curiosity and encouraging them to explore the marvels of the cosmos.

One of the workshop's highlights was the opportunity for students to speak directly with Niruj Mohan Ramanujam, asking pressing questions and receiving insightful responses. The kids took advantage of the opportunity to speak with an expert on topics ranging from black holes to the potential of alien life, increasing their grasp of astronomy.

Finally, the contact with Astronomer Niruj Mohan Ramanujam was a valuable learning experience for students at UITS Schools. It not only enlarged their views but also inspired their awe and curiosity about the vastness of the world. As students continue their studies, the insights obtained from this workshop will act as a guiding light, leading them to deeper discoveries and comprehension in the field of astronomy.



SOARING HEIGHTS: THE PARACHUTE MAKING AND LAUNCHING EXTRAVAGANZA FOR EIGHTH GRADERS

On the vibrant morning of February 1st, the eighth-grade students were immersed in an engaging Parachute Making and Launching Challenge. The event, a fusion of science and excitement, unfolded as an inspiring journey into the principles of physics, engineering, and teamwork. Armed with materials like garbage bags, styrofoam balls, air bubble wrap, thread, and paper cups, students eagerly delved into the world of parachute design.

The adventure commenced with an 80-minute Parachute Making session, where creativity and collaboration took center stage. Working in teams, students embraced the challenge of crafting parachutes from unconventional materials. Laughter and animated discussions filled the room as ingenious ideas were shared, and unique designs took shape against the backdrop of the first day of February.

As the clock ticked away, each team proudly presented their parachute prototypes, reflecting a diverse range of designs. From experimenting with different shapes to meticulously considering materials, the students showcased both their scientific curiosity and imaginative flair.

The subsequent Launching phase added a layer of excitement as students watched their parachutes take flight on this special day. The challenges were tailored to engage young minds – ensuring a soft landing for raw eggs, delicate chalk pieces, and bouncy styrofoam balls. The air was charged with anticipation as these young engineers tested their creations against the laws of physics.

Egg landings became a lesson in precision, chalk descents in finesse, and styrofoam ball bounces in adaptability. The challenges not only tested their scientific understanding but also encouraged quick thinking and problem-solving, transforming the event into a dynamic learning experience.

Teamwork emerged as the unsung hero of the day. Collaborative efforts were on full display as students brainstormed solutions, adjusted designs, and supported each other through triumphs and challenges. The event became a platform for practical learning, emphasizing that the journey of discovery is often as valuable as the destination.

In the end, the Parachute Making and Launching Extravaganza on the 1st of February was more than just an experiment; it was a celebration of scientific exploration, creativity, and teamwork. As parachutes gracefully descended, carrying eggs, chalk, and styrofoam balls, the students witnessed firsthand the tangible results of their efforts, solidifying the concepts of physics memorably and enjoyably.

The event not only enriched their understanding of scientific principles but also marked a special chapter in their academic journey, as on this particular February day, they navigated the skies of knowledge, reaching new heights with every parachute launch.



SPACE INDIA'S STAR PARTY EXTRAVAGANZ AT G.D. GOENKA PUBLIC SCHOOL

On the enchanting evening of February 14, 2024, G.D. Goenka Public School, in collaboration with Space India, orchestrated a captivating Star Party that unfolded as an immersive journey through the cosmos. Aimed at students from classes 2 to 6, the event surpassed mere stargazing and transformed into an engaging exploration of the universe.

The evening commenced with enthralling stargazing sessions where students, armed with curiosity, peered through powerful telescopes, discovering constellations and planets that adorned the night sky. The interactive workshops conducted by seasoned educators from Space India were a highlight, unraveling the mysteries of the solar system in a way that made complex astronomical concepts accessible and fascinating for young minds.

The school premises were magically transformed into an interactive wonderland, complete with hands-on experiments, allowing students to create their mini galaxies. Informative displays lining the corridors provided bite-sized information on celestial wonders, while a 3D model of the solar system became a hub for exploration, enhancing students' understanding of planetary movements.

The collaborative efforts between G.D. Goenka Public School and Space India were seamlessly woven into the fabric of the event. The coordination between astronomy educators and the school staff ensured that each element of the Star Party contributed to a vibrant and immersive learning experience.

Student engagement was at its peak as animated discussions about favorite constellations echoed through the air, and joyous moments of discovery during hands-on experiments created an atmosphere of both learning and laughter. The Star Party succeeded not only in providing intellectual stimulation but also served as a stress buster, striking the perfect balance between education and entertainment.

In conclusion, the Star Party of February 14, 2024, was a celestial triumph, leaving an indelible mark on the cosmic curiosity of young astronomers. Beyond its educational objectives, the collaborative efforts between G.D. Goenka Public School and Space India created a magical evening, a journey through the stars that the students will cherish, providing memories that will linger for years to come. The event was not merely an astronomical exploration; it was an odyssey through the cosmos that sparked a sense of wonder and curiosity among the students.



SOLAR SOAR DAY - A STELLAR EXPLORATION EXPERIENCE FOR CLASS 6 STUDENTS

On February 2, 2024, G.D. Goenka Public School, in partnership with Space India, orchestrated a stellar event titled "Solar Soar Day" for the enthusiastic students of class 6. This unique initiative aimed to provide an immersive and educational experience in the captivating realms of rocketry and solar observation.

The day unfolded with an enlightening session on rocketry, where students delved into the intricacies of rocket components and principles. Under the expert guidance of educators and professionals, students took an active role in constructing their rockets, culminating in the thrilling launch of these creations using hydro pressure. The air buzzed with excitement as young minds witnessed firsthand the practical application of rocket science.

Transitioning seamlessly into the second segment of the day, the focus shifted to safe solar viewing techniques. Emphasizing safety protocols, students were educated on secure methods of observing the sun. The apex of this segment featured the use of a high-quality 200mm Dobsonian telescope, allowing students to observe the sun's features with remarkable clarity and precision.

The collaborative efforts of G.D. Goenka Public School and Space India not only provided an enriching learning experience but also ignited a newfound curiosity and enthusiasm for science and astronomy among the participating students. "Solar Soar Day" stood as a testament to the school's commitment to holistic education, combining theoretical knowledge with hands-on activities and safe exploration. The event left an indelible mark on the young minds involved, fostering a lasting appreciation for the wonders of the universe.



EXPLORING EXCELLENCE: THE ST. MARTIN DIOCESAN SCHOOL SCIENCE EXHIBITION

Amidst the corridors of St. Martin Diocesan School, Delhi Cantt., a palpable sense of anticipation filled the air on the morning of February 13th. The occasion? A prestigious Science Exhibition, a testament to the ingenuity and scholarly pursuit of the students, graced by the esteemed presence of the Principal. Commencing promptly at 10 am, the event heralded a day dedicated to scientific inquiry and discovery.

This year's exhibition was distinguished by a collaborative effort with Space India, an organization committed to nurturing scientific curiosity and knowledge among the youth. Together, they orchestrated the development of four remarkable models, each a manifestation of the students' dedication and reverence for the sciences.

1. Zodiac Model:

Enter the enchanting realm of the Zodiac Sign Model, meticulously crafted by the talented students of Class IX. Here, visitors were treated to an immersive experience, delving into the esoteric world of zodiac signs and their celestial counterparts—the constellations. From the unwavering determination of Aries to the profound intuition of Pisces, each sign was portrayed with intricate detail, accompanied by profound symbolism and ancient wisdom. The exhibit served as a celestial odyssey, encapsulating the brilliance of student creativity and the enigmatic allure of the cosmos.

2. Chandrayaan Model:

Prepare for a celestial voyage as you bear witness to the unveiling of the Chandrayaan-3 Model, a triumph of scientific endeavor by the 9th-grade students. Inspired by the GSLV MK III, this miniature rocket symbolized India's aspirations for lunar exploration. With meticulous precision, the students crafted a representation of power and innovation, poised to conquer the vast expanse of space. Through this project, they demonstrated the future of lunar exploration, a testament to their unwavering commitment and passion for the field of space science.

3. Obstacles Avoiding Truck Model:

Embarking on a journey into the realm of vehicle automation, students endeavored to achieve advancements in vehicular technology. The Obstacles Avoiding Truck Model showcased sophisticated technology and machine control, heralding a future of enhanced safety and efficiency in transportation systems. Equipped with features such as edge detection and obstacle avoidance, the project underscored the potential of automation to revolutionize road safety and efficiency, reflecting the students' dedication to innovation and progress.

4. Smart Parking Model:

In a nod to the era of automation, the Smart Parking Model emerged as a beacon of innovation and efficiency. Leveraging sensors and microcontrollers, the project aimed to optimize parking systems, aligning with the vision of Smart Cities. By automating vehicle counting and display, the students showcased the transformative potential of technology in urban infrastructure, epitomizing their commitment to sustainable development and modernization.

As visitors traversed the exhibition, they were met with a tapestry of creativity and intellectual exploration. From the mysteries of the cosmos to the intricacies of technological advancement, each project served as a testament to the students' boundless potential and scholarly prowess.

In the realm of science and innovation, the St. Martin Diocesan School Science Exhibition stood as a beacon of excellence, celebrating the spirit of inquiry, creativity, and collaboration. Guided by the mentorship of Space India, students embarked on a journey of discovery, leaving an indelible mark on the landscape of scientific exploration.

As the curtains drew to a close on yet another successful exhibition, one thing became abundantly clear—the future of science and innovation shines brightly in the capable hands of these young visionaries.

Here are some of the glimpses of the day filled with excitement, enthusiasm, innovation and fun.



ASTROTOURISM -SHREE RAM WORLD SCHOOL

The students of Shree Ram World School embarked on an enchanting stargazing expedition, spanning two days and one night, immersing themselves in the awe-inspiring night sky and untamed wilderness of Sariska, Rajasthan. This journey wove a tapestry of treasured memories that are destined to linger in their hearts for a lifetime.

Setting off from their familiar school grounds, the expedition was punctuated by delightful pit stops at the Old Rao Hotel, where the students indulged in delectable meals, igniting their enthusiasm for the forthcoming adventures. The meticulously crafted itinerary at Astroport Sariska unfolded with an array of team-building activities, followed by a captivating astronomy session that deepened their reverence for the celestial wonders adorning the night sky. Infusing a cultural ambiance into the experience, the students reveled in traditional Rajasthani dance performances under the starlit canopy.

The pinnacle of the day was reached with a sumptuous dinner, fostering connections among the students, and concluded with a serene overnight stay at the hotel. As the dawn's first light painted the sky on the following day, the students greeted a new morning with a hearty breakfast amidst the welcoming atmosphere of the hotel. The expedition continued with an exhilarating jungle safari, immersing the students in the vibrant realm of wildlife. Taking an educational twist, the adventure featured a captivating rocketry session, where students crafted and launched their own hydrorockets, amplifying the excitement of their journey. The session culminated in a lively prize distribution ceremony, lauding the efforts and achievements of the students. A collective photograph encapsulated the essence of shared experiences and the bonds forged during the trip.



Appreciation Letter

We are writing on behalf of ShreeRam World School Dwarka to express our sincere gratitude for the wonderful experience we had during our visit to Astroport Sariska with Astrotourism India Pvt Ltd on 25th January.

The entire trip was a blend of education, adventure, and fun, providing our students with an enriching learning experience.

The facilities and services provided by Astroport Sariska were good. The students enjoyed the celestial observations and the hands-on activities conducted by your guides.

Moreover, the attention to safety and the planning by Astrotourism India Pvt Ltd were evident throughout the trip, contributing to a secure and enjoyable experience for our students and accompanying staff.

We would like to extend our heartfelt appreciation to the entire team at Astroport Sariska and Astrotourism India Pvt Ltd for making this educational excursion a memorable one. We look forward to future collaborations.

Best Regards
Team SRWS

With a heartfelt farewell to Astroport Sariska, the return journey included a stopover for lunch. As the students were transported back to the school, they carried with them not only cherished memories but also a sense of accomplishment and camaraderie nurtured through this unforgettable astronomical odyssey. The expedition served as a testament to the school's commitment to providing enriching experiences that transcend traditional boundaries, leaving an indelible imprint on each student's heart and mind.



CONTACT INFO@SPACE-GLOBAL.COM TO TRAVEL WITH US

MONTHLY TELESCOPIC OBSERVATION

SPACE ARCADE team conducted 2024's 2nd Monthly Telescopic Experience session on the 17th of February 2024 in Chennai and Delhi.

People from various places joined the observation with their telescopes, binoculars, and other astronomical equipment. They learned and experienced the breathtaking view of the Moon and planets such as Saturn and Jupiter. They also learned about different types of telescopes and cleared all their queries on the Alignment of various telescopes then did basic Astrophotography.

Everyone had their hands-on telescopic experience and enjoyed the view of the moon and its craters, Planet Jupiter through the 8" Dobsonian telescope and Schmidt-Cassegrain telescope set up by the SPACE team.



HIGHLIGHTS OF FEBRUARY 2024

Solar eclipse on Mars! Perseverance rover sees Martian Moon Phobos cross the sun

Earth is not the only planet that experiences stunning solar eclipses as moons pass in front of our solar system's sun.

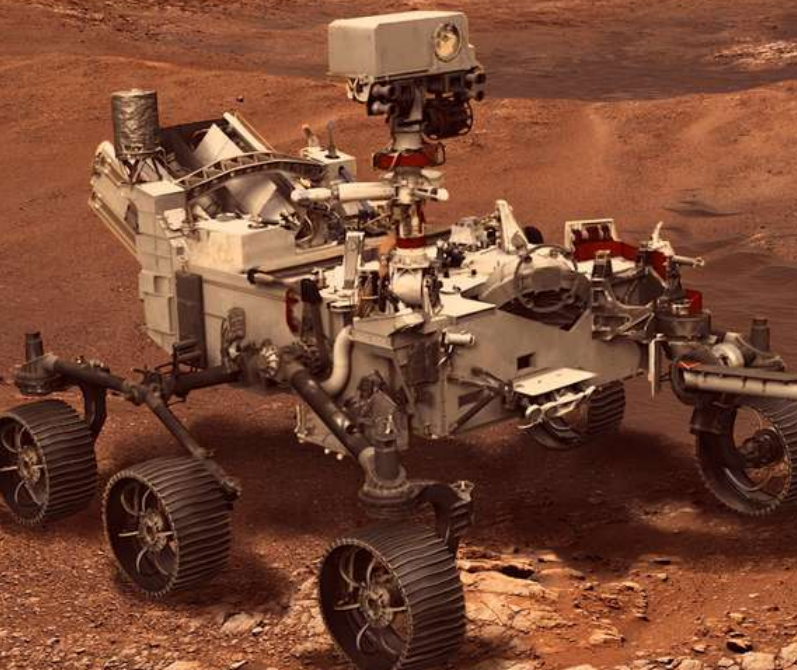
Two months before a total solar eclipse is anticipated to cover a large portion of North America, Mars saw its own eclipse. A timelapse of photographs shot by NASA's Perseverance rover last week shows the Red Planet's dying moon Phobos crossing in front of the sun, providing a striking scene.

On February 8, the Perseverance rover, which landed on Mars in 2021, took a sequence of photographs of the odd-shaped little moon passing in front of the much-larger sun, one per second, to guarantee it captured the brief event.

The photographs show Phobos, a tiny potato-shaped moon, traveling across the sun over 35 seconds. It comes fewer than two months before a total solar eclipse that will be seen in North America.

Last week's eclipse on Mars was best described as a partial or annular eclipse, with Phobos, which is only around 7 miles/11.5 kilometers across, appearing too small to hide the entire sun. Phobos is growing closer to Mars and is expected to crash with it in approximately 50 million years.

As a result, its apparent size will eventually become large enough to fully conceal the sun. Technically, that allows for a total solar eclipse from Mars, but because Phobos is shaped like a potato, it will never generate a perfect totality.



INDIA'S JOURNEY TO THE COSMIC FRONTIER: FROM HUMBLE BEGINNINGS TO STELLAR ACHIEVEMENTS

Space exploration has always captured the imagination of nations, and India stands at the forefront of this celestial journey. From its nascent days to the present, India's space program has evolved exponentially, marking significant milestones along the way.

In its infancy, India's foray into space was modest. The establishment of the Indian Space Research Organisation (ISRO) in 1969 laid the groundwork for what would become a remarkable saga of scientific advancement. ISRO's maiden satellite launch in 1975, Aryabhata, marked India's entry into space exploration.

However, it was the launch of India's first indigenous satellite, Rohini-1, in 1980 that truly signaled India's capabilities in space technology. This success was followed by a series of satellite launches for communication, earth observation, and navigation, bolstering India's space infrastructure.

In 2008, India achieved a significant milestone with the Chandrayaan-1 mission, its first lunar probe. Chandrayaan-1's discovery of water molecules on the moon's surface not only expanded scientific knowledge but also showcased India's prowess in space exploration.

India further solidified its position in the global space arena with the Mars Orbiter Mission, Mangalyaan, in 2013. This mission made India the first country to reach Mars on its maiden attempt and at a fraction of the cost of similar missions by other nations. Mangalyaan's success highlighted India's efficiency and cost-effectiveness in space endeavors.

Continuing its trajectory of success, India launched the Chandrayaan-2 mission in 2019, aiming to explore the moon's south pole region. Although the mission faced challenges, including the loss of communication with the Vikram lander, it underscored India's determination and resilience in pushing the boundaries of space exploration.

Looking ahead, India's space ambitions remain ambitious and expansive. With plans for manned space missions, interplanetary exploration, and satellite technologies, India is poised to further elevate its status as a global space power.



ISRO ACHIEVEMENTS

1. India ranks among top space-faring nations.
2. Achieved Mars Orbiter Mission in 2014, low cost.
3. Established Indian Space Research Organisation (ISRO) in 1969.
4. Successfully launched over 100 satellites in single mission.
5. Contributed to global satellite launches.
6. Operates indigenous satellite navigation system (NavIC).
7. Collaborates with international space agencies.
8. Growing commercial space sector presence.
9. Emphasizes space technology for societal benefits.
10. Leverages space for agriculture, disaster management, and communication.

INDIAN SPACE ENDEAVOR GAGANYAAN UNVEILS CREW MEMBERS ALSO PLANNED FOR FLIGHT CREWED BY HUMANOID ROBOT LATER THIS YEAR

India's Gaganyaan mission, the country's first manned space mission, is making steady progress towards its goal of sending astronauts into space. Prime Minister Narendra Modi recently awarded astronaut wings to four chosen designates in a special ceremony at the Vikram Sarabhai Space Centre in Thiruvananthapuram, Kerala. Group Captain P Balakrishnan Nair, Group Captain Ajit Krishnan, Group Captain Angad Pratap, and Wing Commander S Shukla received their astronaut wings as they prepare to embark on the historic Gaganyaan mission, scheduled between 2024 and 2025.

These selected individuals underwent a rigorous training program in Russia and are now stationed at an ISRO unit to familiarize themselves with the specifics of the mission. The Gaganyaan project, with a budget of 90 billion rupees, aims to demonstrate India's human spaceflight capability by sending a crew of four into orbit for a three-day trip before safely returning them to Earth. To ensure the success of the mission, cutting-edge equipment is being developed for the spacecraft, including life support systems and communication technology.



In addition to the manned mission, ISRO is also preparing for the unmanned Gaganyaan-1 test flight, scheduled for the third quarter of this year. The recent successful qualification of the rocket engine used in the test flight marks a significant milestone in India's journey towards human spaceflight. The humanoid robot Vyomitra, which will accompany the test flight, is designed to simulate human functions in the space environment and interact with the spacecraft's systems.

With the development of advanced technology and the dedication of the chosen astronauts, India's Gaganyaan mission is on track to make history as the country's first human space travel mission. The upcoming test flight and eventual manned mission signify a significant step forward for India's space exploration efforts and demonstrate the country's growing capabilities in the field of spaceflight.

SpaceX deorbiting 100 older Starlink satellites to 'Keep space safe and Sustainable'

Elon Musk's SpaceX announced on Tuesday that it will deorbit 100 early-version 1 Starlink satellites as part of its efforts to make "space safe, sustainable, and accessible, protecting astronauts, satellites in orbit, and the public on the ground."

The company's Starlink satellites deliver comparatively low-latency internet by operating in low-Earth orbit (LEO) fewer than 600 kilometers above the Earth. In the event that one of its satellites malfunctions in orbit, it will deorbit naturally within 5 years.

However, SpaceX has already begun the controlled deorbiting of 406 of the approximately 6,000 satellites it has launched to date. 95 percent of those spacecraft have already plummeted from orbit, and 17 are non-maneuverable. However, those satellites are being extensively followed to ensure they don't collide with other satellites.

"The satellites will lower in a safe, circular, and controlled manner, which should take about six months for the majority of the vehicles. A controlled, propulsive deorbit is far shorter and safer than a comparable ballistic deorbit from the same altitude. Throughout the descent, all satellites will maintain their maneuverability and collision avoidance capabilities.

Furthermore, the business stated that these deorbiting satellites will be responsible for any high-risk conjunctions by space safety and sustainability best practices. Space trash endangers both other satellites and people in orbit, such as those aboard the International Space Station or China's Tiangong space station.

At typical orbital speeds of roughly 35,000 kilometers per hour, a piece of debris the size of a plum will have the same momentum as a car traveling down the highway. Debris frequently collides with one another, forcing it to fragment further.



ISRO launched GSLV-F14/INSAT-3DS mission

On Saturday, February 17, 2024, at 17:30 hours IST, the GSLV-F14/INSAT-3DS mission is successfully launched from SDSC-SHAR in Sriharikota. The INSAT-3DS meteorological satellite is to be launched into the Geosynchronous Transfer Orbit (GTO) by the GSLV on its sixteenth mission. Later orbit-raising operations will guarantee that the satellite is in a geostationary orbit. The three-stage, 51.7-meter-long Geosynchronous Satellite Launch Vehicle (GSLV) has a liftoff mass of 420 tonnes.

A successor to the Third Generation Meteorological Satellite from Geostationary Orbit is the INSAT-3DS Satellite. Ministry of Earth Sciences (MoES) provides full funding for the GSLV-F14/INSAT-3DS mission. It is intended to improve meteorological observations and surface monitoring for weather forecasting and hazard alerts on land and in the ocean.

The satellite, in addition to the currently in operation INSAT-3D and INSAT-3DR satellites, will enhance the Meteorological services. Indian industries have made a substantial contribution to the satellite's construction. The payloads of satellite are 6 channel Imager, 19 channel Sounder, Data Relay Transponder (DRT), Satellite Aided Search & Rescue transponder (SAS&R).

The primary objectives of the mission are:

- To monitor Earth's surface, carry out Oceanic observations and its environment in various spectral channels of meteorological importance.
- To provide the vertical profile of various meteorological parameters of the Atmosphere.
- To provide the Data Collection and Data Dissemination capabilities from the Data Collection Platforms (DCPs).
- To provide Satellite Aided Search and Rescue services

NASA INGENUITY MARS HELICOPTER, BROKEN AND ALONE, SPOTTED BY PERSEVERANCE ROVER ON MARTIAN DUNE

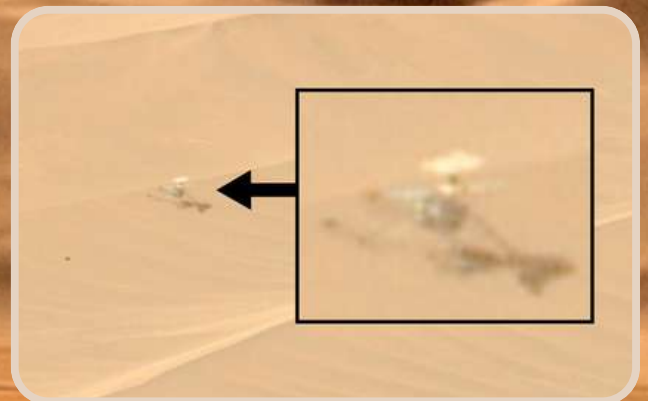
This mosaic was taken on February 4, 2024, by NASA's Perseverance Mars rover, and it depicts the Ingenuity Mars Helicopter at its last airstrip. On January 18, 2024, upon landing on its 72nd trip, the helicopter sustained damage to its rotor blades. The region where the helicopter finished its last journey has been nicknamed "Valinor Hills" by the Ingenuity team, in honor of the imaginary place found in J.R.R. Tolkien's epic books, which include the "The Lord of the Rings" series.

The rover's Mastcam-Z imager took the six photos that were pieced together to create this mosaic at a distance of roughly 450 meters (1,475 ft). This enhanced-color view highlights minute color variations in the image to provide greater clarity.

The Niels Bohr Institute of the University of Copenhagen and Arizona State University collaborate on the design, manufacture, testing, and operation of the cameras as well as the calibration targets. Malin Space Science Systems in San Diego and Arizona State University lead the Mastcam-Z instrument's operations.

One of the main goals of Perseverance's Mars mission is astrobiology, which includes looking for evidence of extinct microbes. The rover will be the first mission to gather and store Martian rock and regolith (broken rock and dust), analyze the planet's geology and historical climate, and open the door for future human exploration of the Red Planet.

These sealed samples would be collected from the surface of Mars by later NASA missions working with the European Space Agency (ESA) and sent back to Earth for further examination. NASA's Moon to Mars exploration strategy, which includes the Artemis moon missions to assist get ready for human exploration of the Red Planet, includes the Mars 2020 Perseverance mission. The Perseverance rover was constructed and is operated by JPL, an organization that Caltech oversees on behalf of the agency in Pasadena, California.



RADIO SIGNALS FROM ORION NEBULA REVEAL NEW DATA ABOUT STRANGE CELESTIAL OBJECTS: 'JUMBOS'

The stunning finding of some free-floating, planetary-mass objects in the Orion nebula last year by astronomers using the James Webb Space Telescope (JWST) cast doubt on their theories of planet and star formation. And now, another study has added to the enigma surrounding these objects, known as Jupiter-mass binary objects, or JuMBOs.

JuMBOs are neither truly planets nor stars. The objects were first discovered in the Orion nebula by Mark McCaughrean, senior science advisor at the European Space Agency (ESA), and associates. Known by the name Messier 45, this nebula is a star-birthing zone located around 1,350 light years away from Earth.



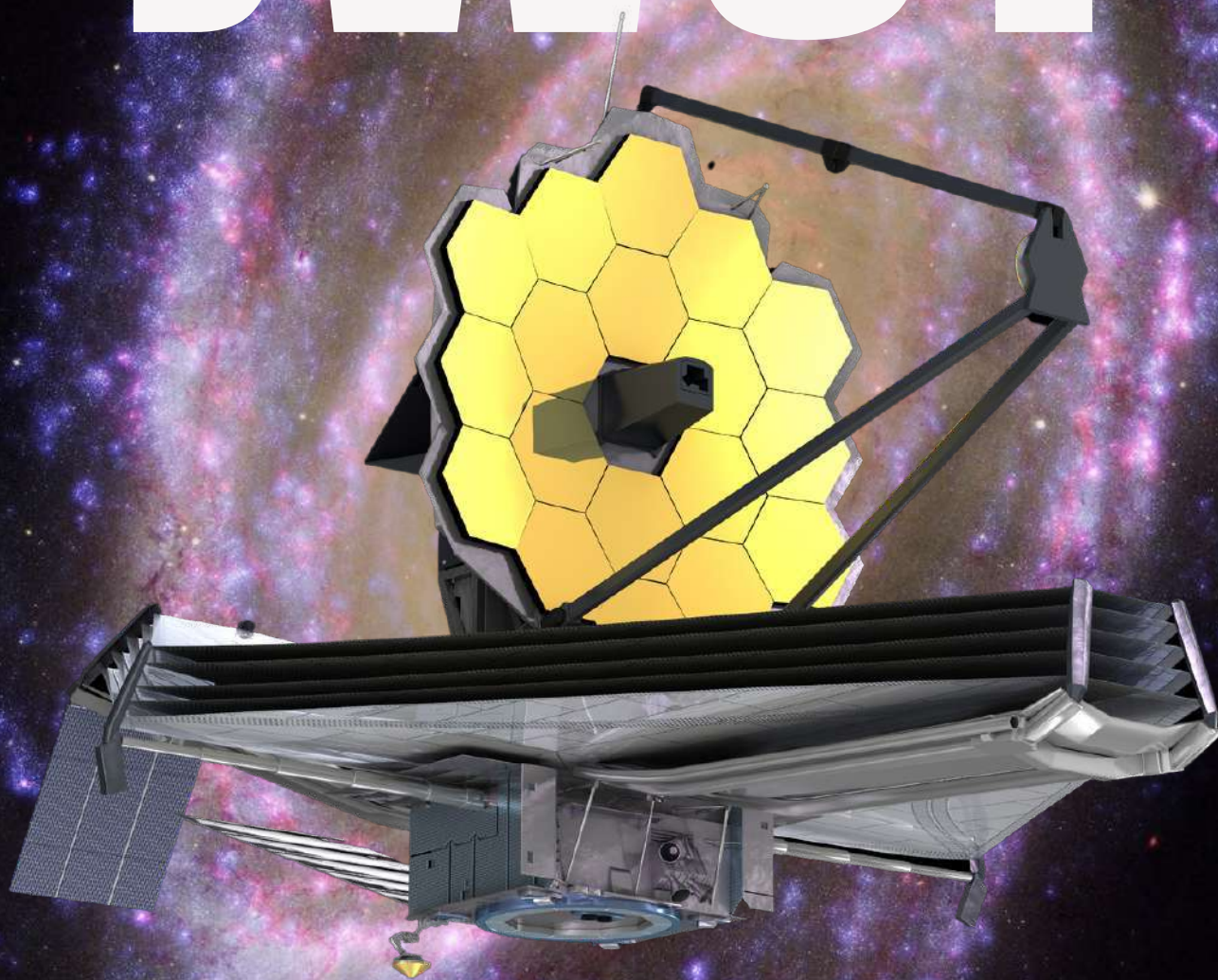
It was possible to view the radio signal emanating from "JuMBO 24's" two components. The two components appear to have approximately 11 times the mass of Jupiter, making them the largest of their sort that the JWST has observed. The remaining components have masses ranging from 3 to 8 times that of the planet with the highest mass in the solar system.

The signal was far stronger than radio signals from objects that resembled brown dwarfs, or JuMBOs. Similar to stars, brown dwarfs are objects that are born, but unlike stars, they are unable to accumulate enough mass to cause the fusion of hydrogen to helium at their cores. Scientists are quick to refute any notion that radio transmissions are an evidence of intelligent life on Earth in the instance of JuMBO 24. Due to their inability to initiate the process that characterizes a star during its main sequence lifetime, brown dwarfs—whose masses range from 13 to 75 times that of Jupiter—have earned the unflattering moniker "failed stars."

"Radio emissions from brown dwarfs and normal stars can be explained by certain mechanisms. There is a lack of mechanism to explain this extremely powerful radio emission for JuMBOs. JuMBOs defy conventional observations of binary stars because they are hot, gassy, relatively tiny entities that exist in pairs. The smaller a stellar body is, the less probable it is to be found in a binary partnership; typically, scientists assume that only the most massive stars enjoy life in binary pairings.

GALACTICA

JWST



James Webb Space Telescope makes rare detection of 2 Exoplanets orbiting Dead stars

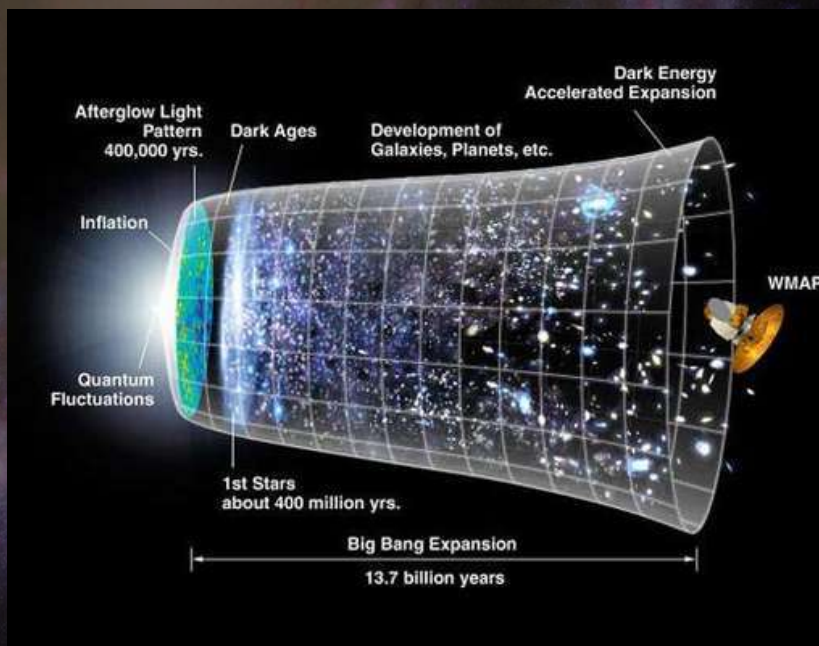


The James Webb Space Telescope (JWST) has made a groundbreaking observation, potentially offering a glimpse into the future of our solar system. It detected two exoplanets orbiting dead stars, resembling Jupiter and Saturn, orbiting white dwarfs WD 1202-232 and WD 2105-82. These findings hint at what might happen to our gas giants after the Sun dies and becomes a white dwarf in about 5 billion years. The exoplanets' characteristics, similar to those of Jupiter and Saturn, suggest they could survive their host star's demise. Additionally, the presence of heavy elements around the white dwarfs implies potential scenarios for the fate of the asteroid belt between Mars and Jupiter post-Sun death.

These discoveries provide valuable insights into planetary systems after stellar death and bolster the understanding of the relationship between gas giants and metal pollution in white dwarfs. This achievement not only offers a glimpse into our solar system's future but also represents a significant scientific milestone.

JWST finds dwarf galaxies packed enough punch to reshape the entire early universe

Astronomers using the James Webb Space Telescope (JWST) discovered that small galaxies in the early universe, resembling dwarf galaxies today, played a significant role in shaping the cosmos when it was less than a billion years old. These galaxies, abundant during a crucial stage of cosmic evolution between 500 and 900 million years after the Big Bang, likely contributed to cosmic reionization, a pivotal process in the universe's development. This revelation challenges previous assumptions about the sources of ionizing radiation necessary for reionization, with smaller galaxies proving to be unexpectedly powerful in this regard.



The JWST's spectroscopic capabilities in the infrared were essential for identifying these faint dwarf galaxies, showcasing the telescope's importance in unraveling the mysteries of cosmic evolution.

Moreover, the discovery relied on Albert Einstein's theory of general relativity, emphasizing the enduring relevance of fundamental scientific principles in advancing our understanding of the universe's history and mechanisms.

ROCKET LAUNCHES IN MARCH 2024

Maiden Flight

- Date: March 9 , 2024
- Rocket: Kairos(Space One)
- Agency: Space One
- Country: Japan
- Launch Site: Space One Launch Pad, Space Port Kii, Japan

Purpose: On March 9, 2024, at 07:30 GMT+5:30, the inaugural flight of the KAIROS launch vehicle, developed by the active Japanese company Space One, is scheduled. Priced at \$9.0 million, the KAIROS has a payload capacity of 250 kg to Low Earth Orbit (LEO) and features four stages without strap-ons.



Live and Let Fly (NROL-123)



- Date: March 20,2024
- Time: Expected in march
- Rocket: Electron
- Agency: Rocket Lab
- Launch Site: Rocket Lab Launch Complex 2 (Launch Area 0 C) Wallops Island, Virginia, USA
- Purpose: The electron orbital expendable launch vehicle with an optional third stage, has been developed by the American aerospace company Rocket Lab. Designed specifically for launching small satellites and CubeSats into sun-synchronous orbit and low earth orbit, the Electron stands out as the pioneering orbital-class rocket utilizing electric-pump-fed engines.

Soyuz MS-25

- Date: March 21 , 2024
- Time: Mar 21st, 2024,6:51 PM GMT+5:30
- Rocket: Soyuz 2.1a
- Agency: Russian Federal Space Agency (ROSCOSMOS)

Purpose: The Soyuz 2.1A transitioned its flight control system from analog to digital, enabling launches from stationary platforms and accommodating larger fairings and payloads. Presently, it is employed for manned Soyuz and Progress missions to the International Space Station (ISS). Soyuz MS-25, a human exploration mission, is set to transport two cosmonauts and one astronaut to the ISS using the Soyuz spacecraft launched from the Baikonur Cosmodrome in Kazakhstan.





Resurs-P No.4

Date: Mar 30th, 2024

Time: Sat • Mar 30th, 2024, 3:06 PM GMT+5:30

Rocket: Soyuz 2.1b

Agency: Russian Federal Space Agency (ROSCOSMOS)

Country: Russia

Launch Site: Soyuz-2 represents the contemporary rendition of the Russian Soyuz rocket, functioning as a three-stage carrier rocket designed for deploying payloads into low Earth orbit. The enhanced 2.1b version incorporates an upgraded RD-0124 engine to the second stage, resulting in improved performance. Focusing on the Resurs-P No.4 specifications, it belongs to the Earth Science category, operates in Sun-Synchronous Orbit, and involves a launch cost of \$80,000,000.



Capella Acadia 3

- Date: Expected in March , 2024
- Location: Rocket Lab Launch Complex 2 (Launch Area 0 C), Wallops Island, Virginia, USA
- Rocket: Electron
- Agency: Rocket Lab
- Country: USA

Purpose: The Electron is a two-stage orbital expendable launch vehicle, with an optional third stage, created by the American aerospace company Rocket Lab. It serves as a small-lift launch vehicle specifically designed for deploying small satellites and CubeSats into sun-synchronous orbit and low Earth orbit. Distinguished as the pioneering orbital-class rocket employing electric-pump-fed engines, the Electron relies on nine Rutherford engines on its first stage for propulsion. Beyond its primary launch function, the Electron is also employed as a suborbital testbed, known as HASTE, contributing to research in the field of hypersonics.

SPACE X LAUNCHES IN MARCH 2024

Crew-8

- Date: Mar 1st, 2024
- Time: 10:34 AM GMT+5:30
- Rocket: Falcon 9 Block 5
- Agency: SpaceX
- Country: USA
- Launch Site: Cape Canaveral, FL, USA

Purpose: The Falcon 9, developed and produced by SpaceX, is a two-stage rocket designed for the reliable and secure transportation of satellites and the Dragon spacecraft into orbit. The Block 5 variant represents the fifth major upgrade with a primary focus on enhancing rapid reusability.



Transporter 10 (Dedicated SSO Rideshare)

- Date: Mar 4 ,2024
- Time: Expected in March
- Rocket: Falcon 9 Block 5
- Agency: SpaceX
- Country: USA

Launch Site: Space Launch Complex 4E,Vandenberg SFB, CA, USA
 Purpose: The Transporter 10 mission is a dedicated rideshare flight intended for a sun-synchronous orbit, carrying numerous small microsattellites and nanosatellites catering to both commercial and government customers.



Dragon CRS-2 SpX-30

- Date: March 12 , 2024
- Rocket: Falcon 9 Block 5
- Agency: SpaceX
- Country: USA
- Launch Site :Space Launch Complex 40 Cape Canaveral, FL, USA
- Time : 6:17 AM GMT+5:30
- Purpose:..The upcoming mission marks the 30th instance of SpaceX's Commercial Resupply Services to the International Space Station (ISS), conducted within the framework of the second contract with NASA.



TV-D2

- * Date: March , 2024, Expected
- Location: Satish Dhawan Space Centre First Launch Pad
- Rocket: Gaganyaan Abort Test Booster
- Agency: ISRO(Indian Space Research Organization)
- Country: INDIA

Purpose: On October 21, 2023, at around 10:00 a.m. IST, ISRO conducted the Test Vehicle Abort Mission-1 (TV-D1), a high-altitude abort test. This mission aimed to ensure the crew's safety by testing their ability to exit the rocket in the event of a malfunction. The initial launch attempt earlier in the day was halted just five seconds before the scheduled time. The second attempt was successful, following a 45-minute delay due to weather concerns that pushed the launch from the originally slated 8:00 local time. During the TV-D1 mission, the crew module experienced an unexpected upended orientation during recovery by the Indian Navy from the Bay of Bengal. To address this issue and enhance safety measures, ISRO planned to test an "up righting system" during the Test Vehicle Abort Mission-2 (TV-D2), scheduled for launch in Q1 2024.



STARLINK LAUNCHES IN MONTH OF MARCH

Starlink Group 6-42| Starlink Group 6-40| Starlink Group 6-43| Starlink Group 6-44| Starlink Group 6-45| Starlink Group 6-46| Starlink Group 6-47 .

SpaceX launches Starlink satellites in groups using Falcon 9 rockets, placing them in low Earth orbit (LEO) below 2,000 kilometers. The goal is global broadband coverage via a satellite network communicating with ground stations and user terminals. A \$52 million mission is deploying satellites for SpaceX's Starlink project in Low Earth Orbit (LEO) to enhance global Internet connectivity. This falls under the Communications category, showcasing SpaceX's dedication to space-based broadband services.



***Note: Launch dates of the missions are scheduled to be launched in March 2024 but may subject to change.**

WHAT'S UP IN THE SKY - MARCH 2024

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.



PLANETS VISIBILITY

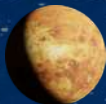
Mercury

Evening Planet, best seen later in this month



Venus

Morning planet, Visible for the entire month in southeast sky



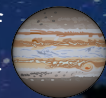
Mars

Morning planet brighter but will get lost in twilight



Jupiter

Evening planet, best placed at start of month when still at decent altitude. Position deteriorates through month.



Saturn

Too close to the Sun therefore it will be difficult to be seen this month.



Uranus

Lies close to Jupiter and, like its brighter companion, is losing altitude rapidly as darkness falls.



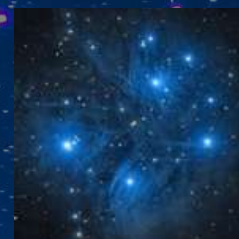
Neptune

The ice giant will not be visible in this month.



BRIGHT DEEP SKY OBJECTS

The Messier 45 (M45), also known as the Pleiades or Seven Sisters, is a bright open star cluster located in the constellation Taurus, the Bull. The Pleiades cluster has an apparent magnitude of 1.6 and lies at an average distance of 444 light years from Earth. Moon is 3.8° away from the star cluster on March 8, 2024



M35, or Messier 35, Known as shoe - Buckle cluster is an open star cluster located in the constellation Gemini. Through a telescope, M35 reveals a rich field of stars, and individual stars can be resolved. The cluster is located at a distance of 2772 light-years from Earth and is often noted for its bright stars and overall attractiveness.

M44 also known as the Praesepe or Beehive Cluster is one of the nearest open clusters to Earth at about 577.3 light years away from Earth located in the constellation Cancer. It got its name because of its appearance like a hive of bees and it contains a larger population of stars holding around 1,000 stars. It's a breathtaking sight through binoculars or a small telescope.



The Orion Nebula which is also known as M42 is located in the constellation Orion with a distance of about 1344 light-years from Earth. It is a star nursery and one of the brightest nebulae visible to the naked eye with a magnitude of 4.0. It's a magnificent active star formation zone that may be seen with binoculars or a small telescope.

ASTRONOMICAL EVENTS - MARCH 2024

MERCURY AT GREATEST ELONGATION EAST

Since Mercury's orbit is closer to the Sun than Earth's, it is constantly seen near the Sun and is frequently obscured by its glare. When it reaches its greatest separation from the Sun, which are moments known as greatest elongation, it is only visible for a few weeks at a period. Depending on whether Mercury is to the east or west of the Sun, these apparitions occur alternately in the morning & evening skies, repeating approximately once every 3 -4 months. It is visible in the early evening darkness when it is oriented towards the east, where it rises and sets shortly after the Sun. It rises and sets just before the Sun when it is located to the west of the Sun and is visible shortly before sunrise. Mercury is best seen during certain times of the year though. It will reach its maximum altitude of 17° above the horizon at dusk on March 25, 2024, during its apparition in March-April 2024. Two things contribute to this annual variability: Mercury's elliptical orbit and the ecliptic's tilt toward the horizon.

Mercury, the closest planet to the Sun, exhibits varying heights above the horizon throughout the year due to the changing angle at which the ecliptic intersects the horizon during sunset. Despite maintaining a constant distance from the Sun, Mercury's apparent position changes. Its non-circular orbit results in a 52% difference in distance between its closest approach and farthest point from the Sun. Depending on its position relative to the aphelion or perihelion portions of its orbit, Mercury's greatest elongation from the Sun varies. Optimal times to observe Mercury's long axis in an edge-on perspective are mid-September and mid-March. During its apparition in March-April 2024, Mercury will separate from the Sun by a distance of 18 to 28°, elongating to a maximum of 18° east of the Sun.

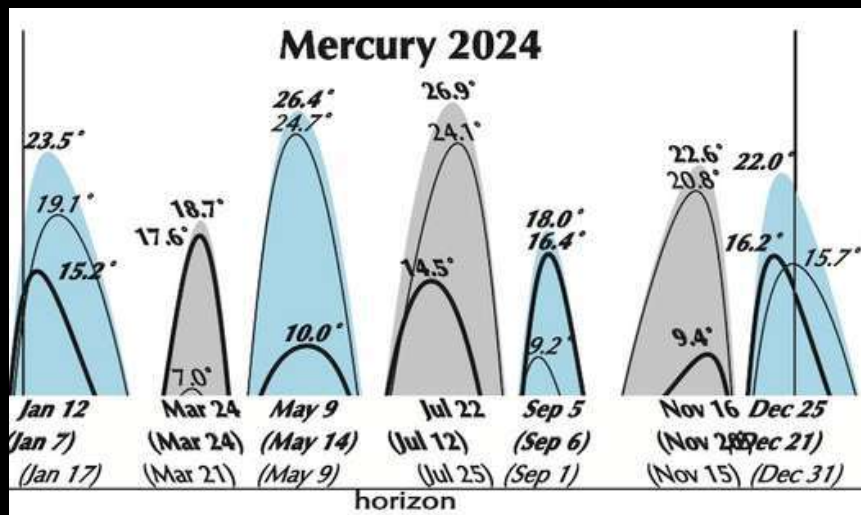
When to look: Mercury is farthest from the sun on our sky's dome, at greatest elongation on March 24, 2024 at 23:24 IST P.M.

Where: Look west, in the sunset direction; shortly after sunset. The sun's innermost planet will be at its best for the year for the Northern Hemisphere.

Magnitude: At greatest elongation, Mercury will shine at magnitude -0.3; it will be brighter than most stars.

Through a telescope: Mercury will appear about 38% illuminated and will measure 7.5 arcseconds across.

Constellation: Mercury will lie in front of the constellation Pisces the Fishes. Doubtless, most of the stars in this constellation will be lost in the twilight.

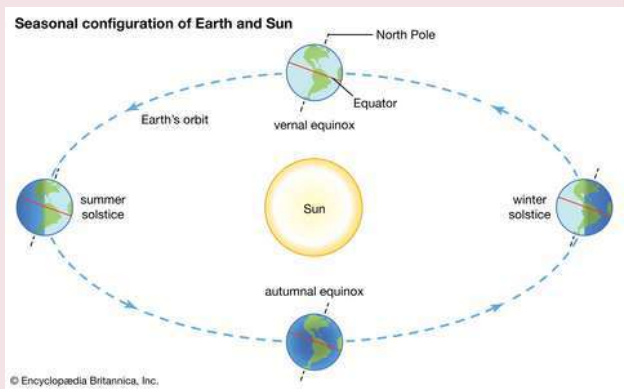
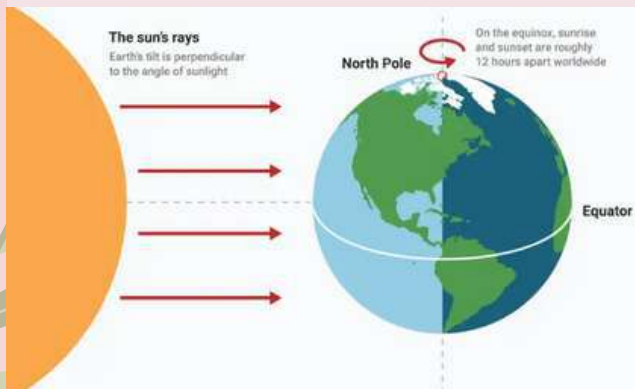


Mercury elongations compared. Here, gray areas represent evening apparitions (eastward elongation). Blue areas represent morning apparitions (westward elongation). The top figures are the maximum elongations, reached at the top dates shown beneath. Curves show the altitude of the planet above the horizon at sunrise or sunset, for latitude 40 degrees north (thick line) and 35 degrees south (thin line). Maxima are reached at the parenthesized dates below (40 degrees north bold). Chart via Guy Ottewell's 2024 Astronomical Calendar.

SPRING EQUINOX

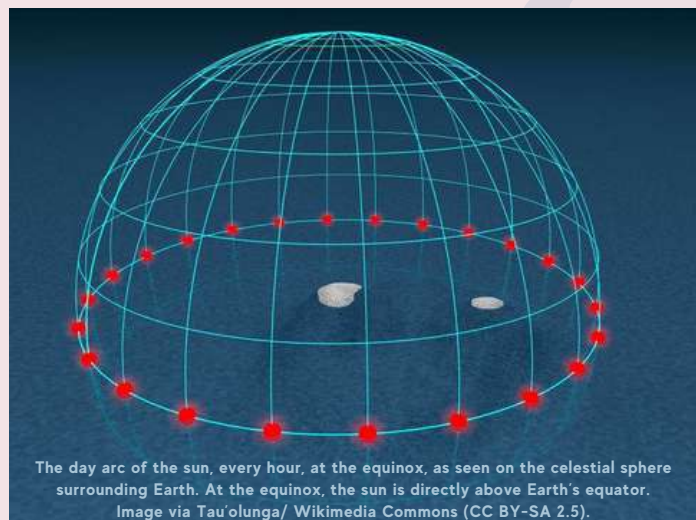
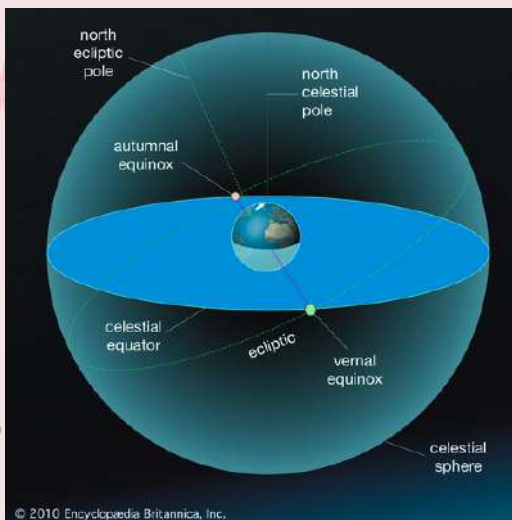
WEDNESDAY, 20 MARCH 2024 AT 08:34 IST

The word 'equinox' comes from the Latin 'æquus' meaning equal and 'nox' meaning night. The March equinox marks the sun's crossing above the Earth's equator, moving from south to north. It also known as the vernal equinox or the spring equinox, and marks the astronomical beginning of the spring season in the Northern Hemisphere. The seasons are reversed in the Southern Hemisphere where it will be autumn, also known as fall equinox or autumn equinox. The Sun will pass directly above the equator, bringing nearly equal amounts of day and night on all parts of Earth. At the equator, an equinox results in about 12 hours of daylight and 12 hours of night. Equinoxes and solstices are caused by Earth's tilt on its axis and the ceaseless motion it has while orbiting the Sun.



Sun rises due East and sets due West?

The Earth rotates or spins toward the east, which is why the Sun, Moon, planets, and stars all rise in the east and move westward across the sky. Except at the North and South Poles, you always have a due east and due west point on your horizon. That location represents the meeting of your horizon with the celestial equator, which is an imaginary line above the Earth's true equator. The sun is on the celestial equator, which crosses all of our horizons at positions directly due east and due west.



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 like distant diamonds and planets roam over the cosmic canvas. Conjunctions, those ethereal moments in the heavens when heavenly bodies appear to collide, provide a mesmerizing 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 Moon and Jupiter

On March 14th, the gaseous giant Jupiter will meet the 4-day-old Moon in the constellation Aries. The apparent distance between the two objects will be $3^{\circ}36'$ in the late night. They will be in the Western direction. Jupiter is at a magnitude of -2.1 and the Moon has a magnitude of -10.9 .



Place: New Delhi / Date: 14th March / Time: 07:44 p.m.



Place: New Delhi / Date: 15th March / Time: 08:49 p.m.

Conjunction of Moon and Pleiades

On March 15th, the seven sisters or Messier 45 (M45) will meet the 5-day-old Moon in the constellation Taurus. The apparent distance between the two objects will be $0^{\circ}35'$ in the night towards the Western direction. The Pleiades is at a magnitude of 1.3 and the Moon has a magnitude of -11.4 .

Conjunction of Venus and Saturn

On March 21st, the Earth's twin sister Venus will meet the ring planet Saturn in the constellation Aquarius. The apparent distance between the two objects will be $0^{\circ}18'$ in the late night. Venus is at a magnitude of -3.9 and the Saturn has a magnitude of 1.0 . The chances of seeing this conjunction from northern latitudes aren't high.



Place: New Delhi / Date: 21st March / Time: 05:55 a.m.

The Global Archetype of Mercury, Swift Messenger of the Gods

Mercury, the swift messenger of the gods in Roman mythology, has transcended his origins to become a pervasive archetype in various cultures worldwide. This enduring figure embodies swiftness, communication, commerce, and trickery, and his influence can be found in the mythologies and folklore of diverse civilizations. Here are some mythical tales about Mercury from 10 different cultures:

Roman Mythology: Mercury, known as Hermes in Greek mythology, is revered as the god of commerce, communication, and travelers. His winged sandals and cap symbolize his swiftness as he serves as the messenger of the gods.

Greek Mythology: Hermes, one of the twelve Olympian gods, is celebrated for his speed and eloquence. He is also the patron of thieves and merchants, credited with inventing the lyre and guiding souls to the underworld.

Egyptian Mythology: Thoth, the god of wisdom, writing, and magic, shares similarities with Mercury. Often depicted with the head of an ibis bird, Thoth mediates between gods and humans, akin to Mercury's role.

Norse Mythology: Odin, chief of the gods, bears resemblance to Mercury. Associated with wisdom, poetry, and magic, Odin's shapeshifting abilities and communication with other realms echo Mercury's attributes.

Hindu Mythology: Budha, the god of communication and intellect, resembles Mercury. Associated with Wednesday, Budha influences speech, intelligence, and commerce in Hindu beliefs.

Chinese Mythology: Zhang Guolao, an Eight Immortal, is associated with Mercury for his swift travel and water connection. Riding a donkey backward, he symbolizes unconventional journeys.

Maan Mythology: Ek Chuah, the god of trade and merchants, shares traits with Mercury. Honored by traders for protection and prosperity, Ek Chuah embodies commerce and travel.

Aztec Mythology: Tezcatlipoca, a trickster deity associated with magic, shares attributes with Mercury. Often depicted with a smoking mirror, Tezcatlipoca's enigmatic nature parallels Mercury's cunning.

Japanese Mythology: Susanoo, god of storms and trickery, bears similarities to Mercury. Known for his unpredictable nature, Susanoo embodies the mischievous traits associated with Mercury.

Native American Mythology: Various Native American tribes feature trickster figures akin to Mercury. Coyote, for example, possesses cunning and intelligence, playing significant roles in creation myths.

These tales highlight the universal appeal of the swift messenger archetype, transcending cultural boundaries and resonating with humanity's fascination with communication, commerce, and trickery. Each culture imbues this archetype with its unique symbolism, enriching the collective tapestry of global mythology.

The Mythology of Hermes: Messenger of the Gods

In ancient Greek mythology, Hermes holds a prominent place as the son of Zeus, the chief of the gods, and Maia, a nymph among the Pleiades. Born in Arcadia, near the majestic mountain of Cyllene, Hermes quickly revealed his mischievous nature and cunning wit.

Legend has it that mere moments after his birth, Hermes orchestrated a daring feat, stealing a herd of cows from his brother Apollo, the sun god. To cover his tracks, Hermes made the cows walk backward, confounding Apollo's attempts to track them. When confronted, Hermes denied any involvement in the theft, but their feud was resolved through a clever exchange. Hermes gifted Apollo the lyre, an instrument he had just invented, and in return received the herald's staff, known as the caduceus.

Hermes's ingenuity didn't stop there. He famously crafted a musical instrument from a tortoise shell, which he gifted to Apollo in homage to the nine Muses. This instrument, known as the lyre, produced the most enchanting music in the universe. Meanwhile, Hermes fashioned his own shepherd's pipe, foreshadowing the musical talents of his future son, Pan. In matters of love, Hermes was no less intriguing. His dalliances with Aphrodite, the goddess of love, resulted in the birth of Peitho, the embodiment of persuasion and seduction, along with other offspring like Tyche, Eunomia, and Hermaphroditus. He also fathered Pan with Penelope and Autolycus with Chione, the latter becoming the grandfather of the renowned hero Odysseus.

As the messenger of the gods, Hermes is often depicted wearing a traveler's hat called a petasos and winged sandals known as talaria, enabling him to traverse the realms with unmatched swiftness. His caduceus, originally a willow wand adorned with ribbons, later transformed into a symbol of peace entwined by serpents. Legend has it that Hermes used the caduceus to quell a dispute between two fighting snakes, symbolizing his ability to bring harmony and peace.

Additionally, Hermes carries a purse symbolizing his role as the god of riches, trade, and good fortune. In Roman mythology, he is revered as the god of trade, profit, merchants, and travelers, embodying the spirit of commerce and prosperity.

Through his multifaceted nature, Hermes embodies qualities of cunning, creativity, and diplomacy, making him a beloved figure in ancient mythology whose influence transcends time.



The Sun Daggers of the Ancestral Pueblo

Humans have a tendency to pick out patterns. Thus, it is not surprising that ancient civilisations could notice the peculiarity of equinoxes and solstices. Equinoxes and solstices were very significant in ancient cultures. For example, in ancient agricultural societies, equinoxes and solstices were crucial for the planting and harvesting of crops. The significance is also reflected in ancient architecture and stone circles. After all, the astronomical observations made by the ancient civilisations allowed them to design buildings that indirectly focused on the rise and set of the sun on these days.

The most famous of these ancient monuments is Stonehenge, an ancient stone circle in Wiltshire, England. The structure's stones are aligned to the sunrise and sunset on the summer and winter solstice, respectively.

Another monumental structure that marks the equinoxes and solstices can be found near the entrance to Chaco Canyon, New Mexico, US. It is an impressive butte that was sacred to the ancestral Pueblo Culture, a prehistoric Native American civilisation that inhabited the place until 1150 AD. Here, the ancient Pueblo people used to come and observe. Atop the Fajada Butte are three sandstone slabs measuring between two to three meters. These slabs cast shadows of the late morning and midday sun on the cliff face behind them during the equinox and solstice. On the cliff face, a large spiral, measuring 34 cm high and 41 cm wide, with nine and a half turns in a counterclockwise manner from its centre, is etched on stone. Additionally, beside the spiral, on the left side, a coiled snake petroglyph can be found. This site, now known as the Sun Dagger because of how the light appears on the cliff face, was discovered by Anna Sofaer in 1977. It was sacred to the people of Chaco Canyon, who made regular pilgrimages to the site.

During the equinox, a long, thin dagger-like shaft of light is seen off the centre of the spiral and a smaller shaft of light bisects the smaller snake petroglyph. On the summer solstice, a single dagger-like shaft of light bisects the spiral, while during the winter solstice, two dagger-like shafts of light brackets the spirals.

Unfortunately, nowadays, access to Fajada Butte is restricted. Due to the increase in visitors, erosion around the place increased. This led to the rock slabs shifting, which altered the pattern.



STUDENT'S CORNER

SPACE X - EXPLORING THE FUTURE

Navya Kiran
Astronomer

Have you ever dreamed of traveling to outer space? Or maybe you've imagined what it would be like to see Earth from far away? Well, SpaceX is a company that's making these dreams closer to reality. Let's take a journey into the exciting world of SpaceX and explore how they're changing the way we think about space travel.

SpaceX is a company founded by Elon Musk in 2002 with a big goal: to make space travel more accessible for everyone. They design, manufacture, and launch advanced rockets and spacecraft. One of their main missions is to reduce the cost of space travel so that one day, people like you and me could journey to other planets!

One of the most remarkable achievements of SpaceX is the development of the Falcon rockets. These rockets are designed to carry payloads, like satellites, supplies to the International Space Station (ISS), and even people into space! What makes the Falcon rockets special is that they're partially reusable. Imagine if you could reuse parts of your toy after playing with it - that's kind of what SpaceX does with its rockets. This reusability helps to make space travel more affordable and sustainable.

In 2020, SpaceX made history by successfully launching astronauts to the ISS aboard the Crew Dragon spacecraft. This marked the first time astronauts were launched into orbit from American soil since the end of the Space Shuttle program in 2011. It was a giant leap forward in bringing space travel back to the United States and opening up opportunities for more people to explore beyond our planet.

But SpaceX's ambitions don't stop there. They're also working on something called Starship, which is a next-generation spacecraft designed to carry even more people and cargo into space. Starship is like a big shiny rocket that's being built to take us not just to the ISS but eventually to the Moon, Mars, and beyond! Elon Musk, the founder of SpaceX, dreams of creating a human civilization on Mars, and Starship is a crucial step toward making that dream a reality.

SpaceX isn't just about exploring space; they're also helping to make life better here on Earth. They're launching satellites that provide internet access to remote areas, helping people connect and access information no matter where they live. This kind of technology can make a big difference in bridging the digital divide and ensuring that everyone has access to the opportunities that the internet offers.

So, why is SpaceX important? Well, they're pushing the boundaries of what's possible in space exploration. They're inspiring a new generation of scientists, engineers, and explorers to dream big and reach for the stars. Who knows, maybe one day you'll be one of the astronauts traveling to Mars aboard a SpaceX spacecraft!

In conclusion, SpaceX is a fascinating company that's making space travel more affordable, sustainable, and exciting than ever before. From launching astronauts to the ISS to building rockets that could one day take us to Mars, SpaceX is leading the way in shaping the future of space exploration. So, keep looking up at the stars, because with companies like SpaceX leading the charge, the possibilities for what we can achieve in space are endless!

SPACE DEBRIS AND ITS EFFECTS

Aditya Shukla
Club Student

Space junk, or space debris, is any piece of machinery or debris left by human in space.

It can refer to big objects such as dead satellites that have failed or left in orbit at the end of their mission. It can also refer to small things, like bits of debris or paint flecks that have fallen off a rocket. Some human-made junk has been left on the Moon, too. Which is from missions like Apollo 11 and Apollo 13.

While about 2,000 active satellites orbiting around Earth at the moment, there are also 3,000 dead ones littering space. What's more, there are around 34,000 pieces of space junk big than 10 centimetres in the size and millions of smaller pieces that could nonetheless prove disastrous if they hit something else.

All space junk is the result of launching objects from Earth, and it remains in orbit until it re-enters the atmosphere. Some objects in lower orbits of a few hundred kilometres can return quickly. They often re-enter the atmosphere after a few years maximum of the part burns up - so they don't reach the ground. But debris or satellites left at higher altitudes of 36,000 kilometres - where communications and weather satellites placed in geostationary orbits - can continue to circle Earth for hundreds or even thousands of years.

Fortunately, at the moment, space junk doesn't pose risk to our exploration efforts. Instead it poses danger to other satellites in orbit.

These satellites try to move out the way of all this incoming space junk to make sure they don't get hit and potentially damaged or destroyed.

In total, across all satellites, hundreds of collision avoidance expedience are performed yearly, including by the International Space Station (ISS), where astronauts live.

It could well be. Several companies are planning vast new groups of satellites, called mega constellations, that will beam the internet down to Earth. These companies, which include SpaceX and Amazon, plan to launch thousands of satellites to achieve global satellite internet coverage. If successful, there could be an additional 50,000 satellites in orbit. It means a lot more collision avoidance manoeuvres would be needed.

The United Nations ask that all companies remove their satellites from orbit within 25 years after the end of their mission. It is tricky to enforce because satellites can (and often do) fail. To tackle this problem, several companies around the world have come up with novel solutions.

How to Terraform any Planet?

Sourajit Mandal, Astronomy camp

Terraforming is the hypothetical process of deliberately modifying the atmosphere, temperature, surface topography or ecology of a planet to be similar to the environment of Earth to make it habitable for humans to live on. This can be a very important process for the existence of humans in the future. But... How do we do that? How do we even choose a suitable planet for terraforming?

First we need to choose a suitable planet. Our planet cannot be gaseous. It has to be solid. It's size should not be very much different from Earth. We would not find many issues in smaller bodies but larger planets can cause a lot of problems. A larger planet would mean a higher gravity. Higher gravity would make it difficult for life to exist without much alteration. A planet near the size of Earth would be perfect. Next, we need to see its position in respect to its star. It should be present in the goldilocks zone of the star. This means its temperature would neither be very hot nor too cold. The planet also should not be tidally locked. That can cause one side of the planet to be very cold and the other to be very hot. These factors are necessary for deciding the planet as they cannot be altered by us humans.

Now that we have chosen our planet, we need to explore it further. We need to study its atmosphere, its composition, and its environment. We also need to investigate its geological features and its surface conditions. Some things necessary for life are water and an atmosphere. We need to get these things to our chosen planet now.

We may skip this step if the planet already has water. We may melt the poles of the planet if the poles have liquid water. How? We can nuke the poles of the planet in a controlled manner. This will melt the poles. Melting the pole will provide liquid water to the planet. If the planet does not have liquid water or water in very less quantity, then we would need to redirect comets towards the planet at different locations. The comets will melt and slowly we will have a lot of water in the form of an ocean.

Getting water is an important part of getting an atmosphere. As soon as we have water on the planet the water will start to evaporate. The water vapour will be an important part in the atmosphere. If the planet is very cold then we can increase the greenhouse gases in the composition of the atmosphere. We humans are certainly very good at that. If the planet is very hot due to extra greenhouse gases, we would not need to worry much about that... a lot of it would get dissolved in the ocean we made.

Now that we have an ocean on the planet and a stable atmosphere, we are ready to open up our spacesuits... wait...no... don't open the spacesuit... We still do not have oxygen there...ahhh...!!

Ahem.. to get oxygen on our planet we would need help from some other species. This species, though way more simple than us humans, have an amazing capability we humans can never have... the capability of photosynthesis...

Welcome the wonder species... The Cyanobacteria!! Cyano... what??

Let us come back to our home planet for once. 3.5 billion years ago Earth was way different than what it is today. Back then, the Earth's atmosphere consisted mainly of nitrogen, carbon dioxide and methane. This is something like what we now have in our chosen planet. In the huge watery oceans of Earth, unicellular life was thriving. This unicellular life consisted of anaerobic bacteria, which did not need oxygen to survive. They scavenged for any other molecules they found.

Somewhere between 2.5 and 3.5 billion years ago, one of these species, probably floating in the ocean, developed an ability called photosynthesis. This species could utilise the sunlight and produce free oxygen molecules by using the water and carbon dioxide. Soon this bacteria saw a major population growth. There was abundant water, carbon dioxide and sunlight for it to utilise. This slowly started to change the composition of the Earth's atmosphere. The change in the atmosphere caused the death of many other species. This was the world's first mass extinction event. This also paved the way for the existence of multicellular organisms. The species is also the common ancestor of all plants. The species... is cyanobacteria.

We may use this bacteria on our planet too. This would take a lot of time but would surely work out. Now we would have got oxygen on our planet.

Time to open up the spacesuit... 3...2...1... zero.... STOP! There are chances the planet does not have a magnetic field. This can cause solar winds and storms to destroy our hard work. If the planet does not have a magnetic field then we can install strong electromagnets on the poles of the planet to replicate the same. We also do not have an ozone layer on the planet. We need an ozone layer on the planet to stop the harmful UV rays from the star. We can artificially synthesise the ozone in the planet.

Now that we have an ozone layer and a magnetic field, is it safe to open up the spacesuit? We should first plant many plants and trees on that planet. Many types of simple animals should also be left open on the planet in a controlled manner. We should first try to solve all the problems that are faced by the organisms. Slowly we should introduce more and more complex creatures in the environment. Finally we would be free to open up our spacesuits.

Terraforming a planet is no less than any science fiction for today. Even if we have the technology for planets like Mars, Venus or our own moon, we do not have the budget. Terraforming is supposed to be a very important process that humans will have to do in order to survive the forces of destruction by war and nature. Terraforming is important for humans to get a second chance for keeping Earth habitable. Terraforming is important for making humans an interstellar species. Terraforming is important for making life permanent till the end of the universe. And yet... we have not started to terraform a single planet. Maybe one day... we will terraform some planet and live till the very end of the universe.

Cosmic Microwave Background: A Window into the Early Universe

Nikhilesh B
| Astronomer

The Cosmic Microwave Background (CMB) is a pervasive and faint glow that fills the entire universe, providing crucial insights into the early moments of our cosmos. Discovered accidentally in 1965 by Arno Penzias and Robert Wilson, the CMB has since become a cornerstone in our understanding of the universe's evolution. This essay explores the significance of the CMB, its discovery, and the invaluable information it offers about the early universe.

In the early 1960s, Penzias and Wilson were working on a radio antenna at the Bell Telephone Laboratories in New Jersey. Despite their efforts to eliminate all sources of interference, they discovered a persistent noise that couldn't be explained. Little did they know that this faint signal was the CMB, a remnant of the universe's infancy. Simultaneously, astronomers Arno Penzias and Robert Wilson were working at Bell Laboratories, trying to eliminate any source of radio interference for their experiments. They discovered an unexpected noise that persisted, no matter what they did. Eventually, they realized that they were detecting the afterglow of the Big Bang, the CMB, inadvertently confirming the Big-Bang theory.

The CMB is a treasure trove of information about the early universe. It represents the afterglow of the Big Bang, providing a snapshot of the universe when it was only 380,000 years old. This relic radiation allows astronomers to study the conditions that prevailed during the universe's infancy and has become a powerful tool for cosmologists.

One of the key features of the CMB is its uniformity. It is remarkably isotropic, meaning that its temperature is nearly the same in all directions. However, slight temperature variations, known as anisotropies, exist, and they hold the key to understanding the seeds of structure formation in the universe. These minute fluctuations were crucial in the formation of galaxies, galaxy clusters, and large-scale cosmic structures.

Furthermore, the CMB provides critical evidence for the concept of cosmic inflation. Inflationary theory posits that the universe underwent an exponential expansion in the first fraction of a second after the Big Bang. This rapid expansion would have smoothed out any irregularities, resulting in the uniformity observed in the CMB. The precise measurements of the CMB anisotropies by instruments like the Planck satellite have strongly supported the inflationary paradigm.

The CMB also allows scientists to estimate the age of the universe. By analyzing the temperature fluctuations in the CMB, researchers can determine the density and composition of the universe. These findings, combined with other cosmological observations, have led to the current understanding that the universe is approximately 13.8 billion years old.

The discovery of the Cosmic Microwave Background revolutionized our understanding of the universe's origins and evolution. Its accidental detection by Penzias and Wilson marked a pivotal moment in cosmology, providing empirical evidence for the Big Bang theory. The CMB's isotropy and subtle anisotropies have become powerful tools for unraveling the mysteries of the early universe, supporting the concept of cosmic inflation and helping estimate the age of our cosmos. As technology advances, future missions and experiments promise even more detailed insights into the CMB, opening new chapters in our quest to comprehend the cosmos.

FUTURE PREDICTION MODEL USING SUPER ARTIFICIAL INTELLIGENCE

Manas Agarwal
Summer Camp

I propose a hypothetical Artificial Intelligence model of predicting future in real time based on facts and figures of current scenario of a particular place.

Let's take a scenario like you are in your room sitting idly and imagining what this room will look like after 10 years or so. Or you can also imagine that if this room will exist or not. For now it seems impossible to predict this thing but in the idea that I am proposing we can predict this thing with almost great accuracy.

Now I am going to tell you how we can accomplish this task. We will have an Artificial Intelligence computer system in which will take dataset in the form of features and rows. Let's dive deeper in the technicalities of this.

This dataset will include the features or we can say columns in which there are factors of the room's current scenario such as what is the location of room in latitudes and longitudes, the rate at which the earth is moving, the rate at which the tectonic plates are shifting, the financial status of your family, the financial future plans of your family, your and your family's likes and dislikes (As these will affect your decision making regarding your house), who all visits your home and how frequently and what is their mentalities or like and dislikes, your house surroundings, your seismic zone and thousands of more features. These all features will be there in the dataset and this dataset will not be static but dynamic.

Now comes the next step that is applying deep learning algorithms on this dataset. This data set will be fed to the deep learning algorithms in which weights and biases will be updated in nano secs and this will produce many possibilities of that room.

Now here we should consider that the dataset is also dynamic so the dataset is changing at every nano sec and accordingly the weights and biases and according to that the possibilities. It is very likely that every figure will reach to infinity in this scenario but our Artificial Intelligence model will get the most probable or the most accurate scenario of that room.

Now here comes the Matryoshka brain concept. As we have seen above that the amount of work required to be done is very much demanding and it is very much not possible for even today's quantum computers to do this task. So here we will require a mega computer that can handle this type of work.

Matryoshka brain can be called as an extension of Dyson's Sphere. Although both are very much different in working but the concept is almost same. Matryoshka brain is essentially a series of nested Dyson's spheres built around a star, resembling Russian matryoshka dolls. Each inner sphere utilizes the heat radiated by the outer one, resulting in increased computational power and efficiency. The innermost sphere would directly harness the star's energy for the ultimate supercomputer within, potentially exceeding the computational power of all computers on Earth combined.

This Artificial Intelligence model will give the final image of that predicted room scenario. And you can specify the number of possibilities in the program and this model will give you that number of possibilities. Or you can also watch the image change in real time (Just like a time lapse video) as the weights and biases get updated in real-time.

AL-Robot

Kurmapu Anvesh sai
|Astronomer

Introduction:

India is going to build its space station, my innovation is about a robot that helps astronauts. That is AL-robot where AL means (Antariksha Likitham) , a specialized robot that will be a good friend for the astronauts in the space station.

Mechanism:

This robot contains four cameras in front and one screen to show the information. It also contains two electric fans on either side of the robot for movement. For charging it needs a charging base in the station connected to solar cells for instant recharge.

Uses:

I just want to make space research more advanced. My robot will help Astronauts to monitor their fitness, records, reports of their experiments, and many other things. More like two cameras in the robot will scan the surroundings remaining two for Astrophotography. It also helps the astronauts to know any damage in the space station results in less risk. It helps in moving things in antigravity. It can also find damages to space stations outside caused by space debris and inform astronauts to repair.

Benefits:

My robot helps mankind in many ways. So, it will be beneficial in the fields of astronaut fitness progress, astrophotography, and more. It can scan surroundings and provides a 3d route map for new astronauts into the space stations.

Astrobees :

This is a robot developed by NASA and I am inspired by this to develop my robot but the difference is that my robot can monitor the fitness of the Astronauts. Also, it can communicate with astronauts with the help of radiophones. An astrobee contains three robots. So this project NASA is just my inspiration.

Conclusion:

According to me, having new technologies can push us to create a new world.



VISUAL ARTS FROM SPACE ASSOCIATED ASTRONOMERS



Moon captured by Dhruv Punjabi Iastronomer



Moon captured by Bhavans Rajaji Vidyasharam Students



Snow moon captured by iAstronomer Mohammed Zaiduddin using KSON Telescope on 24 February 2024

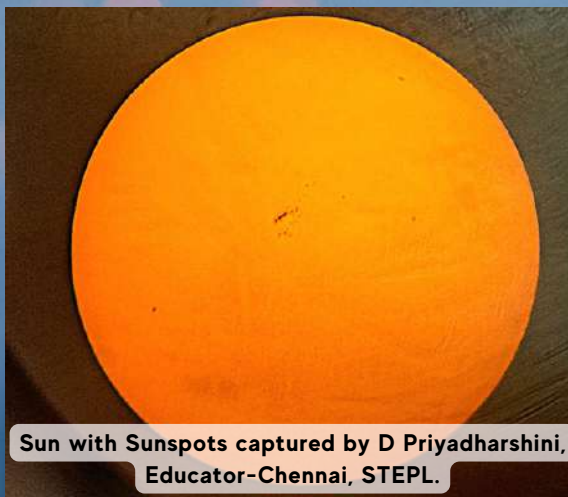


October month Lunar Eclipse captured by Abhineet Bansal Iastronomer

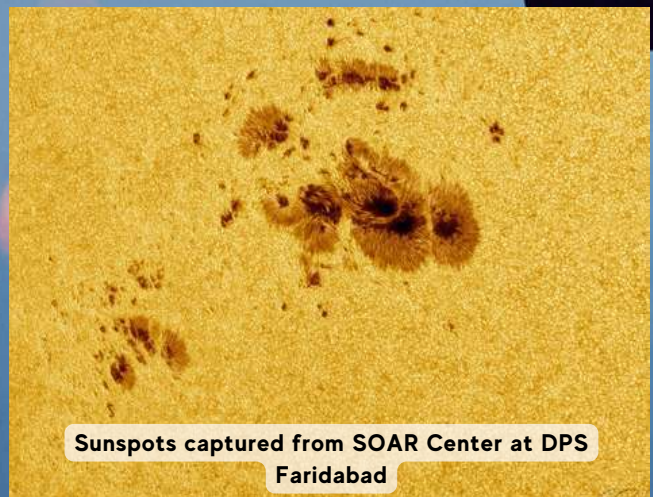
ASTROPHOTOGRAPHS BY SPACE



Polar Star trails captured by Mr. Ranjith Kumar E, Team Lead, Education - Chennai, STEPL.



Sun with Sunspots captured by D Priyadharshini, Educator-Chennai, STEPL.



Sunspots captured from SOAR Center at DPS Faridabad



Sun with Flares and Jupiter with moon IO captured by Shirilmon S,GAPL.

HISTORICAL EVENTS HAPPENED IN MARCH

LAUNCHING KEPLER

In January 1992, scientists announced the discovery of rocky planets orbiting a pulsar. The first known exoplanet. Within the year, William J Borucki of NASA's Ames Research Center submitted his first proposal to look for more exoplanets. Since 1983, Borucki has been researching the potential of photometers – high-precision light detectors – to detect Earth-sized exoplanets through the distinctive dip in starlight they cause while passing in front of their host star.

When Kepler launched on 7th March 2009, it was NASA's 10th Discovery-Class mission. Named after Johannes Kepler, the 17th-century German astronomer who discovered the laws of planetary motion, Kepler was a specially designed telescope with an image sensor array and a spacecraft built around it. It was to determine the abundance of exoplanets, the range of sizes, the shape of the exoplanet's orbit, estimate the number of planets in a multiple-star system, and determine the properties of stars that have planetary systems. Its main aim was to hunt for Earth-size exoplanets in the star's habitable zone, where liquid water might exist on the planet's surface. Kepler detected the planets by observing the planet when it transits its host star. During these transits, the star's brightness dips a little.

In 2013, mechanical issues forced mission managers to modify the mission where the telescope used the pressure of sunlight to stabilize itself.

Kepler made several key discoveries throughout its years of service.

- Planets outnumber stars.
- Small planets are common.
- Planets are diverse.
- Solar Systems are diverse.

On 15th November 2018, Kepler was decommissioned due to running out of fuel. It ran out of fuel. Currently, it is still in its Earth-trailing orbit and will continue to do so.

Kepler's discoveries have launched us into the golden age of exoplanets and reinvigorated the study of stars. For years to come, the data Kepler has collected will give more information on the distribution of exoplanets while providing new insights on stars. discoveries.

Kepler operated for nine years, observing over 500,000 stars. To date, it has discovered more than 2,600 exoplanets.



DISCOVERY OF URANUS- THE ICE GIANT

When William Herschel looked up to the night sky on 13 March 1781, he was looking for double stars, observing nebulae and searching for signs of life on other worlds. He did not anticipate expanding our perception of the Solar system. Thus, when Herschel first observed a faint object within Gemini, he believed it to be a comet. It took a couple of months of observation to declare that Herschel's comet was a planet.

William Herschel, and his sister Caroline, had discovered Uranus, the first planet to be discovered since antiquity.

As it seems to be a common occurrence, Herschel was not the first person to spot Uranus. The distant planet had been observed several times before, but its true nature went unrecognised. Of its previous observers, Britain's first Astronomer Royal, John Flamsteed, observed Uranus six times in 1690, while French astronomer Pierre Charles Lemonnier spotted it a dozen times between 1750 and 1769.

German astronomer Johan Elert named Uranus, a departure from naming conventions. Herschel, who had the right to name the planet, named it George's Star, after the then-current king of England. Since astronomers in continental Europe were not keen on having a heavenly body celebrate King George III, they quickly adopted the new name.

Uranus is a gas giant comprised of hydrogen, helium, and methane. The third largest planet in the solar system, Uranus orbits the sun once every 84 Earth years. It is the only planet to spin perpendicular to its solar orbital plane, almost as if it is lying on its side. This peculiarity is thought to be due to a collision with another planet.

Currently, Uranus has 28 known moons and a faint ring system.



William Herschel

First Photograph of the Moon

First photograph of the Moon March 23, 1840 First Photograph of another body (a daguerreotype-process image exposed for 20 minutes.) Magazine and Digital Space

Previously, to capture the details of Earth's closest companion, one was required to have artistic skill to translate the features seen on the Moon onto paper. However, on 23rd March 1840, John William Draper took the first photograph of the Moon. The Moon has a prominent role in many cultures, and it is no surprise that as soon as the first photograph was taken, photographers turned their attention to the sky.

To capture the Moon, Draper took a 20-minute long exposure, utilizing the daguerreotype process and a 5 reflecting telescope from his rooftop observatory at New York University. The daguerreotype technique was the first publicly available photography technique invented by Louis Daguerre, where the image formed on a silver-plated copper plate. The resultant photo was accurate, detailed and very sharp. Daguerreotype techniques were an extremely expensive process.

Draper's improvement of the daguerreotype process allowed the visualisation of craters, mountains and valleys on the Moon's surface. Previously, it was hard to capture these features.

His son, Henry Draper, inherited his passion for astrophotography and is credited with taking some of the best Moon photos of the 19th century.



The first photo of the moon

DISCOVERING TITAN

In the mid-17th century, Christiaan Huygens proposed that Saturn was surrounded by a thin, flat ring, inclined to the ecliptic and inclined to the ecliptic. With his brother's help, Huygens built several telescopes to prove his hypothesis. However, with the first telescope, Huygens discovered Titan on 25th March 1655. When he published his findings, Huygens simply called the moon 'Saturni Luna'. This simple name worked for twenty years while it was a lone moon. However, after the discovery of six other Saturnian moons, John Herschel suggested naming Saturn's first moon 'Titan'.

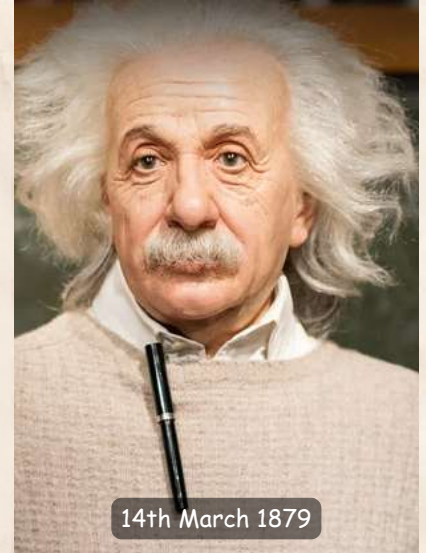
Titan is Saturn's largest moon and is larger than Mercury, the smallest planet in the solar system. For some time, scientists mistakenly believed it was the largest moon in the solar system. This mistake was due to Titan's thick and opaque atmosphere - the only satellite in the solar system known to have an atmosphere. Titan also has large seas of pure liquid methane close to its north pole, whose seabed is covered with a sludge of organic-rich material.

Thus far, three spacecraft and one lander have studied Titan. Results from data show that Titan consists of several layers with a hot centre. Additionally, Titan's thick atmosphere's rotation speed is higher than its surface's speed. Titan is also known to have wind and rain despite its extremely cold surface temperatures. Titan's similarities to Earth, have led many scientists to speculate that microbial alien life could exist on the moon.

Happy Birthday

ALBERT EINSTEIN

One of the greatest and most influential scientists in the 20th century is arguably Albert Einstein (14th March 1879 - 18th March 1955). Born in Ulm, Württemberg, Germany, to a secular Jewish family, he grew up and became a theoretical physicist who was a central figure in revolutionizing the scientific understanding of nature. In 1905, Einstein published four groundbreaking papers where he outlined a theory of the photoelectric effect, gave an explanation for Brownian motion, introduced his special theory of relativity and demonstrated if his theory of relativity is correct, mass and energy are related to each other and the space and time are connected. Einstein called this structure space-time. Ten years later, he proposed the general theory of relativity, which extended his system of mechanics to include gravitation. He followed this up the next year by laying out the implications of general relativity on modelling the structure and evolution of the universe. In 1921, Einstein won the Nobel Prize for Physics for his explanation of the Photoelectric effect.



KALPANA CHAWLA

When the space shuttle Columbia launched on 19 November 1997 with Kalpana Chawla (17th March 1962 - 1 February 2003) aboard, she became the first female astronaut of Indian origin to fly to space. Born in Karnal, Haryana, India, Chawla was an aerospace engineer who had a certificated flight instructor's license for aero-plane and glider ratings, as well as commercial pilot's licenses for single-and multi-engine land and seaplanes, and gliders, and instrument ratings for aero-planes. She was a part of NASA's Ames Research Center, where she conducted computational fluid research on vertical and/or short take-off and landing concepts. In 1995, Chawla joined NASA's Astronaut Corps and was selected for her first flight in 1997.

GOVIND SWARUP

Govind Swarup (23rd March 1929 - September 7, 2020) was a pioneer in radio astronomy in India. Born in Thakurdwara, Uttar Pradesh, he was the driving force in building ingenious and powerful observational facilities. Throughout his career, he contributed to the fields of solar radio emission, radio galaxies, quasars pulsars, interplanetary scintillation, dark matter and cosmology. His ability to come up with out-of-the-box ideas to construct unique facilities such as the Ooty Radio Telescope at Ootacamund and the giant Meterwave Radio Telescope (GMRT) near Pune allowed for front-line research in radio astronomy to take place. He was the founding director of the National Centre for Radio Astrophysics at the Tata Institute of Fundamental Research (TIFR), where, under his leadership, a strong group on radio astrophysics research was built. A bulk of India's radio astronomy community is made up of his students and his students' students.



Celebrating Our Esteemed CMD's 50th Birthday

February marked the celebration of a very special occasion – the 50th birthday of our Founder and Chief Managing Director, Dr. Sachin Bahmba on February 3rd! It was a day filled with joy, appreciation, and reflection on the remarkable journey we have embarked on under his visionary leadership. As all the Spacians gathered to mark this significant milestone with the cake-cutting ceremony, it provided us with a unique opportunity to express our gratitude for his resilient dedication, undying spirit, and constant guidance that have driven SPACE toward success for the past 23 years and continue to do so.



Love in Orbit: Valentine's Day at SPACE

On February 14, love, appreciation, and cheerfulness filled the air at SPACE as we celebrated Valentine's Day for the first time. Is the day just about hearts, flowers, and romantic dinners? Well, not at SPACE! For us, it's a day to spread love in all its purest forms – from friendships to admiration, from high-fives to heartfelt thank-yous. The day was themed "Spread Love and Appreciation this Valentine's Day at SPACE!"

Our Spaceship was transformed into a beacon of positivity and gratitude as Spacians from all corners and cubicles took a moment to shower love on our organization and its amazing people. We set up the red Appreciation Box, inviting everyone to jot down their thoughts and feelings for SPACE – whether it was a shout-out to a colleague, a high-five to a team, or a big virtual hug to the organization as a whole. And the best part? It was all kept anonymous, allowing for genuine, heartfelt, and meaningful expressions of gratitude to flow like cosmic stardust.

So, here's to you, Spacians – each and every one of you who makes SPACE the incredible place it is. Whether you're crunching numbers in accounting, brainstorming ideas in marketing, or our directors/CEOs/heads steering the ship from the captain's chair, along with our beloved employees and effortlessly helpful staff, your contributions don't go unnoticed. Together, we're reaching for the stars, galaxies, and beyond!

Fresh Flair, Fresh Air: Incorporating the Latest SPACE Initiative in February!

To enhance our workspace, the HR Team under the guidance of Director – Capacity building, Mrs. Shalini Bahmba; initiated a drive to make SPACE more eco-friendly through the inclusion of more pots and plants throughout the organization, which has significantly greened and freshened our office environment.

This proactive measure reflects our dedication to creating a healthier, more sustainable workplace that resonates with our values and vision for SPACE's future.

Newly Launched Space Tee's:

As the temperature rises and summer approaches, it's time to gear up and show off our love and pride for SPACE! We're excited to wear our new collection of company-branded t-shirts, with better fabric, design, and color, Spacians will now collectively represent the commitment to excellence, pride, innovation, and collaboration at SAPCE.

Visit to Planetarium:

On the occasion of National Science Day, Chennai team visited the BM Birla Planetarium and was mesmerized by the captivating Planetary and scientific shows with dazzling display of stars, planets, and galaxies left in awe of the vast mysteries of the universe.



Intern's Insight: Akash Tuteja (Marketing Intern)

My internship at Space Technology & Education Pvt. Ltd. has been a highly enriching experience, characterized by a supportive and team-oriented culture. At Space India, I'm part of a passionate marketing team dedicated to astronomy, space systems, and STEM education, where our team's commitment shines through. Guided by my manager, Mr. Shivam Gupta, an inspiring leader, I've grown professionally, benefiting from his motivational approach and strategic task assignments.

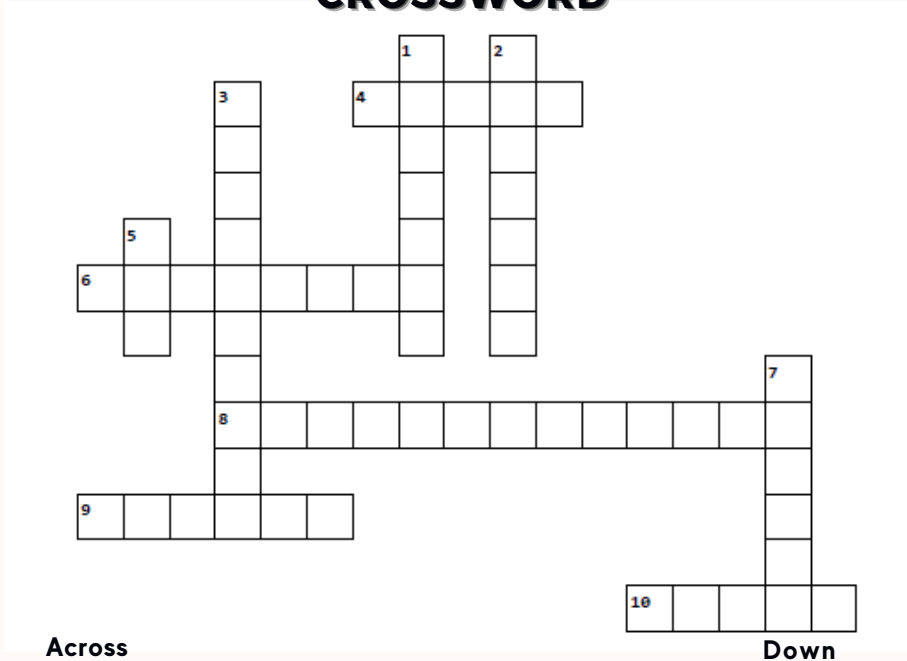


His support, along with valuable input from Stuti in Public Relations, has been crucial in overcoming challenges and enhancing my skills. Looking forward, I'm excited about the learning opportunities and further growth within this vibrant team.

Until next time, reader, keep spreading love, sharing smiles, and shining bright like the winner you are!

TRAIN YOUR BRAIN

CROSSWORD



Across

Down

- 4. Which country becomes the fifth to land a spacecraft on the moon?
- 6. What type of atmosphere does Pluto have, according to the New Horizons mission?
- 8. By whom was Pluto discovered?
- 9. Name of ISRO's first scientific satellite for X-ray polarization measurements of Black hole?
- 10. Which country achieved a historic lunar landing with its Smart Lander for Investigating the Moon?

- 1. Which spacecraft was the first to observe the phenomenon of "magic islands" on Titan, Saturn's largest moon?
- 2. Which astronomer faced house arrest for advocating the heliocentric model of the solar system?
- 3. Who is credited with the title of the father of modern astronomy?
- 5. What was the name of the Soviet/Russian space station that operated from 1986 to 2001?
- 7. What is the name of Pluto's largest moon?

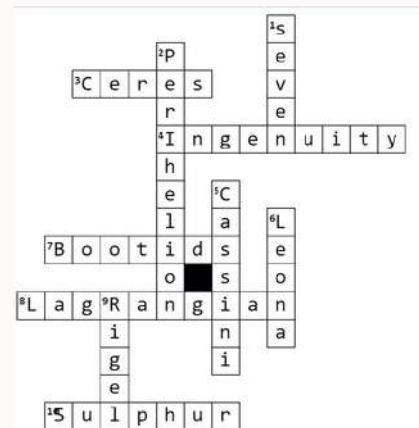
ASTRONOMY WORD PUZZLE

Find the names of the Jupiter's Moon from the mixed letters and mark them.

JUPITER MOONS

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

- AITNE
- KALE
- ARCHE
- AOEDE
- HERMIPPE
- SPONDE
- HEGEMONE
- EUPORIE
- KALLICHORE
- EUANTHE
- THELXINOE
- MNEME
- PASITHEE
- EURYDOME
- ORTHOISIE



Answers for last month puzzles.

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

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

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