

Galactica

Astronomy and Space Science Magazine

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Moon Phases And Planet Visibility

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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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ABOUT SPACE



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

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

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

CMD's Message



**Dr. Sachin Bahmba,
CMD, SPACE**

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

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

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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SPACE INSIGHTS

CAPTIVATING MOMENTS

A GLIMPSE INTO SPACIAN'S SPECTRA EVENT



On March 2nd, 2024, Spacian's Spectra, an event was organized to ignite the passion for science and exploration at Spaceship, Dwarka sector - 11, with an exhilarating celebration of National Science Day. The event was organized by the Education, Operation, and Product Development team, featured a multitude of engaging activities that captivated participants of all ages.

Spread across five distinct locations—the Cricket ground, studio, classroom, educator bay corridor, and terrace—the event offered a diverse array of experiences aimed at fostering curiosity and understanding of the wonders of our universe.

In an interactive session that showcased the mesmerizing beauty and scientific significance of comets, educator delved into their composition and journey through space. Using everyday materials like dust, water, soya sauce, ammonia, and dry ice, participants witnessed the creation of a comet, gaining insights into its formation and behavior within our solar system. Through other interactive demonstrations, they gained insights into Pascal's law via hydrobots, the refraction of light through prisms, and in the Weigh Yourself on Different Planets activity, participants understood the gravitational force that governs weight differences across the solar system.

The festivities continued with an assortment of games designed to both entertain and educate. From "Ring the Planet" to "Save the Earth" and "Meteor Attack," participants eagerly embraced the challenges, with winners earning the exhilarating opportunity to launch hydro-rockets—a tangible manifestation of the principles of rocket science.

Speaking of rocket science, the event offered firsthand experiences of rocketry through three distinct launch methods: pop rocketry with vinegar and baking soda, air rocketry utilizing air pressure, and hydro rocketry propelled by water and air pressure. These engaging demonstrations underscored the accessibility and excitement of space exploration.



Colleagues from different departments were treated to an immersive Spacewalk experience through virtual reality, offering a glimpse into the awe-inspiring vistas of outer space. Meanwhile, observations of the Sun through a Dobsonian telescope equipped with solar filters and solar view goggles provided participants with a unique perspective on our nearest star, complete with mesmerizing views of sunspots. The management team, including Dr. Sachin Bahmba, Ms. Shalini Bahmba, Mr. Pankaj Jain, and Mr. Mitul Jain, graced each setup, experiencing the wonders of science firsthand.

From the excitement of hands-on experiments to the enlightenment of interactive demonstrations, Spacian's Spectra on National Science Day offered a thrilling voyage through the realms of science and space exploration. The event concluded with an energetic alien dance, bringing together participants in a celebration of discovery and wonder, culminating in a memorable group photograph.



As we reflect on this unforgettable event, let us carry forward the spirit of inquiry and adventure, ever eager to unlock the mysteries of the cosmos and broaden our horizons of understanding. With each discovery, we inch closer to unraveling the secrets of the universe and embracing the boundless possibilities that lie beyond.

CELEBRATING INNOVATION: ST. MARTIN DIOCESAN SCHOOL - AARAMBH 2024

The school corridors buzzed with excitement as parents, teachers, and students gathered for the much-anticipated Parent-Teacher Meeting coupled with a captivating Science Exhibition Showcase. It was a celebration of curiosity, creativity, and innovation as students proudly displayed their projects, offering glimpses into the realms of science that they had explored and conquered. It all started on time, at 8:30 a.m., and marked the beginning of a day full of scientific research and exploration.

In this showcase, a multitude of fun-filled Astronomy and Robotics model made by students were displayed which were thoroughly enjoyed by people of all age groups—from students to parents.

1. Zodiac Model:

Explore the fascinating world of the Zodiac Sign Model, created by the Class IX students. Parents were given an interactive experience that explored the mysterious realm of zodiac signs and the stars. The display functioned as a heavenly voyage, capturing both the mysterious appeal of the universe and the creativity of the students.

2. GSLV MK III Model:

Get ready for a heavenly journey as you watch the 9th grade students unveil the Chandrayaan-3 Model, a scientific success. This little rocket, which took inspiration from the GSLV MK III, represented India's hopes for lunar exploration.

3. Obstacles Avoiding Truck Model:

Students attempted to accomplish vehicle automation in this project. Vehicle automation aims to lessen pollution and traffic jams while increasing road safety, efficiency, and convenience.

4. Smart Parking Model:

The emergence of the Smart Parking Model as a model of efficiency and creativity was a tribute to the automation era. In line with the concept of smart cities, the project used sensors and microcontrollers to optimize parking systems.

5. VR Session:

In a world where technology continues to reshape the landscape of education, the realms of space and beyond are no longer distant mysteries confined to textbooks. On the contrary, they are now accessible through innovative means such as Virtual Reality (VR), allowing individuals to embark on immersive journeys right from the comfort of their homes or classrooms. Recently, at school's Parents-Teacher Meeting (PTM), they embarked on an extraordinary voyage into the cosmos through the lens of Virtual Reality.



LIVE WEBINAR ON MOON-JUPITER CONJUNCTION



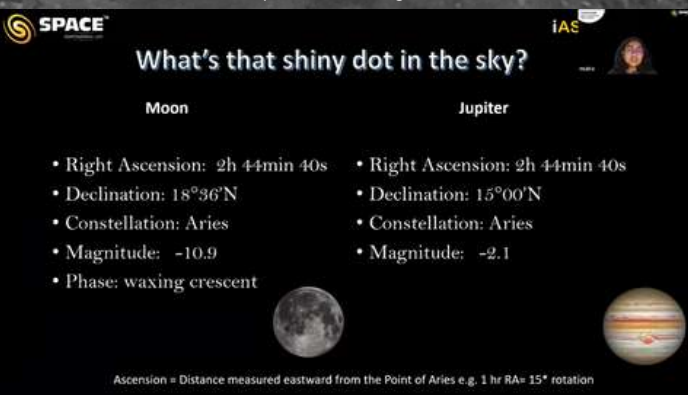
The iAstronomer Club recently organized a captivating live webinar centered on the celestial event of the Moon and Jupiter coming into close proximity on March 14, 2024, within the Aries constellation. This rare occurrence, coupled with the Moon in its crescent phase and the visibility of Jupiter's four Galilean moons, provided a mesmerizing celestial spectacle for enthusiasts and participants alike.

Hosted by iAstronomer's very own Maira Kapoor and Riaan Gupta, the webinar was a delightful blend of informative content, interactive sessions, and celestial observations. The event commenced with an insightful discussion on the conjunction of the Moon and Jupiter, highlighting the astronomical significance of such celestial alignments.

One of the highlights of the webinar was the Stellarium view, where participants were treated to a virtual tour of the Moon and Jupiter, providing a detailed perspective on their positions and movements during the conjunction.



Riaan Gupta introducing the event



Maira Kapoor explaining about Moon and Jupiter



Maira Kapoor showing view of the Moon and Jupiter

This immersive experience allowed attendees to grasp the astronomical dynamics at play during this celestial event. The session also included a lively quiz segment, engaging participants with questions related to astronomy, the Moon, and Jupiter. This interactive element not only tested their knowledge but also fostered a sense of camaraderie among fellow astronomy enthusiasts.

As the webinar drew to a close, participants were treated to a breathtaking live view of the Moon through telescopes, capturing its crescent phase in stunning detail. The event concluded with a sense of awe and appreciation for the wonders of the cosmos.

The success of the webinar was evident in its large turnout, with numerous participants joining in to witness and learn about the Moon-Jupiter conjunction. The blend of educational content, interactive sessions, and live celestial observations ensured that everyone had a fulfilling and enjoyable experience.

The iAstronomer Club's initiative to host such engaging events not only promotes a deeper understanding of astronomy but also fosters a sense of community among astronomy enthusiasts, creating memorable experiences under the vast canvas of the night sky.

ASTRO-TOURISM: SRI VENKATESHWAR INTERNATIONAL SCHOOL

Embarking on diverse journeys of exploration and discovery, the students of Sri Venkateshwar School have ventured into three distinct realms, each offering its own tapestry of experiences and learnings. From the untamed wilderness of Jim Corbett National Park to the historical wonders of Jaipur, and the celestial marvels of Sariska's Astroport, these expeditions have not only enriched their minds but also fostered bonds of camaraderie and personal growth.

In the captivating wilderness of Jim Corbett National Park, students immersed themselves in a whirlwind of adventure and exploration. Trekking through rugged terrain, conquering thrilling obstacles, and embarking on unforgettable jungle safaris, they encountered the majestic wildlife that calls the park home. Amidst the splendor of nature, they engaged in team-building exercises, honing their communication skills and forging lasting friendships. The highlight of their odyssey was the exhilarating hydro rocketry activity, igniting their passion for scientific exploration and innovation. As they returned home, their hearts brimmed with cherished memories and a sense of accomplishment from their transformative journey into the heart of nature's wonderland.



In contrast, the students of Sri Venkateshwar International School delved into the historical and architectural wonders of Jaipur. Guided tours of iconic landmarks such as the City Palace, Amber Fort, and Hawa Mahal immersed them in the regal heritage and architectural brilliance of Rajputana. Beyond historical exploration, they savored traditional Rajasthani cuisine, enjoyed cultural performances, and engaged in hands-on learning through a thrilling rocketry workshop. A captivating stargazing session under the night sky sparked wonder and curiosity about the universe, leaving them with a deeper appreciation for culture, history, and science.





Meanwhile, at Sariska's Astroport, students embarked on a celestial odyssey, immersing themselves in the mesmerizing night sky and cultural ambiance. From team-building exercises to spellbinding astronomy sessions and captivating Rajasthani dance performances, the expedition was a fusion of education and entertainment. Culminating in a spirited rocketry session and award ceremony, it left an enduring impression on each student's heart and psyche, showcasing the school's dedication to providing enriching experiences beyond conventional boundaries.

In essence, these expeditions epitomize Sri Venkateshwar School's commitment to holistic education, nurturing not only academic growth but also personal development, cultural appreciation, and lifelong memories. Whether in the wilderness, amidst historical splendor, or under the celestial canopy, students have embarked on transformative journeys that have shaped their perspectives and enriched their lives.



ASTRO CARNIVAL - AHMEDABAD

Space India organized a series of events on the 22nd and 23rd of March to promote astronomy and educate the public about the universe. This event at Urban Chowk on Rajpath Club Road and Urban Chowk Chandkheda offered high foot traffic and visibility, allowing Space India to reach a large and diverse audience. It increased awareness about space and astronomy and provided an opportunity for meaningful interactions and discussions with the attendees. The event featured engaging activities designed to captivate attendees of all ages and backgrounds.

Space India's vision for its scientific outreach program is to ignite a passion for exploration and discovery, empowering individuals to delve into the depths of the cosmos. The goal is to impact the scientific community while inspiring the next generation of astronomers and space enthusiasts. By fostering curiosity and providing engaging experiences in astronomy and science education, we aim to add a touch of excitement and wonder to the journey of understanding and resolving the mysteries of the universe. The event attracted a diverse crowd, with people of all ages showing keen interest and asking numerous questions about space and astronomy.

One of the highlights of these events was the comet-making activity, where participants had the opportunity to learn how comets are formed. This hands-on learning experience allowed the audience to create miniature comets, gaining insight into the composition and characteristics of these celestial objects. The activity provided a fun and interactive way to understand comets and sparked curiosity to uncover the science behind them.

Another fascinating activity was telescopic observations, where the participants gained access to telescopes for planet and night sky observations. This experience allowed participants to observe celestial bodies up close, revealing details and features that are not visible to the naked eye. Alongside these observations, discussions were held on the functioning of telescopes and the techniques used to observe celestial objects.

Additionally, an activity focused on the concept of weight on different planets. Attendees could experience the differences in gravitational pull on various celestial bodies, offering a unique perspective on planetary characteristics. This interactive demonstration educated the public about the varying conditions on different planets while making the learning process engaging and memorable.

The event was a tremendous success, with a massive turnout of enthusiastic attendees. Parents praised our efforts in educating young minds and spreading awareness about space and astronomy. Our educators engaged in various activities, including telescopic observations, to provide hands-on learning experiences to the participants.

The overall goal of such events is to promote astronomy as a fascinating and accessible field of study. Astronomy, as defined by Space India, encompasses the study of everything beyond Earth's atmosphere, including visible objects like the Sun, Moon, planets, and stars, as well as distant galaxies and microscopic particles that require specialized instruments for observation.



By encouraging students through hands-on activities, Space India aims to ignite a passion for astronomy and inspire future generations of space enthusiasts and scientists. Space India's approach to public outreach and awareness-building in astronomy is commendable. Here are some additional details about their programs and efforts:

Engaging Programs: Space India organizes a variety of programs for public outreach, including astronomy workshops, stargazing sessions, and interactive exhibitions. These programs cater to people of all ages and backgrounds, fostering a deeper understanding and appreciation for space science.

Educational Initiatives: Besides events and workshops, Space India conducts educational initiatives such as school visits, where they bring hands-on activities and demonstrations to students. These initiatives inspire young minds and cultivate an interest in STEM (Science, Technology, Engineering, and Mathematics) fields, particularly in space-related disciplines.

Community Engagement: Space India actively engages with local communities to promote awareness about space exploration and its significance. They collaborate with schools, universities, and community organizations to reach a wider audience and create a culture of curiosity and exploration.

Online Resources: Space India leverages digital platforms to reach a global audience. They create and share informative content, videos, and resources on their website and social media channels, providing accessible and engaging content for space enthusiasts of all ages.

Collaborative Efforts: Space India collaborates with other space organizations, academic institutions, and government agencies to amplify their impact and reach. By working together as partners, they can create more comprehensive and impactful outreach programs that benefit the public and inspire the next generation of space explorers.

Overall, Space India's efforts to promote public outreach and awareness-building not only educate and inspire individuals but also contribute to fostering a space-literate society that values scientific exploration and discovery.

Exploring the cosmos involves spreading knowledge and awareness about astronomy, including how we can observe planets and stars using large telescopes. Our company, Space India, organized an event in Ahmedabad for public outreach. Our Vision for the Scientific outreach program is to Impact the scientific, Build the strongest Roots for Understanding and Resolving the mystery of the Universe, and Astronomy and Science Education that can Foster their Curiosity.



MONTHLY TELESCOPIC OBSERVATION

SPACE ARCADE team conducted 2024's 3rd Monthly Telescopic Experience session on the 23rd of April 2024 in Chennai and Delhi.

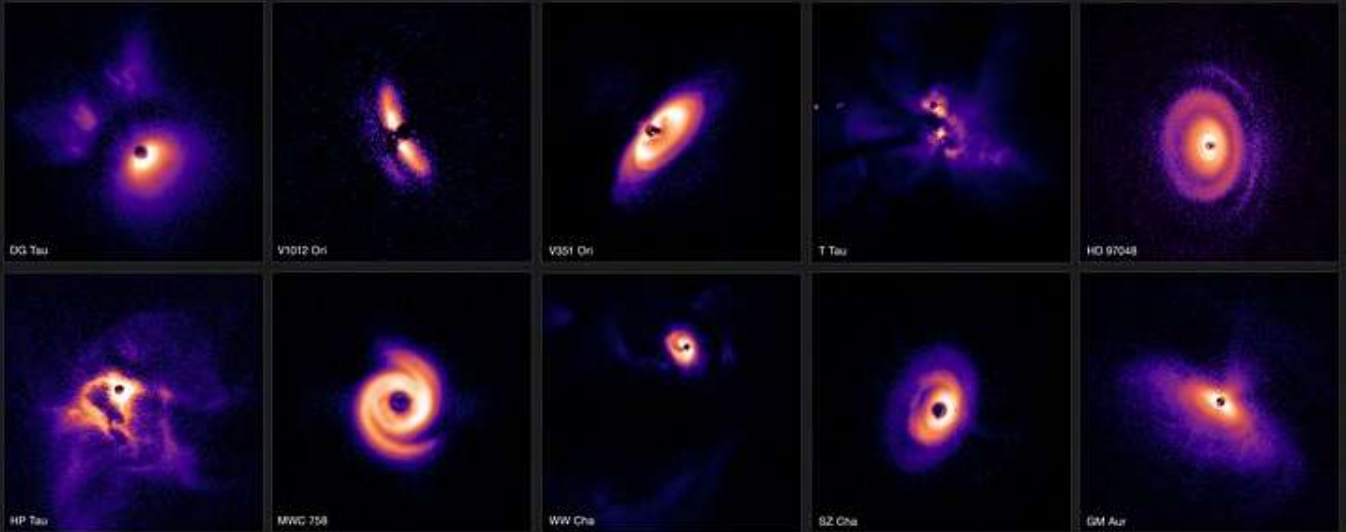
People from various places joined the observation with their telescopes, binoculars, and other astronomical equipment. They learned and experienced the breathtaking view of the Moon and planets such as Saturn and Jupiter. They also learned about different types of telescopes and cleared all their queries 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 MARCH 2024

Stunning images from Very Large Telescope captures unique view of planet formation



The stunning images, captured using the European Southern Observatory's Very Large Telescope (ESO's VLT) in Chile, represent one of the largest ever surveys of planet-forming discs.

Magnificent photos taken with Chile's Very Large Telescope (VLT) provide new information about planet formation surrounding young stars. Emerging planet systems appear less like debris disks and more like small galaxies in these portraits. The sculptures display beautifully formed spiral arms emerging from dense dust. Others show less distinct clouds of glowing material.

These observations offer astronomers a rare chance to investigate the formation of planets. Framed by over 80 young stars and their planet-forming disks, the collection of photos was taken with one of the most potent telescopes in the world.

The Milky Way galaxy contains three main star-forming areas from which the newborn stars and their young planets originate. Some come from the somewhat farther-off Orion gas cloud, which is 1,600 light-years away from Earth, while others reside in the Taurus or Chameleon I gas clouds, both of which are situated approximately 600 light-years from Earth.

Depending on whatever site they originated from, the planet-forming disks that the researchers discovered showed notable variations. For example, the researchers saw clusters of two or more stars in the Orion cloud, surrounded solely by weak disks that constitute planets. The disks of several of the region's most massive stars have peculiar shapes, which may indicate the existence of giant planets that exert strong gravitational pulls on their individual disks, causing distortion.

Since the 1990s, telescopes in space and on Earth have found over 5,000 exoplanets, or planets orbiting stars other than our sun. Astronomers are currently attempting to determine what variables affect the results of planet-forming alchemy because some of the discovered planetary systems have entirely distinct visual characteristics from our solar system. But watching these processes happen is a challenging task.

Star-forming regions are typically far from one another and covered in dust. Using the VLT's Spectro-Polarimetric High-contrast Exoplanet Research instrument (SPHERE), which has a potent adaptive optics system that can adjust for blurring caused on by Earth's atmosphere and provide clearer images, astronomers created the most recent set of photographs.

Dark Energy Camera captures record-breaking image of a dead star's scattered remains

The Vela supernova remnant, a celestial spectacle spanning 100 light-years across space, emerges as a delicate tapestry of dust, filaments, and gas tendrils, offering a glimpse into the cosmic aftermath of a stellar explosion 11,000 years ago.

Captured by the powerful Dark Energy Camera (DECam) at the Cerro Tololo Inter-American Observatory in Chile, this image marks a milestone as the largest ever released by the camera, boasting a staggering 1.3 gigapixels. This vast coverage is necessary to encapsulate the intricate details of the Vela supernova remnant, situated about 800 light-years away from Earth.

The remnant's significance transcends its sheer size; it serves as a pivotal window into the late stages of stellar evolution and the dispersion of supernova debris into the interstellar medium. This celestial spectacle bears witness to the collision between the remnants of a once-massive star and the surrounding interstellar gas, forming the mesmerizing filaments observed in the image.

Moreover, spectroscopic analysis reveals the presence of various heavy elements within the remnant, offering clues about their origins and the cataclysmic processes at play during the supernova explosion.

At the heart of the Vela supernova remnant lies a neutron star, a compacted core of the deceased star, known as a pulsar. Emitting radio beams akin to a cosmic lighthouse, the Vela pulsar spins at an astonishing rate of 11 rotations per second, contributing to the formation of a pulsar wind nebula—a smaller nebula nestled within the larger remnant.

The constellation housing the Vela supernova remnant, formerly part of the grand Argo Navis, holds its own historical significance. Once unwieldy, it was divided by French astronomer Nicolas Louis de Lacaille into three smaller constellations, including Vela, symbolizing the sails of the mythical ship Argo.

In the celestial dance of discovery, astronomers may indeed find their metaphorical Golden Fleece in the ethereal beauty and scientific insights offered by the Vela supernova remnant, captured in stunning detail by the remarkable capabilities of DECam.



Some of the most interesting objects found within the new 1.3-gigapixel Vela Supernova Remnant image. (Image credit: CTIO/NOIRLab/DOE/NSF/AURA)

Scientists reveal never-before-seen map of the Milky Way's central engine

Although the Milky Way is our home galaxy, how much do we truly comprehend about it? Researchers from Villanova University have led a team that has acquired a hitherto unobserved perspective of the central engine at the center of our galaxy as part of a NASA-funded project.

It took four years to compile the new map of this central Milky Way region, but it shows how the magnetic fields in the center of our galaxy interact with the frigid dust structures that live there. The foundation of stars, planets, and eventually life as we know it is made of this dust. This process is propelled by the Milky Way's central engine.

The results of the team's research also extend beyond our galaxy, providing hints about the interactions between dust and magnetic fields in other galaxies' central engines. The life cycle of our galaxy depends on the vast amount of dust that fills the Milky Way's center and the majority of the region between stars. The light that we observed came from these cool dust grains that were formed by heavy elements that were generated in stars and released as those stars burst.

The core molecular zone, located at the center of the Milky Way, is thought to contain 60 million solar masses of material. The temperature of this enormous dust storage is around minus 432.7 degrees Fahrenheit (minus 258.2 degrees Celsius). That is only a few degrees above the so-called absolute zero, or minus 460 degrees Fahrenheit, which is the temperature at which all atomic motion is thought to end.

In order to determine the orientation of these magnetic fields, the scientists also aimed to determine how this cool dust corresponds with the magnetic fields at the center of the Milky Way. We call this kind of orientation "polarization."

The team deduced the complex structure of the magnetic fields themselves by measuring the polarization of radiation released from dust aligned with magnetic fields. This was then superimposed on a three-color map depicting cold dust clouds in blue and heated dust clouds in pink. Yellow radio-wave-emitting filaments are also visible in the photograph.



A never-before-seen view of the magnetic fields in the center of the Milky Way. Three-color background image also uses data from European Space Agency (ESA) Herschel Space Observatory and the South African Radio Astronomy Observatory (SARAO) MeerKAT Radio Telescope.

(Image credit: Villanova University/Paré, Karpovich, Chuss (PI).

MARS ATTRACTS: HOW THE RED PLANET INFLUENCES EARTH'S CLIMATE AND SEAS

Geological evidence has been found by scientists to support the theory that a 2.4 million-year cycle of deep-sea circulation and global warming is caused by the gravitational interaction between Mars and Earth.

Deep currents flourish and wane, and this correlates to times of higher solar energy and a warmer climate on Earth—a startling connection between Mars and Earth's seas and climate. The study may contribute to our understanding of how ocean circulation is impacted by climate change over geological timescales, as opposed to the kind that humans are currently producing through greenhouse gas emissions.

Müller a geophysicist at the University of Sydney in Australia, claims in the statement that the two planets' gravitational fields interact as they plot their orbits, a process known as resonance. The Earth's orbital radius around the sun is changed by this cosmic exchange, which also affects the planet's proximity to solar radiation. The Earth's temperature rises when it is exposed to more solar energy. It was also discovered that there are more strong ocean currents as a result of the warming climate.

GIANT MARS VOLCANO DISCOVERED 'HIDING' IN PLAIN SIGHT

The Tharsis plateau on Mars is home to a massive volcano, which is the fourth known volcano in the area. The 29,600-foot (9,022-meter) heavily eroded volcano has been lurking in plain sight, slyly infiltrating photographs of the Tharsis region without ever being recognized. Thus far. Situated on the western boundary of Valles Marineris, a massive network of canyons on Mars, the volcano is five times deeper, ten times wider, and twenty times longer than the Grand Canyon.



According to the researchers, the volcano is a shield made of stratified ice, pyroclastic debris, and lava. Lava rose as the volcano's fissures and fractures opened, resulting in thermal erosion and, eventually, the collapse of swaths of the volcano. In terms of height, the recently found volcano barely surpasses Mount Everest (29,000 feet, or 8,839 meters), but it is easily overshadowed by Olympus Mons, the greatest volcano on Mars, which is the size of Arizona and stands an impressive 16 miles (25.75 kilometers) high.

Vesuvian eruptions have not been documented by scientists on any of Mars' volcanoes. However, the planet is seismically active; in 2022, probable magma signals were detected in seismic data from the now-decommissioned InSight lander.

MILKY WAY'S SUPERMASSIVE BLACK HOLE

Astronomers using the Event Horizon Telescope (EHT) have achieved a groundbreaking feat: capturing the first-ever view of polarized light and magnetic fields surrounding Sagittarius A* (Sgr A*), the supermassive black hole at the heart of the Milky Way galaxy.

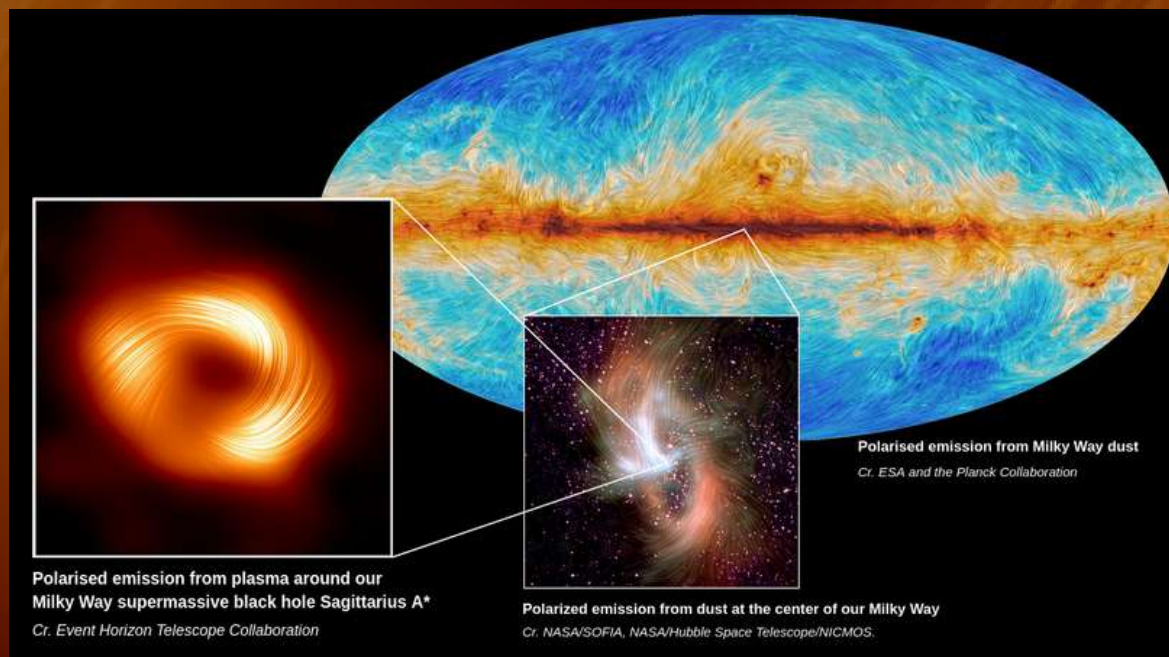
This historic observation has revealed meticulously ordered magnetic fields around Sgr A*, bearing striking similarities to those surrounding the supermassive black hole M87* in the galaxy M87, despite significant differences in mass. While Sgr A* boasts a mass of approximately 4.3 million times that of the sun, M87* dwarfs it with a mass equivalent to about 6.5 billion suns. The discovery suggests that strong and well-organized magnetic fields may be common features among all black holes. Furthermore, the resemblance in magnetic field structures between Sgr A* and M87* hints at the possibility of Sgr A* harboring a previously undetected jet.

Sara Issaoun, a research co-leader at the Center for Astrophysics (CfA) at Harvard & Smithsonian, remarked that the observed magnetic fields could play a pivotal role in the feeding and ejection processes of black holes, influencing the formation of powerful jets. Despite the absence of a visible jet from Sgr A*, astronomers speculate that the magnetic fields surrounding it could facilitate jet formation, albeit in a concealed manner due to its relatively low consumption of matter compared to M87*. The potential discovery of a jet emanating from Sgr A* would not only deepen our understanding of black hole dynamics but also shed light on the evolution of the Milky Way galaxy.

With plans for future observations and advancements in telescope technology, astronomers anticipate further insights into the behavior and interactions of black holes, paving the way for a deeper comprehension of the cosmos.

As researchers continue to unravel the mysteries surrounding black holes, initiatives like the Black Hole Explorer (BHEX) mission concept could provide valuable assistance by enabling space-based observations of black hole dynamics and spin properties.

In the quest to decipher the secrets of the universe's most enigmatic phenomena, each discovery brings us closer to unlocking the mysteries of black holes and their profound impact on cosmic evolution.



At left, the supermassive black hole at the center of the Milky Way Galaxy, Sagittarius A*, is seen in polarized light, the visible lines indicating the orientation of polarization, which is related to the magnetic field around the shadow of the black hole. At center, the polarized emission from the center of the Milky Way, as captured by SOFIA. At back right, the Planck Collaboration mapped polarized emission from dust across the Milky Way. Image Credit: S. Issaoun, EHT Collaboration

JAPAN'S 1ST COMMERCIAL ROCKET EXPLODES SHORTLY AFTER LIFTOFF

Wednesday's first attempt at an orbital launch by a Japanese corporation terminated dramatically seconds after liftoff.

At 10:01 p.m. EDT on March 12 (or 11:01 a.m. Japan time on March 13), the 18-meter-long, four-stage Kairos solid rocket took off from Space Port Kii in Kushimoto, western Japan (0201 GMT). The rocket exploded seconds after it lifted off the launch pad, triggering the flight termination system and ending the flight suddenly.

Debris littered the launch site in an attempt to become the first commercial rocket business from Japan to reach orbit. No individuals were hurt, and no damage was reported during a press conference held after the launch. Any visible fires in the early aftermath were quickly put out.

After determining that it would be difficult to complete its mission, the rocket ended its flight. Three solid propellant stages and an upper stage with liquid propellant make up Space One's Kairos rocket. It is intended to be capable of transporting payloads to low Earth orbit weighing up to 550 pounds (250 kg). Additionally, it is made to be extremely automated. An earlier launch date of March 9 Japan time was canceled due to a vessel raising safety concerns downrange.

Another way to look at the Kairos disaster is as a setback to Japan's larger goals to grow its space sector. The nation's space policy committee is presently drafting the specifics of a 10-year, \$6.7 billion space strategic fund intended to increase the nation's independence, inventiveness, and competitiveness in space.

Increasing Japan's overall launch rate through private enterprises and its new H3 rocket is one of these aims. With its Zero rocket, another Japanese launch firm, Interstellar Technologies, hopes to make its first orbital launch in 2025.



Scientists may have just caught 7 exotic 'ghost particles' as they pierced through Earth

Situated deep under the south pole's ice, the Ice Cube observatory is used by astronomers to detect seven mysterious and exotic "ghost particle" candidates as they travel across Earth. These particles appear to be astrophysical tau neutrinos based on the signals, and they serve as crucial intermediaries between us and intense, high-energy astronomical occurrences.

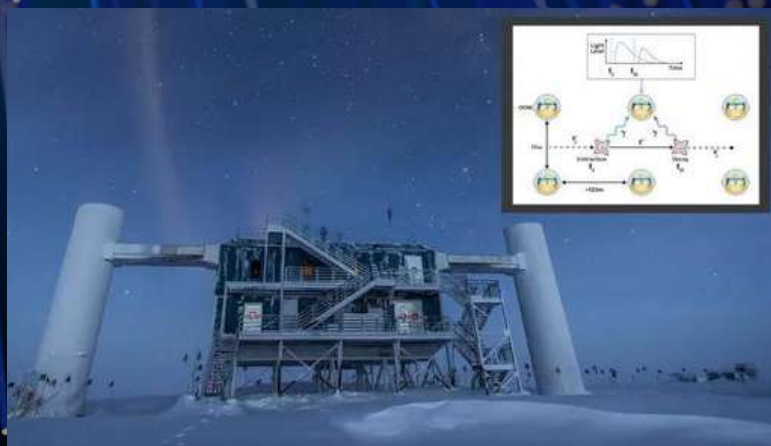
Particles called neutrinos have no mass and no charge, and they travel through space at speeds close to the speed of light. Strangely enough, neutrinos hardly interact with anything at all because of their parameters. Actually, every second, almost 100 trillion of them go through our bodies. Simply put, we are unable to tell. It would take around 100 years for a neutrino to interact with a particle in your body if you were a human-sized neutrino detector. So, it makes sense that neutrinos are referred to as "ghost particles."

"Astrophysical neutrinos," which originate from cosmic sources in the periphery of the Milky Way, are high-energy particles that are classified into three types, or generations: tau, muon, and electron neutrinos. The observatory appears to have identified astrophysical tau neutrinos in particular, which could serve as a whole new class of cosmic messenger, in addition to the first detection of astrophysical neutrinos in 2013.

Digital optical modules, also known as DOMs, are strings of golden globes buried in ice that IceCube utilizes to detect neutrinos as they travel through the Earth. 5,160 DOMs in total are hidden deep under Antarctic ice at the observatory, waiting to produce charged particles when neutrinos contact with the ice's molecules. As these charged particles travel through the ice, they release blue light, which is detected by the DOMs.

More precisely, DOMs detect characteristic light emissions, such as a double cascade event that results in two peaks in light levels, when high-energy astrophysical tau neutrinos interact with molecules. This will expand the sample of tau neutrinos that have been observed and may provide the first-ever three-generation investigation of neutrino oscillations by scientists. This is the process via which neutrinos change their flavor as they move across enormous cosmic distances.

Determining the origin of these ghost particles, the circumstances that sent them hurtling through space in the first place, and the rationale behind their gradual transfer to successive generations may all be solved by comprehending neutrino oscillations.





Global Astronomy Month

presented by **Astronomers Without Borders**

Global Astronomy Month - April 2024

SPACE-INDIA:

Global Astronomy Month (GAM), is organized every year in April by the SPACE India with an aim to unite enthusiasts worldwide in celebrating Astronomy and Space Science. Throughout this month, SPACE India offers a range of astronomy competitions, events and various outreach programs to the public, associated schools, non-associated schools, and students from various other programs to promote astronomy worldwide.

Conduct and participate in Astronomy events to promote Astronomy with SPACE India. Participate in the virtual online observations, Astro-Art contest, Astro-Poetry contest, and many more such competitions, events, and projects and receive amazing rewards!

SPACE India proposes a list of GAM and general astronomy programs to associated schools. Schools conduct events in categories such as Observing events with Global Star Parties and 'Sunday', Virtual online programs, Astro-art, and Astro-poetry contests. Several students in the past have won prizes in GAM Astro-poetry and Astro-art competitions internationally. Many students contributed and clicked stunning Astro-photographs. SPACE-associated schools and other program-associated students have been conducting exciting events during GAM to promote participation.

Beginning in 2012, SPACE-affiliated schools have gained recognition for their extensive social media activity and publishing throughout the past few years.



WEBB UNLOCKS SECRETS OF ONE OF THE MOST DISTANT GALAXIES EVER SEEN

The enigmatic galaxy GN-z11 is one of the youngest ever observed. Delivering on its promise to transform our understanding of the early universe, the James Webb Space Telescope is probing galaxies near the dawn of time. One of these is the exceptionally luminous galaxy GN-z11, which existed when the universe was just a tiny fraction of its current age. One of the youngest and most distant galaxies ever observed, it is also one of the most enigmatic. Why is it so bright? Webb appears to have found the answer.

Scientists using Webb to study GN-z11 have also uncovered some tantalizing evidence for the existence of Population III stars nestled in the outskirts of this remote galaxy. These elusive stars – the first to bring light to the universe – are purely made of hydrogen and helium. No definitive detection of such stars has ever been made, but scientists know they must exist. Now, with Webb, their discovery seems closer than ever before.



PEERING INTO THE TENDRILS OF NGC 604 WITH WEBB



In the realm of astronomy, the term 'nearby' is rather relative. While galaxies neighboring our own Milky Way may be a few million light-years away, those on the farthest reaches, closer to the inception of the universe, can span billions of light-years. Interestingly, the ability to scrutinize nearby objects with high precision often aids astronomers in comprehending distant phenomena.

For instance, consider the star-forming region NGC 604. Situated approximately 2.73 million light-years away within the nearby Triangulum galaxy, this region resembles familiar stellar nurseries in our Milky Way, such as the Orion Nebula. However, NGC 604 boasts a larger expanse and harbors a plethora of recently formed stars. These regions serve as miniature versions of more distant 'starburst' galaxies, characterized by intense rates of star formation.

NASA's Webb, Hubble Telescopes Affirm Universe's Expansion Rate, Puzzle Persists



One of the three scientific justifications to the U.S. Congress for building the Hubble Space Telescope was to use its observing power to give an exact value for the expansion rate of the universe. Prior to Hubble's 1990 launch, observations from ground-based telescopes yielded huge uncertainties. Depending on the expansion rate, the universe could be anywhere between 10 to 20 billion years old. For the past 34 years Hubble has shrunken this value to an accuracy approaching one percent. This has been accomplished by refining the so-called "cosmic distance ladder" by measuring the gold standard of cosmic milepost markers known as Cepheid variable stars.

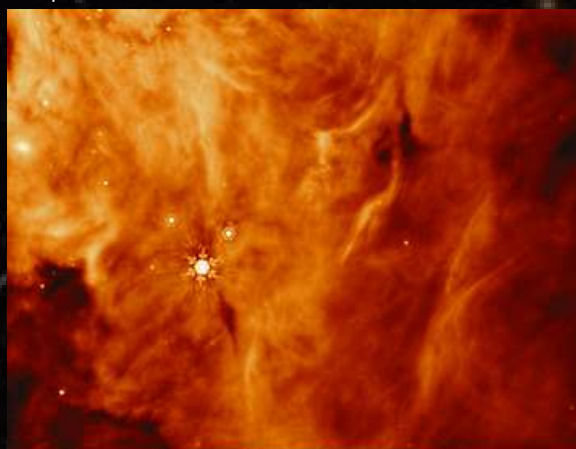
However, the results have puzzled cosmologists for a decade. The best measurements from Hubble show the universe is now expanding faster than predicted based on observations of how it looked shortly after the big bang. These observations were made by the Planck satellite mapping of the cosmic microwave background radiation – sort of a blueprint for how the universe would evolve structure after it cooled down from the big bang.

Cheers! NASA's Webb Finds Ethanol, Other Icy Ingredients for Worlds

NASA's Webb Space Telescope has made a groundbreaking discovery of various carbon-containing molecules essential for potential habitable worlds. Studying two young protostars, IRAS 2A and IRAS 23385, Webb identified complex organic compounds such as ethanol and acetic acid, crucial for forming planets capable of sustaining life. This finding sheds light on the origin of complex organic molecules (COMs) in space, suggesting they originate from solid-phase chemical reactions on cold dust grains rather than solely from warm gas-phase reactions. The detection of these COMs in ices provides insights into their transport from molecular clouds to planet-forming disks and their potential incorporation into comets and asteroids. This discovery holds significance in understanding the chemical evolution of planetary systems, including our own, and the potential delivery of life-building ingredients to primitive Earth.

Stars and their planets form from swirling clouds of gas and dust enriched with chemical elements and compounds from previous generations of stars. One long-standing question in astronomy is: How ubiquitous are the elements crucial to life as we know it?

A new Webb study of two protostars, so young that they have not yet formed planets, has found a variety of molecules ranging from relatively simple ones like methane to complex compounds like acetic acid (familiar to cooks as an ingredient in vinegar). These molecules constitute key ingredients for worlds that might one day host life.



WHAT'S UP IN THE SKY - APRIL 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

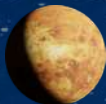
Mercury

Inferior conjunction on 11 April, best seen in the evening sky at the start of the month.



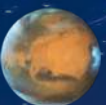
Venus

This planet is unlikely to be seen this month as it is too close to the Sun.



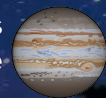
Mars

Poorly placed morning planet, which is best seen at the end of the month.



Jupiter

This planet is unlikely to be seen this month as it becomes lost in the evening twilight.



Saturn

Morning planet but poor visibility.



Uranus

Lost to the evening glare. In conjunction with Jupiter on 20 April.



Neptune

Not visible this month.



BRIGHT DEEP SKY OBJECTS

The Sombrero Galaxy (M104) is a brilliant spiral galaxy in the Virgo constellation, approximately 28 million light-years from Earth. It resembles a wide-brimmed hat and is distinguished by its bright nucleus, noticeable dust lane, and big central bulge. It is a popular subject among astronomers and may be seen with tiny telescopes. It is thought to have a supermassive black hole at its heart.



The M51, also known as the Whirlpool Galaxy, is a classic spiral galaxy located approximately 23 million light-years away in the constellation Canes Venatici. M51 is interacting with a smaller galaxy, NGC 5195, giving it a distinctive "whirlpool" appearance. The apparent magnitude of it will be 8.4.

NGC 4565, also known as The Needle Galaxy, is an edge-on spiral galaxy located about 40 million light-years away in the constellation Coma Berenices. Its distinctive thin, needle-like appearance is accentuated by a prominent central bulge and a dark dust lane running its length. This unique perspective makes it a popular target for astrophotographers.



The Southern Pinwheel Galaxy M83 (NGC 5236; mag 7.2), a face-on spiral galaxy in Hydra, will be visible in the evening sky in the coming weeks. On April 15, it will reach its tallest height in the sky around midnight local time, and on successive evenings, it will peak four minutes earlier. It is quite faint not visible through naked eyes but with a pair of binoculars.

ROCKET LAUNCHES IN APRIL 2024

CST-100 Starliner Crewed Flight Test

- Date: April 22 , 2024
- Rocket: CST-100 Starliner Crewed Flight
- Agency: United Launch Alliance
- Country: USA
- Launch Site: Cape Canaveral, FL, USA
- Purpose: The CST-100 Starliner is a crewed spacecraft developed by Boeing as part of NASA's Commercial Crew Program. It's designed to transport astronauts to and from the ISS, providing a commercial alternative to reliance on Russian Soyuz spacecraft for crew transportation. The Crewed Flight Test (CFT) is a crucial milestone in the development and certification process for the CST-100 Starliner. It involves launching the spacecraft with a crew of NASA astronauts to the ISS to demonstrate its capabilities in a real operational environment. During the CFT mission, the Starliner will autonomously dock with the ISS, remain attached for a certain duration, and then return safely to Earth with the crew onboard.



2 X Galileo

- Date: Apr 22nd, 2024
- Rocket: Falcon 9 Block 5
- Agency: USA
- Launch Site: Core Unknown F9
- Purpose: (Galileo Navigation Satellite System) Galileo is Europe's global navigation satellite system (GNSS), designed to provide highly accurate positioning, navigation, and timing (PNT) services worldwide. It was developed by the European Union (EU) and the European Space Agency (ESA). Each Galileo satellite is equipped with atomic clocks and navigation payloads that broadcast signals used by receivers to determine their exact location and time. Galileo offers interoperability with other GNSS systems like GPS (USA), GLONASS (Russia), and BeiDou (China), enhancing global navigation capabilities. Launched by Falcon 9 Block 5 rocket which is partially reusable two-stage rocket developed and operated by SpaceX.



Maiden Flight

Date: Expected In April
 Rocket: SR75
 Agency: HyImpulse
 Country: South Australia

Launch Site: Koonibba Test Range, South Australia
 HyImpulse is a European aerospace company focused on the development of hypersonic and space technologies. They are known for their work on high-speed air transportation and reusable space launch vehicles. If the Maiden Flight project involving the SR75 is indeed a new development from HyImpulse, it would likely involve advancements in Hypersonic or space technologies. The HyImpulse SR75 is a suborbital rocket that can carry payloads weighing up to 250 kilograms to an altitude of 200 kilometers. It is powered by the HyPLOX-75 hybrid rocket engine, which uses paraffin and liquid oxygen as fuel.



Vostochny Angara Test

- Date: 9 April 2024
- Location: Cosmodrome Site 1A, Vostochny Cosmodrome, Siberia, Russian Federation
- Rocket: Flight Angara A5/Blok DM-03
- Agency: Khrunichev State Research and Production Space Center
- Country: Russia
- Purpose: Vostochny Angara Test

Test Flight, Launch Cost: \$31,000,000. First test launch of the Angara A5 launch vehicle from the Vostochny Cosmodrome. The rocket will carry a mass simulator payload. Angara Rocket Family: The Angara is a family of space-launch vehicles designed to provide lifting capabilities for a wide range of payloads. It's developed by the Moscow-based Khrunichev State Research and Production Space Center.

Electron - "Beginning Of The Swarm"

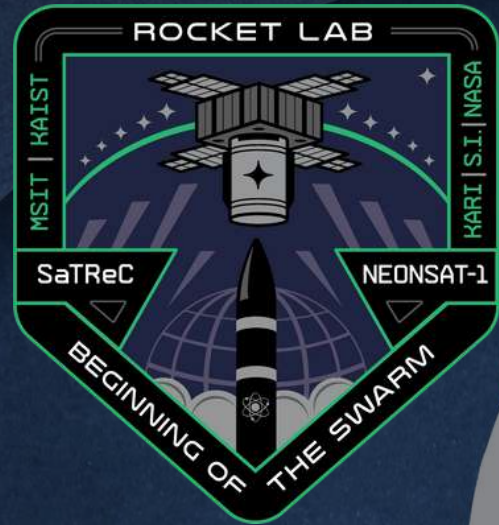
- Date: April 24, 2024,
- Rocket: Electron
- Agency: Rocket lab, USA
- Launch Site: Launch Complex 1

The Electron mission will include carrying a NEONSAT-1 Earth observation satellite for the Satellite Technology Research Center and a satellite for NASA's Advanced Composite Solar Sail System.

Rocket Lab said NEONSTAT will be the primary payload for the upcoming mission. NEONSAT-1 is an Earth observation satellite with a high-resolution optical camera designed to monitor for natural disasters along the Korean Peninsula by pairing its images with artificial intelligence.

NEONSAT-1 is the first satellite developed under the NEONSAT program by SaTReC and KAIST, Korea's leading university in science and technology, which developed and operated Korea's very first satellite KITSAT-1 more than 30 years ago. NEONSAT is funded by the Korean government's Ministry of Science and ICT.

Meanwhile, NASA's ACS3 is a technology demonstration of new materials and deployable structures for solar sail propulsion systems that use sunlight to propel the spacecraft. The NASA mission plans to test the deployment of new composite booms that will unfurl the solar sail to measure approximately 30 feet per side, or about the size of a small apartment in total. Flight data obtained during the demonstration will be used for designing future larger-scale composite solar sail systems for space weather early warning satellites, asteroid, and other small body reconnaissance missions, and missions to observe the polar regions of the sun.



STARLINK LAUNCHES



Starlink Group 7-30| Starlink Group 7-18| Starlink Group 7-19| Starlink Group 7-20| Starlink Group 7-21 | Starlink Group 7-22| Starlink Group 7-23 | Starlink Group 6-48 Starlink Group 6-49| Starlink Group 7-24|Starlink Group 7-25|Starlink Group 7-26.

Starlink is a satellite internet constellation project developed by SpaceX, with the goal of providing high-speed internet access to underserved and remote areas globally. Satellite Deployment: SpaceX regularly launches batches of Starlink satellites into orbit aboard its Falcon 9 rockets. Each batch typically contains dozens to hundreds of satellites.

Delta IV Heavy | NROL-70

- Date: April 08, 2024 - 10:27 IST
- Rocket: Delta IV Heavy
- Country& Launch Site:: SLC-37B, Cape Canaveral SFS, Florida, USA

A United Launch Alliance (ULA) Delta IV Heavy rocket is launching the NROL-70 mission for the National Reconnaissance Office (NRO). Liftoff will occur from Space Launch Complex-37 at Cape Canaveral Space Force Station, Florida. This is the 16th and final launch of a Delta IV Heavy rocket.

The NRO develops and operates the world's most capable and innovative overhead reconnaissance systems to collect intelligence for U.S. national security, and to support disaster relief and humanitarian efforts.

The NROL-70 mission will strengthen the NRO's ability to provide a wide-range of timely intelligence information to national decision makers, warfighters, and intelligence analysts to protect the nation's vital interests and support humanitarian efforts worldwide.



Shenzhou 18

- Date: April 25, 2024
- Launch Area 4 (SLS-1 / 921):Jiuquan Satellite Launch Center, People's Republic of China.
- Rocket: Long March 2F.
- Agency: China Aerospace Science and Technology Corporation
- Purpose: The mission will launch from Jiuquan

Satellite Launch Center on board a Long March 2F rocket. The Shenzhou spacecraft will dock to the Tianhe core module of the station, where the crew will enter prior to the departure of Shenzhou 17.It will carry three taikonauts on board a Shenzhou spacecraft. Tiangong space station's main purpose is for scientific research: the China Manned Space Agency has approved more than 1000 experiments to be performed in microgravity, on questions such as how plants grow in space and how fluids flow.

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

ASTRONOMICAL EVENTS - APRIL 2024

Lyrids Meteor Shower

The Lyrid Meteor Shower is usually active between April 16 and 25 every year. It tends to peak around April 22 or 23.

About the Lyrid meteor shower parent comet

Most meteor showers are caused by debris from a passing comet. For the Lyrids, the comet is named Comet Thatcher. Astronomers first noticed this comet in 1861, around the time of its last perihelion, or closest point to the sun. It takes 417 years to go around the sun once. Its path brings it within the Earth's orbit, then it goes really far away. How far? It goes to a distance of 110 astronomical units (AU). That's 110 times farther from the sun than we are. So Comet Thatcher is now far away, still traveling outward, away from our sun. It'll reach its farthest point from the sun around the year 2283 and then begin its return trip.

The Lyrid meteor shower - spawned by this comet - seems to outburst, or produce an unexpectedly large number of meteors, every 60 years. The next Lyrid outburst is due in 2042. The outbursts happen because of the planets' reshaping the long trail of comet debris left behind by Comet Thatcher in its long orbit. This debris is what intercepts Earth's orbit yearly, to create the meteor shower.

Peak Time: 22-23 April in Up to max 18 meteors per hour From 10:50 p.m. IST

Parent Comet: C/1861 G1 (Thatcher).

The overall duration of the shower: November 19 to December 24, 2023

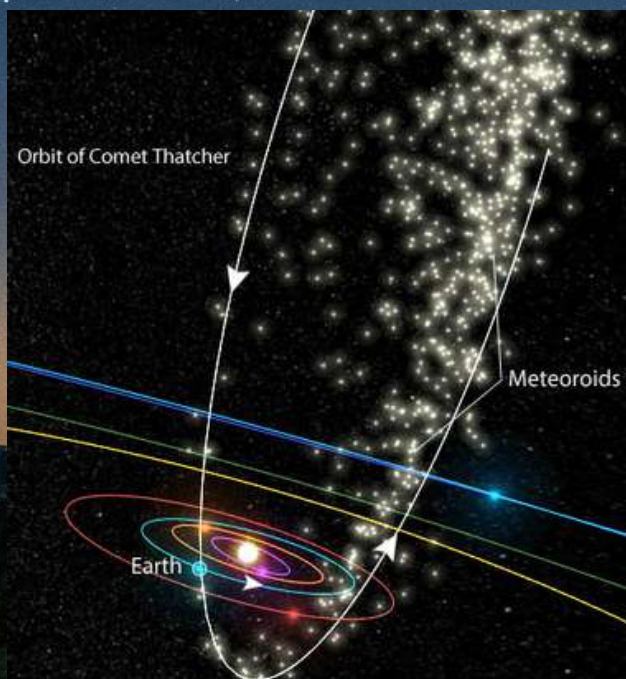
Radiant: Rises before midnight, highest in the sky at dawn.

Nearest moon phase: Full moon falls on April 24. So a bright waxing gibbous moon will be in the sky during the peak morning for the 2024's Lyrid meteor shower.

Duration of shower: April 15 to April 29.

Expected meteors at peak, under ideal conditions: In a dark sky with no moon, you might see 10 to 15 Lyrids per hour. The Lyrids are known for uncommon surges that can sometimes bring rates of up to 100 per hour

Note: This shower's radiant point is far to the north on the sky's dome. So the Southern Hemisphere will see fewer Lyrid meteors.



COMET 12P: A DEVILS HORN



Comets, those ethereal travelers of the cosmos, have entranced humanity for centuries with their fleeting appearances and luminous tails. Among these celestial nomads, Comet 12P/Pons-Brooks emerges as a particularly intriguing puzzle, offering tantalizing clues about the early epochs of our solar system and the secrets veiled within its icy domain.

Discovery and Moniker Origins: In 1812, the French astronomer Jean-Louis Pons first spied Comet 12P, yet it wasn't until 1883 that American astronomer William Robert Brooks unraveled its orbit. Consequently, the comet proudly carries the names of both its intrepid discoverers.

Orbit and Distinctive Traits: 12P orbits the Sun in a highly elongated path, averaging about 3.16 astronomical units (AU) from our star—equivalent to roughly 469 million kilometers. Its trajectory traverses from the solar system's outer fringes to the vicinity of Earth's orbit.

Predominantly comprised of ice, dust, and rocky fragments, Comet 12P undergoes a mesmerizing transformation as it nears the Sun during its cyclical sojourns. The solar heat triggers the sublimation of ice, liberating gas and dust into its luminous tail, etching a spectacle across the cosmos, sometimes spanning millions of kilometers.

estial unknown.

Historical Impact: The periodic return of Comet 12P has afforded astronomers a unique vantage point to study its behavior across multiple apparitions. This ongoing observation has significantly enriched our comprehension of cometary orbits, the evolutionary trajectory of cometary nuclei, and the composition dynamics of comet tails.

Scientific Endeavors: While Comet 12P hasn't been the primary focus of intensive scientific scrutiny compared to some of its celestial brethren, advancements in spacefaring technology have opened avenues for closer examination of cometary bodies. These ventures have yielded invaluable insights into their intrinsic makeup and behavioral patterns.

Future Horizons: As technological prowess continues to soar, the future holds promise for further unraveling the mysteries enshrouding Comet 12P. Prospective missions may unveil its internal architecture, surface constitution, and the mechanisms propelling its activity, fostering deeper comprehension of its enigmatic nature.

In Conclusion: Comet 12P/Pons-Brooks remains an enchanting enigma, offering a rare glimpse into the primordial past of our solar system. Its cyclical returns serve as poignant reminders of the ever-evolving tapestry of the cosmos, stirring the curiosity and wonder of astronomers and enthusiasts alike. As we embark on a perpetual quest to decipher the secrets of cometary realms, Comet 12P stands as a beacon of inspiration, beckoning humanity to explore the depths of the cel

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 Mars and Saturn

On April 11th, the Ringed Planet Saturn will meet the Red Planet Mars in the constellation Aquarius. These Pairs are visible early in the morning before sunrise in the eastern direction. Saturn is at a magnitude of 1.14 and Mars has a magnitude of 1.16.



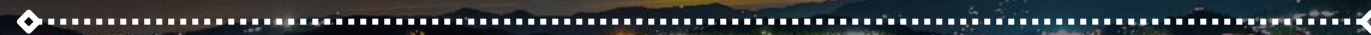
Place: Chennai / Date: 11th April / Time: 04:10 a.m.



Place: Chennai / Date: 20th April / Time: 07:10 p.m.

Conjunction of Jupiter and Uranus

On April 20th, the Gas giant Jupiter and the Rolling planet Uranus will have the closest approach in the evening sky after Sunset. Jupiter has a magnitude of -1.86 and Uranus has a magnitude of 5.84.



Conjunction of Mars and Neptune

On April 29th, the Red planet Mars and the Windest planet Neptune will have the closest approach in the early morning sky Before Sunrise in the eastern direction. Mars has a magnitude of 1.12 and Neptune has a magnitude of 7.94.



Place: Chennai / Date: 29th April / Time: 04:10 a.m.

Building Chiang Mai

Chiang Mai is the largest city in Northern Thailand and is the capital of the Chiang Mai province. The ancient city was founded in 1294 or 1296 by King Mangrai the Great as the capital city of his kingdom, succeeding the previous capital, Chiang Rai. The literal translation of Chiang Mai from Thai to English is “New City.” Chiang Mai was created to be an economic, social and cultural centre of his newly expanded and integrated kingdom called Lan Na.

King Mangrai the Great was the 25th king of Ngoenyang and the first king of Lan Na. Lan Na is called the Kingdom of Million Rice Fields and existed from the 13th to 18th century. Lan Na was one of the many Indianized states that littered South East Asia.

According to historical records, almost 100,000 workers built Chiang Mai, but the length of time it took to finish building the city is not agreed upon. Like many cities in the South East Asian region, Chiang Mai’s architecture was influenced by Indian architecture and building principles, through the influence of the Khmer Empire. Even though there was a large population of people from Southern China, the Chinese Fen Shui principles were absent from the city planning. The possible reason for utilizing Vaastu Shastra, the Indian building principles, instead of Fen Shui is that India and the Lan Na kingdom were geographically similar while having similar climates and religious beliefs.

Vaastu Shastra is a traditional Hindu system of architecture, translated from Sanskrit to English it means the science of architecture. Vaastu Shastra believes that mankind and the Universe are analogous in their structure and spirit and that the Earth is a living organism, pulsing with life and energy. Designs that follow Vaastu Shastra principles attempt to integrate architecture with nature and ancient beliefs utilizing geometric patterns, symmetry, and directional alignments. In Vaastu Shastra, eight regions are present in a building, and each space has a deity ruling over it. At the same time, astrology assigns a planet to each region and states how the space should be used.

King Mangrai the Great chose an auspicious date and time to move into his new residence and start the construction begin construction of Chiang Mai. The date and the time were selected based on the position of the Sun and Moon in relation to Meena Rashi (Pisces) and Punarvasu Nakshatra (Castor and Pollux) respectively. Meena Rashi and Punarvasu Nakshatra were culturally important to the region due to their association with beginning, renewal etc. Additionally, Punarvasu is the birth star of Lord Rama. A god widely worshipped in the region. Even today, the Pisces ascendant and the Punarvasu Nakshatra are chosen for auspicious events in Bangkok and in other cities and temples.

Echoes of Venus: Exploring Love, Beauty, and Fertility Across Mythologies

Venus, the Roman goddess of love, beauty, and fertility, is often associated with various myths and stories across different cultures. Here are 10 mythologies with stories related to Venus:

Roman Mythology (Venus): In Roman mythology, Venus is the goddess of love and beauty. She is often associated with the Greek goddess Aphrodite. One famous myth involving Venus is the story of her birth, where she emerges fully grown from the sea foam after the Titan Cronus (Saturn) castrates his father Uranus and throws his genitals into the sea.

Greek Mythology (Aphrodite): Aphrodite is the Greek equivalent of Venus. One well-known myth is the story of her involvement in the Trojan War. According to legend, she promised Paris, a Trojan prince, the love of the most beautiful woman in the world, Helen of Sparta, in exchange for choosing her as the most beautiful goddess in a contest.

Mesopotamian Mythology (Ishtar): Ishtar is the Babylonian and Assyrian equivalent of Venus. In one myth, Ishtar descends into the underworld to rescue her lover Tammuz. Her journey represents the cycle of fertility, death, and rebirth.

Norse Mythology (Freyja): Freyja, the Norse goddess of love, fertility, and beauty, shares similarities with Venus. She is associated with the Vanir, one of the groups of gods in Norse mythology. Freyja possesses a magical necklace called Brisingamen and rides a chariot pulled by cats.

Hindu Mythology (Shukra): Shukra is the Hindu equivalent of Venus and is associated with the planet Venus as well. He is considered the guru (teacher) of the demons and is known for his wisdom and knowledge of magic. Shukra is also associated with love and desire.

Egyptian Mythology (Hathor): Hathor, the Egyptian goddess of love, beauty, and motherhood, shares some characteristics with Venus. She is often depicted as a cow goddess or with cow horns on her head. Hathor is also associated with music, dance, and fertility.

Chinese Mythology (Chang'e): Chang'e, the Chinese goddess of the moon, has a connection to Venus in Chinese folklore. There's a story about Chang'e and her husband Hou Yi, a skilled archer. When Hou Yi shoots down nine of the ten suns, he becomes a hero, but his wife steals the elixir of immortality and becomes the goddess of the moon, living in exile.



Mayan Mythology (Ix Chel): Ix Chel is the Mayan goddess of fertility, childbirth, and the moon. She is often associated with Venus as a symbol of femininity and cycles of life. Ix Chel is depicted as a young woman wearing a headdress shaped like a crescent moon.

Japanese Mythology (Ame no Uzume): Ame no Uzume is a Shinto deity associated with Venus, known for her role in the myth of Amaterasu, the sun goddess. Ame no Uzume's lively dance lured Amaterasu out of a cave, bringing light back to the world after a period of darkness.

Aztec Mythology (Xochiquetzal): Xochiquetzal is the Aztec goddess of beauty, love, fertility, and flowers. She shares attributes with Venus and is often depicted with flowers and butterflies. Xochiquetzal is associated with both sensual love and the more nurturing aspects of motherhood.

These myths and stories demonstrate the diverse cultural interpretations of the celestial body known as Venus and its associated deities.

DEV GURU SHUKRACHARYA- Hindu Mythology

Son of Maharishi Bhrigu and Kavyamata, Guru Shukracharya is one of the greatest sages in Hindu history. Like other greatest sages like Saptarishis, Shukracharya also possesses vast wisdom and spiritual powers.

Even though he was a highly knowledgeable sage, blessed by Lord Shiva, he did not get the respect and acknowledgment from Devas that he deserved. Feeling disrespected, he chose to become the teacher and guide of Asuras. Guru Shukracharya taught skills of war, politics, and weaponry to Asuras.

The epic Mahabharata mentioned that Shukracharya dedicated his entire life to meditating and making constant efforts to win over heavenly gods. Besides that, he created numerous mantras, rasas, and medicines, which he passed down to his disciples.

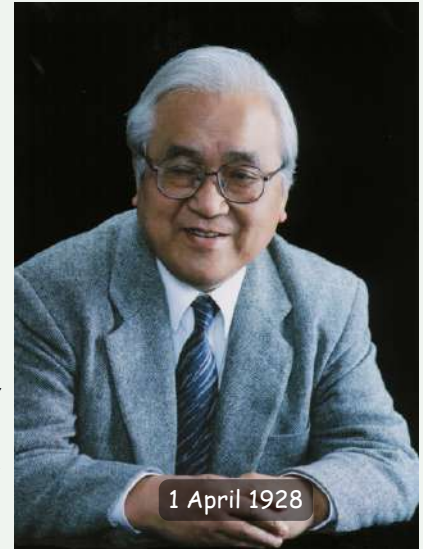
In Vedic astrology, Guru Shukracharya is one of the navagrahas (planets), Planet Venus. It governs over Taurus and Libra zodiac signs. Venus represents femininity, beauty, romance, reproduction, art, and pleasure.



HAPPY BIRTHDAY

Yoshihide Kozai

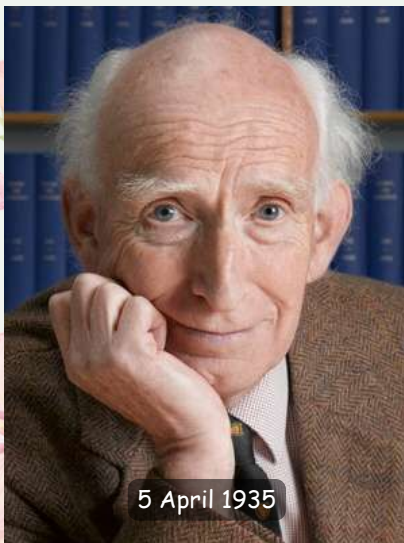
Yoshihide Kozai (1st April 1928 – 5th February 2018) was a Japanese astronomer who specialized in celestial mechanics. Born in Tokyo, Japan, his most famous discovery was the Kozai-Lidov mechanism, simultaneously with Michael Lidov. When Kozai initially made his discovery, it went unnoticed, but today, the mechanism is one of the most studied processes in astrophysics. Kozai was the first Japanese president of the International Astronomical Union (1988 to 1991). He was also the director of the National Astronomical Observatory of Japan (1981 to 1994). Kozai was awarded the Imperial Prize of the Japan Academy. He also was awarded the AAS Division of Dynamical Astronomy Brouwer Award.



1 April 1928

Donald Lynden - Bell

Donald Lynden-Bell (5th April 1935 - 6th February 2018) was a British theoretical astrophysicist who was the first director of the University of Cambridge's Institute of Astronomy. Born in Dover, Kent, Lynden-Bell received the first Kavil Prize for astrophysics, shared with Martin Schmidt. Lynden-Bell was the first person to suggest that the supermassive black holes in the centre of the galaxy might generate the energy emitted by quasars. Throughout his career, he contributed to general relativity, galactic dynamics, telescope design and observational astronomy. Lynden Bell participated. The versatility of his contributions makes him one of the most influential astronomers of his day.



5 April 1935

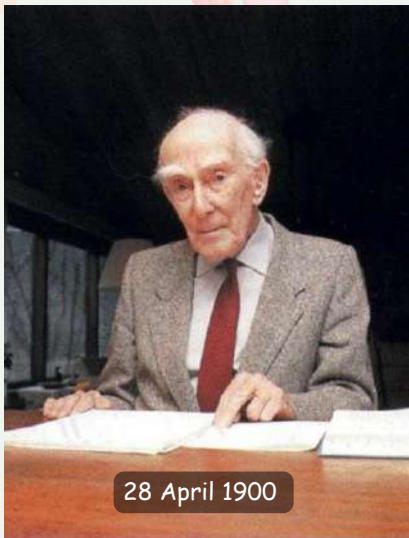
Christiaan Huygens

Christiaan Huygens (14th April 1629 - 8th July 1696) is an important figure in the Scientific Revolution. Born in The Hague, the Netherlands, Huygens made several contributions to science. In astronomy, he studied the rings of Saturn and discovered Titan, Saturn's largest moon. He also invented the pendulum clock, the most accurate timekeeping method for almost 300 years. Additionally, he improved the design of the telescope and formulated equations for centripetal force, elastic collisions and diffractions. Huygens also introduced the concept of light as acting as a wave.



14 April 1629

HAPPY BIRTHDAY



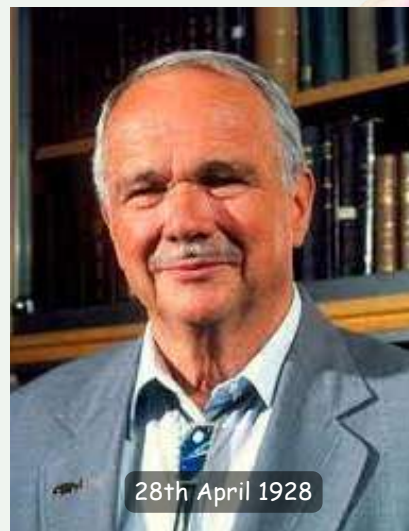
28 April 1900

Jan Hendrik Oort

Jan Hendrik Oort (28th April 1900 - 5th November 1992) contributed to our understanding of the Milky Way. Born in Franeker, the Netherlands, he was a pioneer in radio astronomy. Among his many accomplishments, Oort determined that the Milky Way rotated and repositioned the Solar system, and he was one of the first astronomers to suggest the presence of dark matter in the universe. However, his biggest contribution to astronomy was increasing our understanding of comets. Through observations, he proposed that the solar system was encapsulated by a vast number of comets, now called Oort's cloud. Jan Oort is one of the few people who has seen the Halley Comet on two separate occasions; once when he was 10 years old, the second time 76 years later.

Eugene Merle Shoemaker

Eugene Merle Shoemaker (28th April 1928 - 18th July 1997) was the founder and first director of the United States Geological Survey's Astrogeology Research Program. Born in Los Angeles, California, he helped pioneer astrogeology. He is more widely known for his co-discovery of the Shoemaker-Levy 9 comet, alongside his wife Carolyn S. Shoemaker and David H. Levy. Shoemaker-Levy 9 comet was the first comet we observed impacting a planet. Shoemaker was also a television commentator for the early Apollo missions.



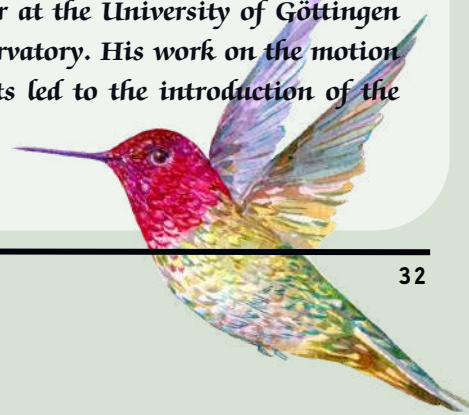
28th April 1928

Johann Carl Friedrich Gauss

Johann Carl Friedrich Gauss (30th April 1777 - 23rd February 1855) was born in Brunswick, Germany. Sometimes called the "Prince of Mathematics," Gauss made several contributions to many fields in mathematics and science. Gauss was instrumental in rediscovering Ceres after its discoverer lost sight of it due to the sun's glare by utilising maths. Gauss was a professor at the University of Göttingen and the director of the Göttingen Observatory. His work on the motion of planetoids disturbed by large planets led to the introduction of the Gaussian gravitational constant.



30 April 1777



STUDENT'S CORNER

A MESSAGE AGAIN

Sourajit Mandal, Astronomy camp

We humans have sent quite a few messages to space for others to find. Be it physical or just a signal, we have done it, and we are doing it again. A physical message this time. But before getting to know more about this message let us talk a bit about the history of such messages.

When talking about sending physical things with information carved on them to outer space, the first thing that comes to mind is the famous Golden Record. The Voyager's golden records are two identical phonograph records sent with the two Voyager missions by NASA. These messages were intended to communicate a story of our world to extraterrestrials. The Voyager messages are carried by a phonograph record, a 12-inch gold-plated copper disk containing sounds and images selected to portray the diversity of life and culture on Earth.

Two small metal plaques were launched with Pioneer 10 and 11 missions before the voyager missions. They were the main inspiration for the Golden Record. These metal plaques, designed by Carl Sagan, consisted of our planet's accurate position concerning some of the bright stars in our galaxy. It also depicts a naked man and woman drawn about the spacecraft.

NASA is sending a message again. This time the message will go to Jupiter's moon Europa which is termed as 'Europa clipper'. It will be made of the metal tantalum and about 7 by 11 inches (18 by 28 centimeters). The plate will feature graphic elements on both sides. The outward-facing panel will feature art that highlights Earth's connection to Europa. Linguists collected recordings of the word "water" spoken in 103 languages, from families of languages around the world. The audio files converted into waveforms (visual representations of sound waves) will be etched into the plate. The waveforms radiate out from a symbol representing the American Sign Language sign for "water."

Since searching for habitable conditions is central to the mission, the Drake Equation will be etched onto the plate as well – on the inward-facing side. The Drake equation is an equation to estimate the possibility of finding advanced civilizations beyond Earth. The equation has inspired and guided research in astrobiology and related fields ever since.

The plate also includes a portrait of one of the founders of planetary science, Ron Greeley, whose early efforts to develop a Europa mission two decades ago laid the foundation for the message.

With the current rate of destruction of Human Civilisation, it is hard to say how long our species will live. These messages, on the other hand, will stay forever. They will continue to exist even after the Earth ends, and remain as archives of information about human development.

NASA EUROPA CLIPPER
 JOURNEY TO AN OCEAN WORLD

SPACE-TIME: A NEW DIMENSION

Souryadeepta Majumda
| Astronomer

Introduction

There are plenty of observations that have contradicted the propagation of light in a straight line. It was observed that when light is traveling in space where a heavenly body or mass is positioned nearby, it is observed that it bends around that body and hence changes the direction of motion. The prior reason for such a phenomenon was explained by Einstein's theory of relativity in 1905, which introduced the concept of space-time.

A brief overview of the concept

Space-time is a particular model which works on a four-dimensional convention of the universe. In this particular model, along with the conventional three dimensions of position, one gets a fourth dimension of time. It has the three-dimensional Cartesian coordinates with a fourth dimension of time. So, in the concept of space-time, the fourth dimension or the dimension of time can be visualized as a plane of space-time. In other words, one can imagine the planets and other celestial objects lying on a piece of cloth, and the cloth is held tightly on the edges. Imagining such a scenario completely, one can think of the planets as some heavy balls on that piece of cloth. Provided that the whole setup is held horizontally, one can see that the positions at which a particular ball is placed create a depression on the cloth. When a marble or a small particle is traveling near this ball on the cloth, it can be observed that the depression deviates the small particle from its actual path. This is the simulation of space-time where, the planet or the celestial object, due to its gravity, creates such a depression, which is also called warping. So, in other words, the bodies warp space-time around them, and when light travels through these areas, they bend their path. This also validates the particle nature of light in such cases.

Does time get affected?

Since time can be seen as a dimension in the concept of space-time and also it can be seen that space-time is warped around gravity, this can be confidently said that time indeed gets affected by space-time curvature and warping. Time is a very abstract concept in the universe, and to see the effects of gravity on time, one needs to see it as a vector. Referring to the context of this topic, when there is mass somewhere, there is gravity and this is the nature of Physics. Space-time warps around gravity, and time being a component of space-time, itself curves around gravity. So, in nature, it is observed that time moves faster near a celestial body as compared to time in a region where there is negligible mass. This is wonderfully explained in Einstein's Theory of Relativity through an experiment known as 'The Twin Paradox'. In this experiment, two identical twin persons are considered where one stays on Earth and the other goes to travel in space. When the latter comes back, it is seen that the twin who stayed on Earth has grown older faster than the one who was in space. This shows how time is affected by gravity. It has also been seen that in the International Space Station (ISS), the astronauts age 0.007 seconds slower every six months.

Outcomes of space-time curvature

As an effect of the space-time curvature, light bends around a black hole and escapes its event horizon hence creating a wonderful impression of the black hole and making it easier to spot them. This phenomenon is also one of the reasons that shape the trajectory of motion of a body in space. Overall, the perspective of space-time is a very joyous way to see how time is biased by mass and energy.

Conclusion

Space-time is a very mysterious and interesting side of the universe that unifies many theories of Physics ranging from the whole set of Classical and Quantum Mechanics to specified topics like String Theory and Relativity. Further studying it can help us understand time as a physical quantity and hence conclude on some stable models of time that can support abstract experimentation. These experiments can lead up to the next level of scientific research which involves technologies like intergalactic travel and even time travel.



Space Missions

Aayan Kumar Chauhan
Club Student

Why should we send space missions?

There are many reasons why we should send space missions. Here are a few:

- To learn more about the universe. Space missions allow us to explore new worlds and learn about the laws of physics that govern the universe. We have learned a lot about the universe from space missions, such as the fact that there are billions of galaxies in the universe and that planets are orbiting other stars.
- To search for signs of life beyond Earth. One of the most exciting possibilities of space exploration is the discovery of life beyond Earth. We have already found evidence that there is water on other planets and moons in our solar system, which is a necessary ingredient for life. Space missions can help us to search for signs of life in these places and to learn more about how life might have evolved on other planets.
- To develop new technologies. Space missions require the development of new technologies, such as new materials, new propulsion systems, and new communication systems. These technologies can then be used to improve our lives in Bharat. For example, the development of GPS technology was driven by the need to track spacecraft in orbit.
- To inspire us. Space missions are a source of inspiration for people all over the world. They show us what is possible and they challenge us to think big. Space missions also remind us that we are all part of something bigger than ourselves.

In addition to these reasons, space missions can also be used to:

- Protect the World from asteroids and comets. Space missions can help us to identify asteroids and comets that are on a collision course with the World. We can then develop plans to deflect these objects and prevent them from hitting the World

- Develop new resources. Space contains a wealth of resources, such as water, minerals, and solar energy. Space missions can help us to develop these resources and to use them to improve our lives on Bharat.
- Expand human civilization beyond Earth. In the long term, we may need to expand human civilization beyond Earth to survive. Space missions can help us to develop the technologies and the knowledge that we need to do this.

Space Missions from Bharat & Bharat's Space History

Bharat has a long and rich history of space exploration. The Indian Space Research Organisation (ISRO) was founded in 1969 and has since launched over 100 satellites into orbit. ISRO has also launched several successful missions to the Moon and Mars.

Here are a few of the most notable space missions from Bharat:

- Aryabhata: Aryabhata was India's first satellite and was launched in 1975. It was named after the great Indian mathematician and astronomer Aryabhata.
- Insat: The Insat series of satellites are used for a variety of purposes, including telecommunications, weather forecasting, and disaster management.
- Chandrayaan-1: Chandrayaan-1 was India's first lunar mission and was launched in 2008. It mapped the Moon's surface and discovered water ice in the Polar Regions.
- Mangalyaan: Mangalyaan was India's first interplanetary mission and was launched in 2013. It entered Mars orbit in 2014 and is still orbiting the planet today.

Mysteries of space in Indian scriptures

Indian scriptures contain many references to space and to the possibility of life beyond Earth. For example, the Rig Veda mentions the existence of other universes. The Upanishads also discuss the possibility of life on other planets.

Here are a few examples of mysteries of space in Indian scriptures:

- The Vimanas: The Vimanas were flying machines that are described in many Indian scriptures. Some people believe that the Vimanas were real and that they were used by ancient Indians to travel to other planets.
- The Pushpaka Vimana: The Pushpaka Vimana was a flying chariot that is described in the Ramayana. It is said that the Pushpaka Vimana was used by the Hindu god Ravana to travel to Lanka.
- The Siddhis: The Siddhis are supernatural powers that are described in many Indian scriptures. Some people believe that the Siddhis can be used to travel to other planets.

Conclusion

Space missions are important because they help us to learn more about the universe, to search for signs of life beyond Bharat, to develop new technologies, and to inspire us. Bharat has a long and rich history of space exploration and has launched many successful space missions. Indian scriptures also contain many references to space and to the possibility of life beyond Earth.

ASTROPHOTOGRAPHS BY SPACE



Milkyway Arm captured by Mr. Ranjith Kumar E, Team Lead, Education - Chennai, STEPL.



Equatorial star trail captured by Mr. Ranjith Kumar E, Team Lead, Education - Chennai, STEPL.



Star trail captured by Ms. Sunita Chauhan, Educator, STEPL.



Milkyway Arm captured by Mrs. Sunita Chauhan, Educator, STEPL.

HISTORICAL EVENTS HAPPENED IN APRIL

ORBITING THE MOON

By 1966, the progress humanity made in its pursuit of space was staggering. In the span of a few years, a satellite has successfully orbited Earth, the first man and woman have already visited the black expanse, and a spacecraft has soft-landed on the lunar surface.

On 3rd April 1966, humanity took their next step. Luna 10, entered the lunar orbit, and almost 3 hours later, it completed its first orbit around the Moon. Launched on 31st March 1966, Luna 10 was part of the Soviet Union's Luna program, which had earlier achieved the first soft landing on the Moon.

There were three primary mission objectives for Luna 10. It was to gain experience in orbital operations, study the lunar environment and, most importantly, to achieve the first lunar orbit. Luna 10 achieved its primary objectives and taught us that the Moon's magnetic field is almost non-existent, lacks an atmosphere, has a non-uniform mass distribution - learnt through its distorted gravity, and the surface has a composition similar to terrestrial basalt.

On 30th May 1966, after Luna 10's batteries were depleted, the mission was terminated. During the 56 days spent in orbit, Luna 10 had completed 460 lunar orbits and transmitted data 219 times. It is believed that the spacecraft's orbit decayed rapidly after mission termination, and by the end of 1966, Luna 10 would have impacted the lunar surface. The impact location is unknown.



COSMONAUTICS DAY

After their success in launching Sputnik, the first artificial satellite to orbit the Earth, in 1957, the Union of Soviet Socialist Republics (USSR) began preparing for crewed missions.

On 12th April 1961, when Yuri Gagarin, a 27-year-old Air Force pilot, launched from Baikonur Cosmodrome, in modern-day Kazakhstan, history was made. His spacecraft, Vostok 1, broke free of the Earth's gravitational pull and entered orbit around the planet. Travelling at 27,400 km/h, the spherical spacecraft orbited Earth once.

Vostok 1 was a pressurized sphere made of aluminium alloy. The spherical design eliminated changes in the center of gravity, to make the journey somewhat comfortable for the cosmonaut. Vostok 1 had two windows built into it. One was positioned above Gagarin's head and the second was at his feet. Through the latter, he saw Earth.

Additionally, as scientists were unsure how weightlessness would affect the human body, most of the spacecraft's actions were dictated by the ground though Gagarin could override and take manual controls anytime.

After the 108-minute flight, Vostok 1 started its descent. Though it was a feat of engineering, it couldn't land safely. Thus, Gagarin ejected from the spacecraft 7 km above the ground and parachuted to the ground.

Today, 12th April, is commemorated as "Cosmonautics Day" in Russia.
(image credits:starcity-tours.com)

Ingenuity's First Flight



A group of NASA scientists sit in a room together, nervously waiting. The group awaits the news if, far away, on another planet, a 1.8 kg chopper flew or crashed. Then, the result came.

On 19th April 2021, Ingenuity lifted off the Martian surface. The flight lasted approximately 40 seconds and reached 3 meters above the ground. It is a brief flight by Earth standards but game-changing nonetheless.

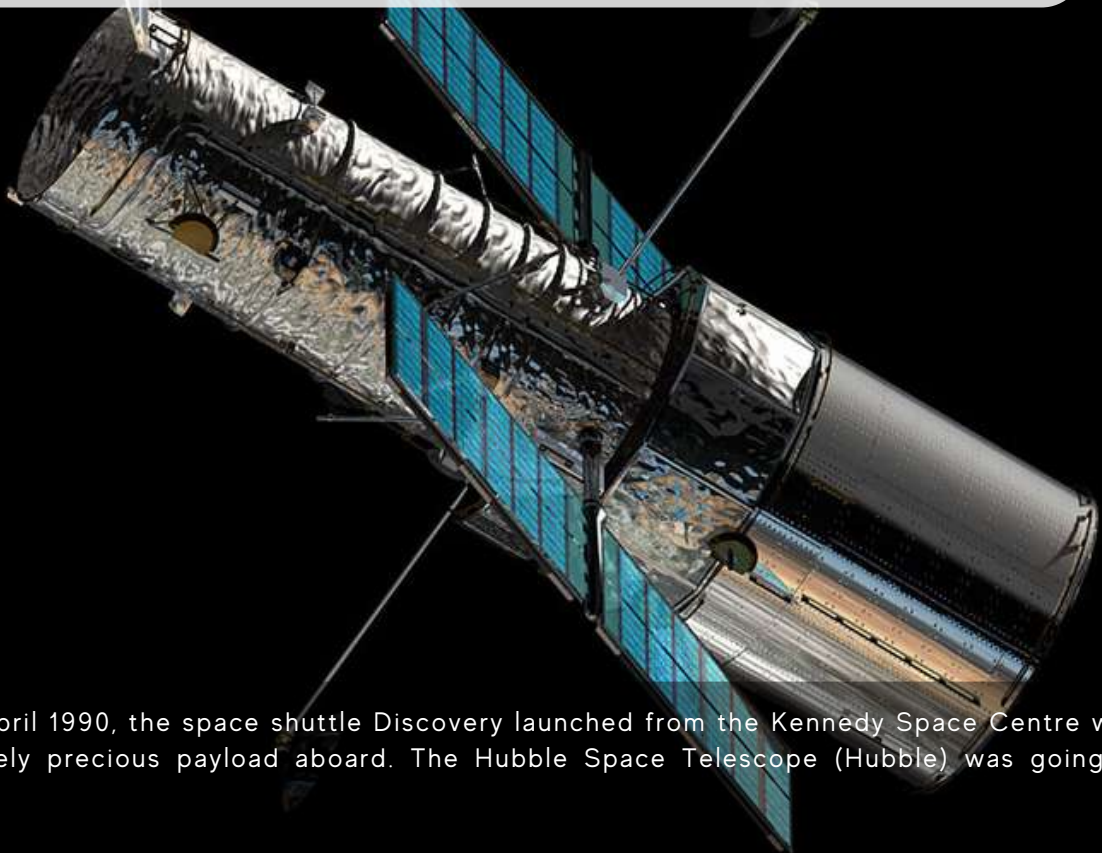
After all, the aerial exploration of Mars can begin.

Ingenuity left Earth's surface on 20th July 2020, hitching a ride with the Perseverance rover. Both rover and chopper landed on the Martian surface on 18th February 2021. Perseverance deployed Ingenuity from its belly on 3rd April 2021. Ingenuity was conceived as a proof of concept, to demonstrate that powered flight is possible on the red planet. Scientists were not sure if such a feat would be possible. After all, atmospheric pressure on the Martian surface level is equivalent to Earth's atmosphere at 28 km from the terrain. Additionally, a helicopter on Earth cannot fly higher than 7 km above the surface. However, while Mars has a thinner atmosphere, it also has a weaker gravity. When developing the mission, scientists hoped that this would have been enough for the flight to take place.

Ingenuity's mission lasted for almost 3 years, far exceeding its projected 30-day lifetime. Throughout its 72 flights, the half-a-meter-tall helicopter covered over 16 kilometres and reached 24 meters above the Martian surface. The mini-chopper adapted to survive the Martian winter and could land by itself.

Ingenuity's mission ended on 25th January 2024. A week earlier, its rotor blades got damaged upon landing, inhibiting future flights.

LAUNCHING HUBBLE



On 24th April 1990, the space shuttle Discovery launched from the Kennedy Space Centre with an extremely precious payload aboard. The Hubble Space Telescope (Hubble) was going to space.

The launch and deployment of Hubble was a long time coming. First conceived in 1969, as the Large Space Telescope, it was believed that by orbiting high above Earth, the telescope would have a clear view of the universe, and not be held back by the blurring and absorbing effects of the atmosphere.

Construction of the Large Space Telescope started in late 1978 and was followed shortly by NASA training their astronauts. NASA envisioned repairing the telescope while it was in space throughout its lifetime, and the astronauts would be doing it.

In 1983, NASA renamed the Large Space Telescope to Hubble Space Telescope, naming it after Edwin Hubble - the astronomer who expanded our perception of the universe while proving the universe was expanding.

Initially, Hubble was supposed to launch in October 1986. However, due to the Challenger disaster, which took place earlier in the year, Hubble's launch was delayed as NASA temporarily stopped the space shuttle program.

Hubble is a Cassegrain reflector telescope which observes visible, near-infrared and ultraviolet light. The initial images, however, puzzled scientists, as they showed the stars to be blurry and fuzzy instead of single points of light. This was due to a production error of the primary mirror which resulted in a surface aberration. NASA came up with a solution on how to deal with the issue before Hubble's first servicing mission. After the repair, Hubble returned information at its expected capabilities and provided astronomers with a unique observing platform.

Hubble still operates today, despite receiving its final service in May 2009. It is expected to work until 2040, operating alongside its successor, the James Webb Space Telescope, which has already launched, and the Nancy Grace Roman Space Telescope, which is yet to be launched.

Attention Spacians, fasten your seatbelts because we're embarking on our March Spaceship Adventures! March was an absolute blast, filled with celebrations that got everyone buzzing! We kicked off the month by launching into orbit with a stellar celebration of **National Science Day - SPACIAN SPECTRA**, curated by our amazing Education Department.

Imagine this: our space-themed extravaganza was filled with activities that turned science into an epic adventure! From quirky experiments to mind-blowing demos by our Space Educators, Spacians began on an out-of-this-world journey through the cosmos of curiosity. And guess what? We even challenged the notion that "Rocket Science is Hard," proving that with a dash of imagination, anything is possible!

Together, we soared to new heights, driven by our passion for discovery and our love for all things science. Here's to delving deeper into the universe of knowledge and having a blast along the way!



Women's day Celebration:

Women's Day at Space was a heartfelt tribute from the HR team to honor and uplift the incredible women in our workforce. It was a touching moment to recognize and celebrate the strength, resilience, and contributions of women, both within the workplace and beyond.

On this special day, we paused to reflect on the importance of creating a safe and inclusive environment where every woman feels valued and empowered.



Each female employee received a vibrant flower and a personalized handmade greeting card, symbolizing our appreciation and admiration for their unique talents and contributions. We believe that a personal touch goes a long way in making every individual feel cherished and remembered.

Together, let's continue to champion equality, diversity, and inclusivity, ensuring that every voice is heard and every woman feels there's scope to thrive more at our workplace and beyond. Here's to the remarkable women who inspire us every day!



Holi celebration:

Jumping right into our next vibrant celebration! On 23rd April 2024, we dove into the colorful chaos of Holi, where every splash of color symbolized the triumph of good over evil. It may have been a small gathering, but boy, was it packed with endless fun!

Imagine this: There's a rainbow of colors, with delicious Gujiya and Dhokla adding a flavorful twist to the festivities. And let's not forget the infectious beats of the dhol, decorated the dance floor as Spacians grooved like never before!

From color fights to lip-smacking treats and epic dance-offs, it was a Holi bash to remember at SPACE! Here's to celebrating the joy of togetherness and spreading smiles one color splash at a time!



Holi & Birthday celebration at Chennai office:

We started out Holi with excitement, gathering for face painting that splashed color across our faces. Laughter filled the air as we shared the joy of vibrant hues. The celebration reached its peak as we indulged in a team lunch, savoring delicious treats and bonding over shared experiences. But the festivities didn't end there! We continued the fun with a birthday celebration, adding another layer of happiness to our colorful day.



Lights, camera, Bolly Jolly! March-2024 Employee Engagement and Monthly Celebration

at Spaceship Dwarka was a full-on blockbuster Bollywood extravaganza! Our office transformed into a dazzling film set, complete with all the glamour of the silver screen. With the stage set for action, drama, and lots of masti, we rolled out the red carpet and celebrated the spirit of cinema in true Bollywood style!

To kickstart the show, we transformed our Spacians into iconic Bollywood characters like Munna Bhai, Geet, Chulbul Pandey, Jai-Veeru, Mogambo, Vijay Deenanath Chauhan, Chatur, and many more. It was a riot of laughter as everyone cherished their alter egos and brought the magic of Bollywood to life!



As the credits rolled, our CEOs shared their blockbuster plans for the upcoming year, setting the stage for an epic journey ahead. But the real stars of the show were our Spacians of the Month - Muskan from HR and Admin Department, and Vikas Kumar Mishra from Academic Support Department.

But wait, the interval wasn't just about grabbing popcorn! We brought out the ice cream truck, whisking everyone away on a nostalgic trip down memory lane, reliving the joys of childhood with candy sticks and frozen treats.

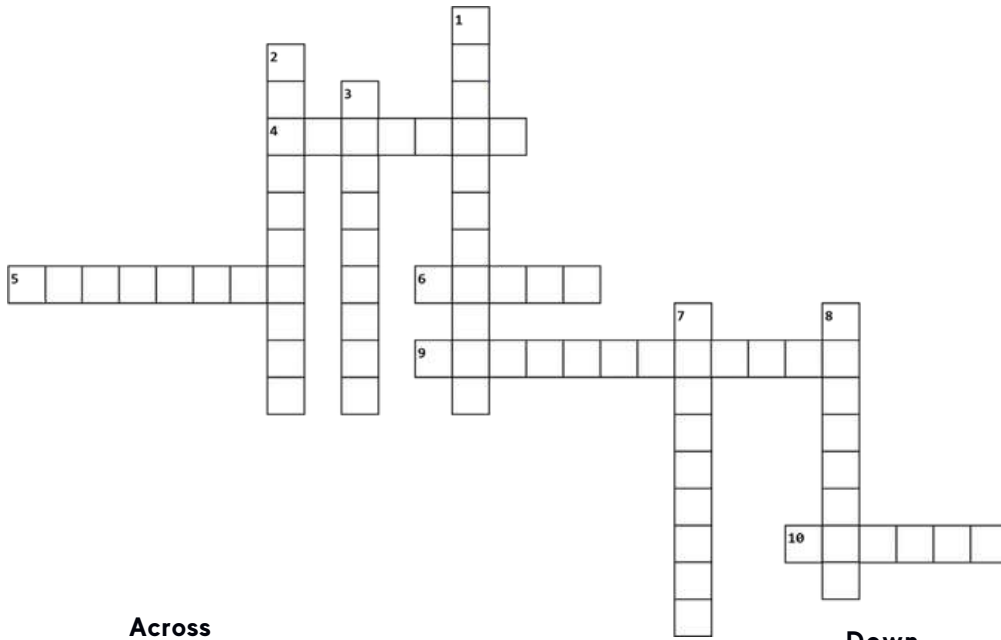
As the movie resumed, it was time for some Bollywood madness! Groups battled it out in a frenzy of song and movie guessing, accompanied by instrumental tunes that had everyone tapping their feet and humming along.

And just like every Bollywood blockbuster, our celebration ended on a high note, with smiles, laughter, and memories to last a lifetime. Here's to many more cinematic adventures and unforgettable moments at Spaceship Dwarka!



TRAIN YOUR BRAIN

CROSSWORD



Across

- 4. Who is attributed with the identification of Saturn's largest moon, Titan?
- 5. Which spacecraft carried Kalpana Chawla into space in 1997?
- 6. What asteroid did OSIRIS-REx go to?
- 9. Which space rover touched down on the Martian surface on February 8, 2021?
- 10. What is the name of Mars's larger moon?

Down

- 1. How many moons constitute the Uranus system?
- 2. Who captured the first-ever photograph of the moon?
- 3. What is the name of the humanoid robot scheduled to journey into space aboard ISRO's inaugural human spaceflight mission?
- 7. What was the inaugural satellite launched by ISRO into space?
- 8. Who is credited with the discovery of Uranus?

ASTRONOMY WORD PUZZLE

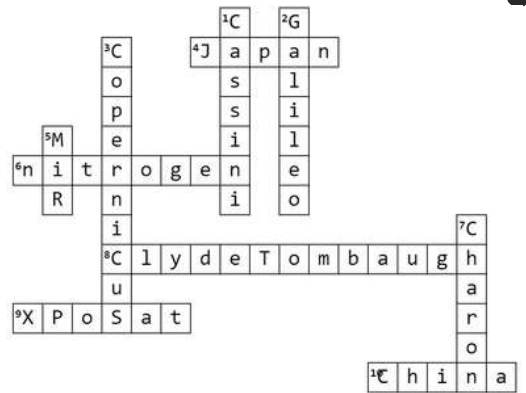
Find the names of the Jupiter's Moon from the mixed letters and mark them.

JUPITER MOONS

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

- VALETUDO
- KORE
- EIRENE
- PASITHEE
- EUPHEME
- IOCASTE
- PANDIA
- MNEME
- ISONOE
- AITNE
- PHILOPHROSYNE
- CHALDENE
- HERSE
- CYLLENE
- ERSA

Answers for last month puzzles.



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

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

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