SPACE™
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Galactica

Astronomy and Space Science Magazine



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

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ABOUT SPACE

Legacy of 24 years | Pioneer Organization | 10000+ Activities Developed | 1000+ Schools Associated | 1.5M+ Students Engaged | 10K+ Outreach Events | 10+ Cities Presence

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

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

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

CMD's Message



Dr. Sachin Bahmba, CMD, SPACE

Space and Astronomy are the future for the young generation of our country. This is a great means to inculcate scientific temperament among the masses. Such astronomy sessions will provide a hands-on learning platform for students wherein they explore the real world of science, I wish for young students to let their ambitions soar and think big as they are the future of our country.

Co-founder's Message



Ms. Shalini Bahmba, Co-founder, SPACE

Astronomy education is important as it builds curiosity, critical thinking, and problem-solving skills, helping young minds prepare for the future. It encourages innovation, exploration, and a scientific mindset. Young learners build creativity and confidence through hands-on, experiential learning, preparing them for careers in space science and technology. We aim to cultivate future innovators who will lead progress, discovery, and global advancement.

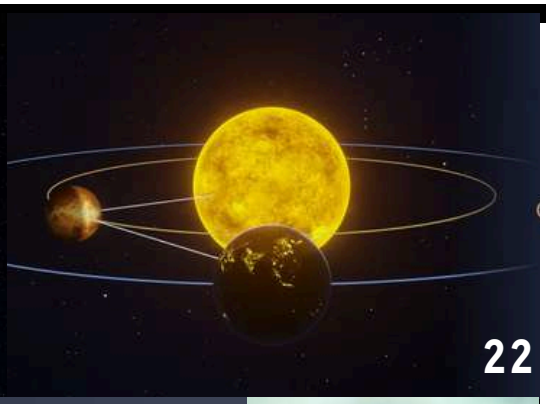
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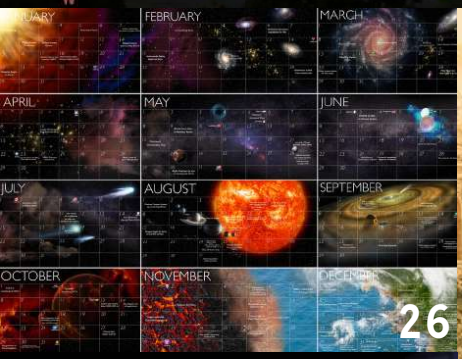
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SPACE INSIGHTS

A Celestial Odyssey: Celebrating a Landmark Year for the "Universe In The School" (2025-2026)

The academic year **2025-2026** marked a transformative era for STEM education across the region as the **Universe In The School (UITS)** program reached new heights in **Nagpur, Bhandara, and Wadamba**. This interdisciplinary initiative was successfully implemented in seven institutions, including **Bishop Cotton Primary & High School** (State Board Sadar, CBSE Sadar, and Dharampeth), **St. Paul's English School** (Bhandara), **St. Ursula Girls' High School & Junior College**, **St. Ursula Primary School**, and **St. Peter High School** (Wadamba). The program brought the wonders of the cosmos directly to students through activity-based experiential learning designed to seamlessly integrate with the regular curriculum

Khagolshala: Maharashtra's First School Space Lab

A historic milestone was achieved at St. Ursula Girls' High School & Junior College with the inauguration of Khagolshala, the state's first school based Space Lab established in collaboration with SPACE India. This state of the art facility is equipped with meticulously arranged astronomy models, telescopes, celestial globes, and scientific instruments. Khagolshala serves as a hub of exploration, inviting students to move beyond textbooks and engage with real scientific tools through inquiry-based discovery.

A Journey of Experiential Discovery: Monthly Achievements Guided by dedicated SPACE educators, the year was defined by the following stellar milestones:

- **July: Sally Ride EarthKAM Workshop:** Students acted as mission controllers, researching global geographical locations and requesting live images of Earth from the **International Space Station (ISS)**.
- **August: National Space Day Celebrations:** Centred on the theme **"Viksit Bharat in Orbit,"** schools hosted vibrant assemblies, 3D model showcases of the Vikram lander, and the popular **"Chef in Space"** activity.
- **September: Lunar Eclipse Observation:** Special evening events were held to observe the eclipsed moon through telescopes, accompanied by student-led discussions to debunk lunar myths.
- **October: Safe Solar Viewing Methods:** Students learned direct and indirect observation techniques using **solar view goggles**, **projection methods**, and student made **pinhole cameras.**
- **November: Solar Observation & Space Lab Tours:** Using telescopes with certified filters, students identified sunspots and learned about the sunspot cycle, while St. Ursula students explored the new Khagolshala lab.





- **December: Cold Moon Exploration:** Sunshine Students participated in evening observations of the **Cold Moon**, fostering a deeper connection with nature through professional telescopes.
- **January: Rocketry Workshops:** A high-energy month where students designed and launched **pop, stomp, and hydro (water) rockets**, gaining a practical understanding of propulsion and aerodynamics.
- **February: Astronomy Showcases & Evening Observations:** Schools organized showcases during science exhibitions, featuring student-made models. **Evening Sky Observations** allowed parents and students to view the **Moon and Jupiter** up close.
- **April: Summer Camps:** The year concluded with **"Train Like an Astronaut"** activities testing physical strength and coordination, alongside terrestrial observation sessions.







A Quarter-Century Legacy of Inspiring Minds As we look back on this stellar year, it is clear that the UITS program has done more than teach science; it has ignited a lifelong passion for discovery. To our dedicated community of readers, educators, and young space enthusiasts, this journey is a testament to the **25-year legacy of SPACE India** in revolutionizing STEM learning. By bridging the gap between classroom theory and the vast expanse of the universe, we continue to nurture the critical thinkers and innovators of tomorrow.

As we celebrate these milestones in Nagpur, Bhandara, and Wadamba, let us continue to **shoot for the moon and shine among the stars**, empowering every student to become a "young scientist" ready to lead the future of global discovery.

Exploring the Universe Through Hands-On Learning

Summer Camp & Night Sky Observation Camp 2026

The Summer Camp 2026, at St. Ursula Girls High School & Jr. College Nagpur conducted by the Space Academy from 26th April 2026, was an engaging and activity-based learning experience for students. Under the guidance of the Space Educators, students constructed their own pinhole cameras and observed the Sun, helping them understand basic astronomical concepts through hands-on practice. They also explored terrestrial observation using a 50 mm telescope, where they viewed objects such as the tops of towers and trees.



The camp included the exciting activity "Can You Be an Astronaut?", in which students underwent tests like lung capacity, muscle endurance, balance, and critical thinking, giving them insight into astronaut training.

Overall, the camp emphasized experiential learning and actively enhanced students' scientific curiosity and communication skills.

The Night Camp, held on 29th April, was an equally enriching and enjoyable experience at the hostel ground. Students assembled telescopes and observed celestial objects such as Jupiter and its moons, as well as the Moon and its surface features.

They also learned about stars and constellations during sky tour, gaining a deeper understanding of the night sky.





The event was graced by the presence of the Manager, Principal, and Vice Principal, who motivated and encouraged the students.

With active participation from guests and students alike, the night camp created a memorable atmosphere of discovery, confidence building, and excitement for astronomy.

Igniting Young Minds: A Journey of Space Exploration

K. R. Mangalam World School, Vaishali, experienced an uplifting celebration of creativity, scientific exploration, and imagination through two extraordinary events held in May 2026. These initiatives inspired students to transcend traditional learning and delve into the practical and inventive dimensions of science.

On 4th May 2026, Grade I students held a unique morning assembly in honor of National Astronaut Day. The assembly underscored the significance of curiosity, bravery, and ambitious dreams through captivating performances and enthusiastic involvement.

The students showcased a meaningful skit that motivated young minds to dream of space exploration, featuring iconic figures like Satish Dhawan, Kalpana Chawla, and Alan Shepard. One student vividly portrayed an astronaut sharing tales from space, generating excitement and wonder among the spectators. The convention culminated in a lively dance performance to Dil Mein Mars Hai, filling the atmosphere with joy and exuberance.









Continuing to foster hands-on learning, the school organized the Aerodynamics Challenge on 14th May 2026 as part of DIMENSIONS 2026. Students from four schools took part in the competition, where they crafted functional parachutes using limited supplies within a designated timeframe. The event served as a venue for collaboration, experimentation, and the practical application of aerodynamics. Participants evaluated and refined their designs while concentrating on stability, descent duration, and innovation.

Exhibiting outstanding artistry and collaboration, K. R. Mangalam World School, Vaishali, proudly claimed victory in the Aerodynamics Challenge.

Five Days Among the Stars: Summer Camp at Victoria School

A five-day Astronomy Summer Camp was successfully conducted at Victoria School CBSE, Thoothukudi, from May 4 to 8, 2026. The camp brought together enthusiastic students from various schools, providing them with an engaging platform to explore the wonders of space through hands-on learning and interactive activities.

The programme was organized in two batches, catering to students of Grades 1–5 and Grades 6 & above. Throughout the camp, participants were introduced to a wide range of topics, including rockets, satellites, hydraulics and their applications, the science of light, the Sun, the Moon, planets, and the concept of future lunar settlements. The sessions were designed to encourage curiosity, critical thinking, and scientific exploration Learning was reinforced through a variety of practical activities and experiments.





Students launched pop rockets, safely observed the Sun using certified solar filters, built hydrobots, explored the properties of light through experiments, experienced the ISS and spacewalk through VR and created models of lunar settlements. These hands-on experiences enabled participants to connect scientific concepts with real-world applications while making learning both enjoyable and memorable.

One of the highlights of the camp was a special evening observation session, where students and their parents gathered to observe planets through telescopes. The session provided participants with a unique opportunity to experience the beauty of the night sky firsthand and deepen their appreciation for astronomy.

The Astronomy Summer Camp successfully combined education, experimentation, and discovery, fostering scientific curiosity among young learners. Through such initiatives, it continues to inspire the next generation of explorers, innovators, and space enthusiasts while making astronomy accessible, engaging, and meaningful for students of all ages.

HIGHLIGHTS OF MAY 2026



Mahoba Joins the Global Asteroid Search

AIASC (All India Asteroid Search Campaign) is the Indian edition of the International Astronomical Search Collaboration> (IASC). It is a citizen-science initiative that allows students, teachers, and astronomy enthusiasts to participate in real asteroid search and discovery activities.

Through AIASC, participants receive astronomical image sets from professional observatories and analyze them using Astrometrica software. By comparing a sequence of images, they identify moving objects such as asteroids and report their findings for verification. This program provides hands-on experience in astronomical research, data analysis, and asteroid detection while contributing to ongoing scientific studies of our Solar System.

IASC (International Astronomical Search Collaboration) is a global educational program that collaborates with schools and institutions worldwide, enabling students to work with real astronomical data and contribute to asteroid discoveries alongside professional astronomers.

Mahoba's students have not only looked at the stars, but have now taken a significant step towards understanding and discovering them.

The AIASC 2026 Mahoba Training Program concluded successfully with a 2 day Teachers Training Program held from 13 to 14 May, followed by a 6 day Student Training Program conducted from 15 to 20 May. Through this initiative, students were prepared for the two month International Asteroid Search Campaign 2026.

With the support of the District Administration Mahoba, more than 900 students and over 50 teachers were introduced to the world of real astronomical research. This initiative, led by SPACE India, gave the youth of Mahoba an opportunity to become part of a global NASA supported outreach programme.

This was not just a training programme, but an inspiring journey connecting young minds with science, space research, and international exposure.

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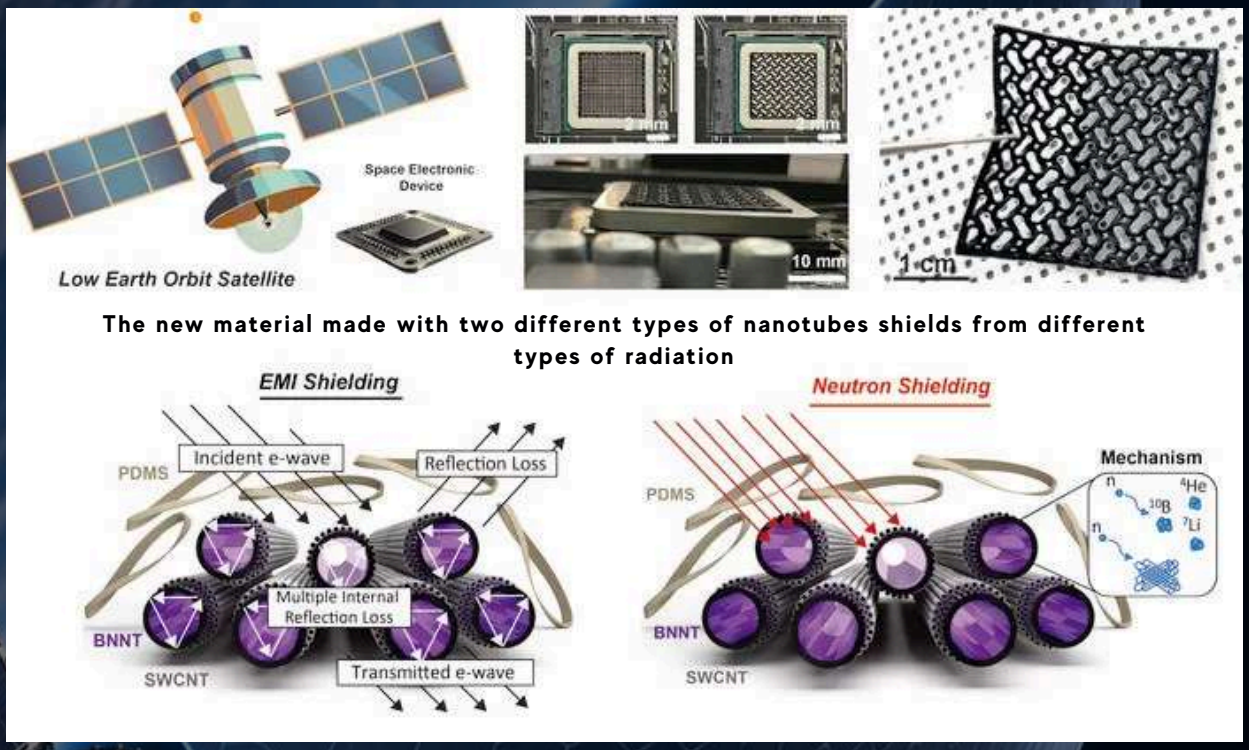
To know more about:
https://space-india.com/outreach/all-india-asteroid-search-campaign/

IASC

Flexible Nano-Shield Could Make Space Technology Safer

Scientists have developed a groundbreaking new material that may revolutionize radiation protection in future space missions. Thinner than a human hair and flexible like rubber, the material is designed to shield both astronauts and sensitive technology from harmful radiation while adding very little weight a major advantage for spacecraft and satellites.

Radiation remains one of the biggest challenges in space exploration. Beyond cosmic radiation in space, many technologies used in spacecraft, satellites, medical equipment, and semiconductors also emit electromagnetic and neutron radiation. These radiations can interfere with nearby electronics and even pose health risks to people working with such systems.



The new material made with two different types of nanotubes shields from different types of radiation

To solve this problem, researchers at the Korea Institute of Science and Technology created a lightweight shielding material using two types of nanotubes carbon nanotubes and boron nitride nanotubes. Carbon nanotubes help absorb and reflect electromagnetic waves, while boron nitride nanotubes capture neutron radiation. Together, they can block an impressive 99.999% of electromagnetic waves and nearly 72% of neutron radiation.

One of the most exciting features of the material is its flexibility. It can stretch to twice its original length and can even be 3D-printed into different shapes. Researchers discovered that printing it in a honeycomb structure improved its shielding ability by an additional 15%.

This innovation could become a gamemchanger for nextmgeneration space technology. From satellites and space stations to astronaut protective gear, the ultramlight and highly effective material may help create safer and more efficient missions in the future.

Into the Sun's Secret Heart "SNAPPY Leads the Way"

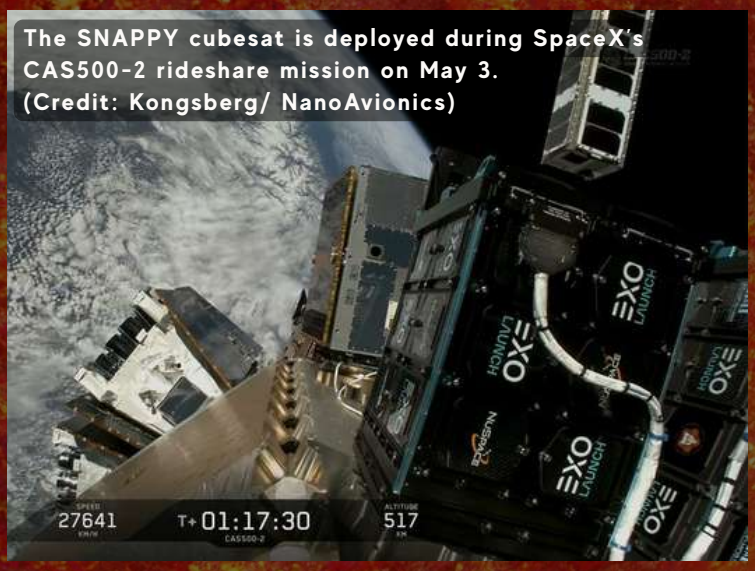


SNAPPY undergoing payload integration.
Credit - SpaceX

Scientists have launched the world's first space based neutrino detector, marking a major breakthrough in the study of the mysterious particles that constantly stream through the universe. The mission, called SNAPPY (Solar Neutrino Astro-Particle Physic), aims to test new technology that could one day allow scientists to directly study processes taking place deep inside the sun.

The tiny detector was launched aboard SpaceX's CAS500-2 rideshare mission on May 3. Packed inside a small 3U cubesat roughly the size of a shoebox, the instrument will orbit Earth at an altitude of about 500 kilometers for nearly two years. Developed using crystals of gallium and tungsten, the detector is designed to capture elusive neutrinos more efficiently than many Earth-based systems.

Neutrinos are extremely tiny, nearly massless particles produced during nuclear reactions inside stars, supernova explosions, and nuclear reactors. Although trillions pass through our bodies every second, they rarely interact with matter, making them incredibly difficult to detect. To study them on Earth, scientists usually rely on giant underground observatories such as the IceCube Observatory in Antarctica or China's Jiangmen Underground Neutrino Observatory.



The SNAPPY cubesat is deployed during SpaceX's CAS500-2 rideshare mission on May 3.
(Credit: Kongsberg/ NanoAvionics)

The mission's primary goal is to confirm that neutrino detection in space is possible. If successful, future missions may carry advanced detectors much closer to the sun, enabling scientists to observe nuclear fusion processes happening deep within the solar core.

Researchers say studying solar neutrinos could reveal hidden details about how the sun produces energy. Since neutrinos escape from the sun's core within seconds, they provide a direct view into regions impossible to observe using conventional instruments.

Scientists describe the mission as "placing a microscope into the core of the sun," potentially opening a completely new era in solar and particle physics research.

India and Sweden Join Forces for Historic Venus Mission

India's growing influence in global space exploration has taken another major leap with the launch of a historic partnership between Indian Space Research Organisation and Sweden for the ambitious Shukrayaan mission to Venus. Signed during Prime Minister Narendra Modi's visit to Gothenburg, the agreement marks India's first dedicated mission to explore Venus, often called Earth's "twin planet."



PM Narendra Modi meets Sweden counterpart Stefan Lofven

While Earth supports life, Venus is a hostile world with temperatures above 460°C, crushing atmospheric pressure, and clouds filled with sulphuric acid. Scientists believe studying Venus could provide valuable clues about planetary evolution and even Earth's future climate.

A key highlight of the India-Sweden collaboration is the contribution from the Swedish Institute of Space Physics, which will provide the Venusian Neutrals Analyser (VNA). This advanced instrument will become part of VISWAS (Venus Ionospheric and Solar Wind Particle AnalySer), developed by India's Space Physics Laboratory in Kerala. The mission will carry 19 scientific payloads, including international contributions from Russia as well.

The VNA instrument will study how solar wind strips away particles from Venus's upper atmosphere. By examining these escaping particles, scientists hope to understand how Venus gradually lost much of its atmosphere over millions of years.

Approved in 2024 with a budget of around ₹1,236 crore, Shukrayaan demonstrates ISRO's reputation for cost-effective yet highly successful missions, following achievements like Chandrayaan-3 Moon Landing and the Mars Orbiter Mission.



Expected to reach Venus after a 112-day journey, the spacecraft will orbit the planet in July 2028, collecting crucial data from various altitudes. Beyond science, the mission symbolizes India's emergence as a trusted global leader in space exploration, strengthening international cooperation in research, technology and innovation.

Strange Stacked Stones Spotted on Mars

NASA's NASA Perseverance rover has once again captured a fascinating mystery on the surface of Mars. On May 13, 2026, during its 1,859th Martian day or "Sol" the rover photographed what appears to be a strange stack of rocks sitting alone in the dusty red landscape. The unusual formation, imaged using Perseverance's Mastcam-Z camera system, resembles three stones carefully balanced on top of one another, almost like a pile created by hikers on Earth.

The discovery immediately sparked curiosity among space enthusiasts. At first glance, the rocks look intentionally stacked, leading many to jokingly wonder if someone had secretly visited Mars before humans officially arrived. However, scientists believe there is a much more natural explanation behind the bizarre structure.



NASA's Perseverance rover spotted a stack of rocks on the Martian surface.

Researchers suggest the formation is likely a single rock that cracked apart over millions of years due to powerful Martian winds and ancient water activity. Mars experiences intense erosion caused by dust storms and changing temperatures, slowly shaping and sculpting rocks into unusual forms. Similar strange geological formations have been spotted before, including striped rocks, spherical stones, and oddly patterned surfaces.

Although the stacked stones may look simple, they offer scientists valuable clues about the Red Planet's history. By studying these formations, researchers can better understand how wind, water, and climate once transformed Mars. Every unusual rock photographed by Perseverance adds another piece to the puzzle of Mars' ancient environment and its potential to once support life.

New Study Reveals Link Between Sunspots and Space Debris



Causes of Space Debris

A new study has revealed that space debris orbiting Earth falls back toward the planet much faster during periods of intense solar activity, a discovery that could significantly improve satellite collision forecasting and mission planning.

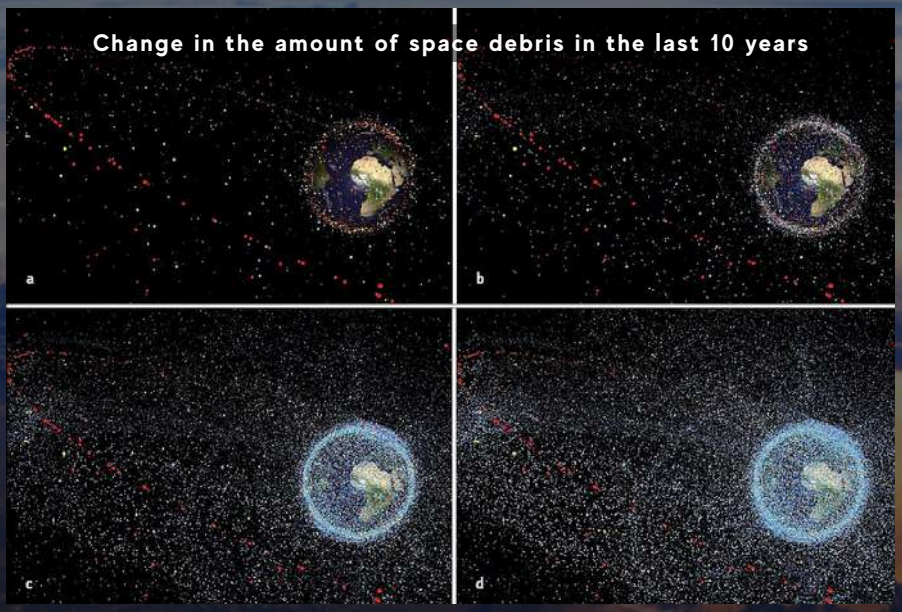
Researchers from the Vikram Sarabhai Space Centre analyzed the movement of 17 pieces of space junk in Low Earth Orbit (LEO) over a span of 36 years. Their findings, published in Frontiers in Astronomy and Space Sciences, show that once solar activity reaches around 67% of its peak, orbital debris begins losing altitude at a much faster rate.

The Sun follows an 11-year cycle of activity marked by the appearance of sunspots. During active phases, the Sun emits stronger ultraviolet radiation and charged particles. These emissions heat and expand Earth's thermosphere, increasing atmospheric density at high altitudes. As a result, orbiting objects experience greater atmospheric drag, causing them to slow down and descend more rapidly.

The study identified a "transition boundary" where this effect sharply intensifies. Scientists believe this threshold is linked to stronger Extreme Ultraviolet (EUV) radiation produced near the solar maximum.



Layer around Earth formed by space debris



As Low Earth Orbit becomes increasingly crowded with satellites and debris from past missions, understanding orbital decay is becoming critical. During periods of high solar activity, increased atmospheric drag causes objects to lose altitude faster, requiring satellites to perform more frequent orbit corrections and consume additional fuel.

Interestingly, the decades-old debris objects used in the study continue to contribute valuable scientific insights, helping researchers better understand how solar cycles influence Earth's upper atmosphere and the future sustainability of space operations.

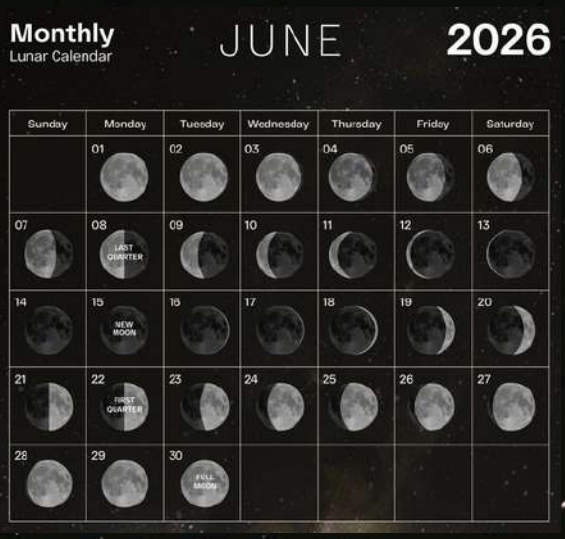
WHAT'S UP IN THE SKY - JUNE 2026

LUNAR CALENDAR

IMPORTANCE OF MOON PHASES FOR STARGAZERS

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

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



PLANETS VISIBILITY

Mercury
Visible in evening sky. Greatest eastern elongation (24.5°) on 15 June. Lost after 20 June.



Venus
Evening planet, best seen in early June, setting late. Near Jupiter on 9 June, Moon on 17 June.



Mars
Morning planet, poorly placed. Low in dawn sky, difficult visibility.



Jupiter
Struggling in evening twilight. Between Venus and Mercury on 16–17 June, near waxing crescent Moon.



Saturn
Poor morning planet initially, improving slightly in visibility throughout June.



Uranus
Uranus is near the Sun, so it's lost in glare and not safely visible.



Neptune
Not visible this month; remains too close to the Sun for observation.



BRIGHT DEEP SKY OBJECTS

Messier 13 one of the finest globular clusters in the Northern Hemisphere, located in Hercules. It contains hundreds of thousands of stars packed tightly together. Easily visible through binoculars and stunning through telescopes, M13 is a favorite target during June evenings.





Messier 57, also known as the Ring Nebula, located in the constellation Lyra, the Ring Nebula is a planetary nebula formed when a dying star expelled its outer layers. Small telescopes reveal its distinctive ring-like appearance, while larger instruments show more details of this beautiful celestial object.

Messier 27, also known as the Dumbbell Nebula, the first planetary nebula ever discovered, located in Vulpecula.. Easily visible through small telescopes, it showcases the final evolutionary stage of a Sun-like star.





Messier 6 a beautiful open cluster in Scorpius containing dozens of bright stars. Its arrangement resembles the wings of a butterfly, giving the cluster its popular name. Best viewed through binoculars, it stands out against the rich Milky Way background.

ROCKET LAUNCHES IN JUNE 2026

A NEW CHAPTER FOR GLOBALSTAR BEGINS IN ORBIT

Globalstar 2-R Mission 1 is a communications satellite mission planned to launch aboard the Falcon 9 Block 5 rocket from Cape Canaveral, Florida. The launch is currently targeted for June 2026, carrying nine next generation Globalstar satellites into Low Earth Orbit at about 1,410 km altitude and 52° inclination.

The Falcon 9 rocket uses a two stage mechanism powered by Merlin engines. After liftoff, the reusable first stage separates and lands on the drone ship "A Shortfall of Gravitas," while the second stage continues pushing the payload into orbit. This reusable system lowers launch costs and improves mission efficiency for satellite constellation deployment.

The rocket is about 70 meters tall with a 3.7 meter diameter and can carry over 22,000 kg to Low Earth Orbit. Its design includes aluminum-lithium tanks, carbon-fiber interstage structures, and autonomous landing technology. The mission satellites are being built by MDA with Rocket Lab supplying satellite buses and deployment systems for the upgraded Globalstar network.



Falcon 9 Block 5
(Credit:SpaceX)

SATELLITES THAT TALK DIRECTLY TO SMARTPHONES



New Glenn
(Credit:Blue Origin)

BlueBird 8 to 10 is a commercial communications satellite mission expected to launch in June 2026 from Cape Canaveral, Florida, USA. The mission will place three BlueBird satellitesBlueBird 8, 9, and 10 into Low Earth Orbit (LEO). These satellites are designed to provide direct satellite to mobile broadband connectivity, allowing standard smartphones to access network coverage even in remote areas without cell towers.

The mission will use the Falcon 9 Block 5 rocket developed by SpaceX. Falcon 9 is a reusable two-stage rocket powered by Merlin engines that use liquid oxygen (LOX) and RP-1 kerosene fuel. The rocket produces high thrust during launch and carries payloads efficiently into orbit.

The rocket mechanism involves the first stage lifting the vehicle through the atmosphere before separating and landing vertically for reuse. The second stage continues toward orbit and deploys the satellites precisely into their planned orbital path, helping reduce launch costs and improve mission reliability.

JAXA'S H3 ROCKET PREPARES FOR A MAJOR TEST

H3-30 Test Flight is a Japanese space mission planned as a test flight of the H3 launch vehicle, expected to launch in June 2026 from the Tanegashima Space Center, Japan. The mission type is a rocket test and technology demonstration mission. It is conducted to evaluate the performance, reliability, and operational capability of Japan's next-generation launch system for future satellite and exploration missions.

The mission uses the H3 Launch Vehicle developed by JAXA and Mitsubishi Heavy Industries. The H3 rocket is a two stage launch vehicle powered by liquid hydrogen and liquid oxygen engines. It is designed to provide higher payload capacity with lower launch costs and improved efficiency.

The rocket mechanism involves solid rocket boosters and the main engine generating thrust during liftoff. After fuel consumption, the stages separate, allowing the second stage to continue toward orbit. The test flight will help verify rocket systems, flight stability, and payload deployment performance for future missions.



H3-30S
(Credit: JAXA)

AMAZON'S MISSION TO CONNECT THE WORLD



Atlas V 551
(Credit: Amazon news)

Amazon LEO (LA-08) is a commercial satellite mission planned for June 2026 to support Amazon's Project Kuiper broadband constellation. The mission will launch multiple internet satellites into Low Earth Orbit (LEO) to provide high-speed internet access across the world, especially in remote and underserved regions. The mission type is a communications and satellite constellation deployment mission.

The mission is expected to use the Atlas V rocket developed by United Launch Alliance. Atlas V is a two stage launch vehicle powered by an RD-180 main engine and solid rocket boosters. It uses liquid oxygen and RP-1 kerosene fuel to generate strong thrust during launch and ascent.

The rocket mechanism involves the first stage lifting the rocket through Earth's atmosphere before stage separation occurs. The upper stage then continues toward orbit and deploys the satellites accurately into their planned positions. This mechanism ensures reliable satellite placement and supports the expansion of global broadband connectivity.

T1H-1: A NEW ERA OF ROCKET REUSABILITY BEGINS

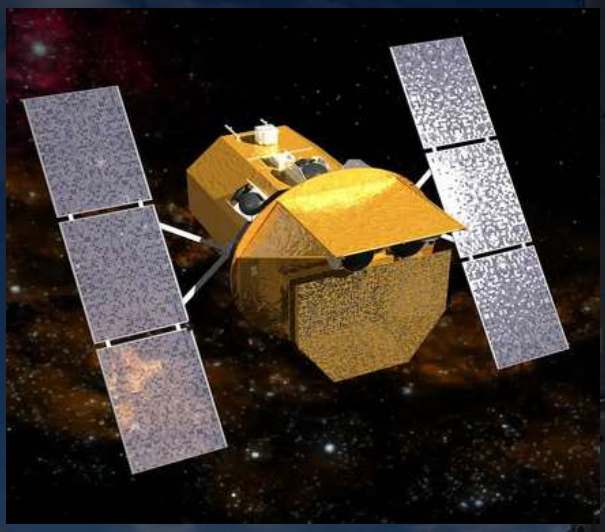
T1H-1 is a European space technology mission planned for 30 June 2026 at the Esrange Space Center in Kiruna, Sweden. The mission type is a reusability technology demonstration and test flight. It is the first low altitude hop test of the Themis reusable rocket demonstrator, designed to test vertical takeoff and landing technologies for future reusable European launch vehicles.


Themis T1H
(Credit: ESA)

The mission uses the Themis Demonstrator developed by ESA and ArianeGroup. The rocket is powered by the Prometheus engine, which uses liquid oxygen (LOX) and liquid methane fuel. The reusable rocket system is designed to lower launch costs and improve operational efficiency for future European space missions.

The rocket mechanism involves vertical launch, controlled hovering, and vertical landing. During the test, the engine generates thrust to lift the vehicle to a low altitude of about 100 meters before descending safely back to the landing pad using landing legs and throttle control.

A LIFELINE IN ORBIT: THE SWIFT RESCUE MISSION




(Credit:SpaceX)

Swift Rescue Mission is a planned emergency crew transportation mission expected to launch in June 2026. The mission type is a crewed rescue and recovery space mission, designed to safely transport astronauts during emergency situations or support crew return operations from low Earth orbit. Such missions play an important role in maintaining astronaut safety and uninterrupted space station activities.

The mission is expected to use the Falcon 9 Block 5 rocket along with the Dragon spacecraft developed by SpaceX. Falcon 9 is a reusable two stage rocket powered by Merlin engines using liquid oxygen (LOX) and RP-1 kerosene fuel. The Dragon spacecraft is designed to carry astronauts safely to and from orbit.

The rocket mechanism involves the first stage generating thrust during liftoff and then separating after fuel depletion. The booster lands vertically for reuse, while the second stage carries the Dragon capsule into orbit. The spacecraft then docks with the station or performs rescue operations before safely returning astronauts to Earth.

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

SETBACKS THAT BUILT SPACE SUCCESS

GENESIS: THE MISSION THAT COLLECTED SAMPLES FROM THE SOLAR WIND

In 2001, NASA launched the Genesis mission, a project designed to collect tiny particles from the Sun called solar wind. Scientists hoped these particles would reveal how our solar system formed 4.6 billion years ago.

The spacecraft traveled nearly a million miles from Earth to a special point in space where the gravity of the Earth and Sun balance each other. There, Genesis collected solar particles using delicate scientific collectors.

In 2004, the spacecraft returned to Earth carrying these valuable samples. NASA planned for helicopters with stunt pilots to catch the falling capsule before it landed, protecting the fragile material inside. But the plan failed.

The parachutes never opened, and the capsule crashed into the Utah desert at almost 200 miles per hour. The impact shattered the collectors into thousands of pieces and covered them with dirt and dust.

Investigators later found the cause: four tiny gravity switches had been installed backwards because of an error in the design drawings. These switches were supposed to detect the capsule slowing down and trigger the parachutes.

Even after the crash, the mission still taught NASA important lessons about testing and spacecraft design. The discovery also helped NASA verify the safety of the Stardust mission, which landed safely in 2006.

Scientists then spent years cleaning and studying more than 10,000 broken fragments. Despite the disastrous landing, they still achieved many of the mission's scientific goals.

The Genesis mission proved that even a failed landing can still lead to major discoveries.



Remains of NASA's Genesis sample. (Credit: USAF 388th Range Squadron)

Happy Birthday



John Couch Adams

John Couch Adams (5 June 1819 – 21 January 1892) was an English mathematician and astronomer best known for predicting the existence of the planet Neptune using mathematical calculations. By studying irregularities in the orbit of Uranus, Adams independently proposed the position of an unseen planet whose gravitational influence explained the deviations. His work, alongside that of Urbain Le Verrier, led to the discovery of Neptune in 1846, marking a major triumph for celestial mechanics. Adams also contributed to studies of meteor showers, lunar motion, and gravitational theory, and later served as director of the Cambridge Observatory. (Image credit:wikipedia.org)

Giovanni Domenico Cassini

Giovanni Domenico Cassini (8 June 1625 – 14 September 1712) was an Italian-French astronomer, engineer, and mathematician renowned for his pioneering discoveries in planetary astronomy. He discovered four moons of Saturn Iapetus, Rhea, Tethys, and Dione – and identified the prominent division in Saturn's rings now known as the Cassini Division. Cassini also made important observations of Jupiter and Mars, improved astronomical mapping, and helped determine the scale of the Solar System through planetary measurements. As director of the Paris Observatory, he played a major role in advancing observational astronomy during the 17th century. (Image credit:britannica.com)



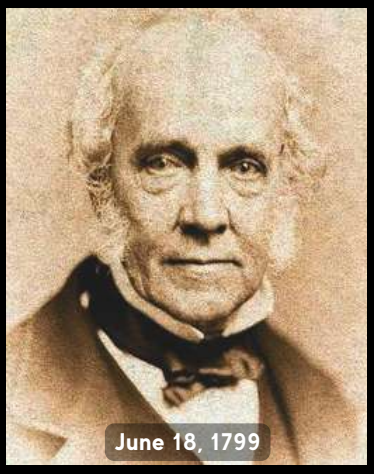


E. C. George Sudarshan

E. C. George Sudarshan (16 June 1931 – 13 May 2018) was an Indian theoretical physicist renowned for his groundbreaking contributions to quantum optics, particle physics, and the foundations of quantum theory. He is best known for developing the Sudarshan Glauber representation in quantum optics and for formulating the V–A theory of weak interactions, which played a crucial role in the understanding of particle decay processes. Sudarshan also made significant contributions to tachyon theory, open quantum systems, and relativistic physics. Through his research and teaching, he became one of the most influential theoretical physicists of the 20th century and greatly advanced modern physics. (Image credit:newsindiatimes.com)

Happy Birthday

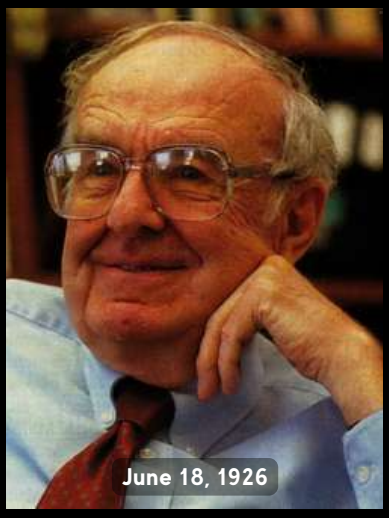
William Lassell



William Lassell (18 June 1799 – 5 October 1880) was an English astronomer and telescope maker celebrated for his discoveries of several planetary moons and his advancements in reflecting telescope design. Using telescopes he constructed himself, Lassell discovered Triton, the largest moon of Neptune, shortly after Neptune's discovery in 1846. He also discovered Hyperion, a moon of Saturn, and Ariel and Umbriel, two moons of Uranus. His innovative use of large reflecting telescopes greatly improved planetary observation in the 19th century and contributed significantly to the study of the outer Solar System. (Image credit:astronomyedinburgh.org)

Allan Sandage

Allan Sandage (18 June 1926 – 13 November 2010) was an American astronomer renowned for his pioneering research on the expansion, age, and large-scale structure of the universe. A successor to Edwin Hubble at the Mount Wilson Observatory and Palomar Observatory, Sandage refined measurements of the Hubble constant and helped establish more accurate estimates of the universe's age. He made major contributions to the study of quasars, galaxies, and stellar evolution, and played a key role in observational cosmology during the 20th century. His precise astronomical observations greatly advanced the understanding of the universe's expansion and evolution. (Image credit:pinterest.com)



Charles Messier



Charles Messier (26 June 1730 – 12 April 1817) was a French astronomer renowned for compiling the famous Messier Catalogue, a collection of nebulae, star clusters, and galaxies observed during his search for comets. Known as the "Ferret of Comets," he discovered or co-discovered several comets and carefully documented celestial objects that could be mistaken for them. His catalogue, which includes well-known objects such as the Orion Nebula and the Andromeda Galaxy, became one of the most important references in observational astronomy. Messier's systematic observations greatly contributed to the study of deep-sky objects and influenced generations of astronomers. (Image credit:meteorologiaenred.com)

SPACE PARADOXES: GLITCHES IN THE COSMOS

THE HEAT DEATH PARADOX: WHY THE UNIVERSE STILL HAS ENERGY

Step outside on a clear night and look at the sky. Thousands of stars glow against the darkness of space, filling the universe with light and energy. But according to physics, this should not last forever. In fact, if the universe had existed for an infinite amount of time, the stars above us should have burned out long ago. So why is the universe still alive and active?

This mystery is connected to a scientific idea called the "Heat Death Paradox."

The paradox comes from an important rule of physics known as the Second Law of Thermodynamics. This law says that energy naturally spreads out over time. Scientists describe this process using a term called entropy. In simple words, entropy is the tendency of things to move from order toward disorder.

A simple example is a hot cup of tea left in a cold room. Slowly, the heat from the tea spreads into the cooler air around it. Eventually, both the tea and the room reach the same temperature. Once that happens, no more heat flows and no useful work can be done.

Scientists believe the universe behaves in the same way. Stars shine because they contain concentrated energy. They continuously release heat and light into space while slowly using up their fuel. Over billions and trillions of years, this energy spreads farther and farther across the cosmos.

If the universe had existed forever, all of this energy should already be evenly spread out. The entire universe would have reached a state called thermal equilibrium, where everything has the same temperature. There would be no bright stars, no glowing galaxies, and no energy left to support life. This final stage is known as "Heat Death" or the "Big Freeze."

But when we observe the universe today, we see something completely different. Stars are still burning, galaxies are still evolving, and enormous temperature differences still exist between hot stars and the cold emptiness of space. This tells scientists that the universe has not had enough time to reach equilibrium.

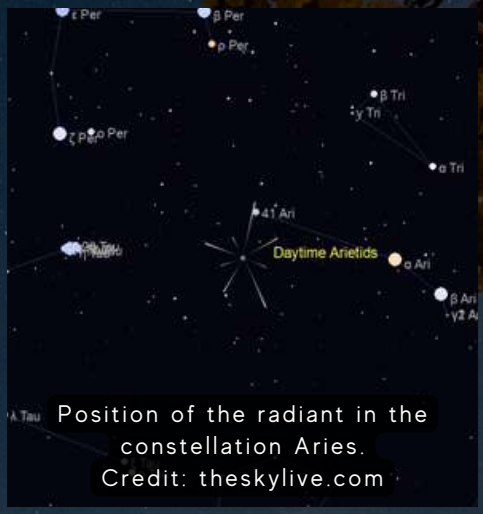
In the 19th century, Lord Kelvin argued that the existence of hot stars in cold space was evidence that the universe could not be infinitely old. Today, scientists believe the universe began with the Big Bang around 13.8 billion years ago.

One day, the stars may fade, and the universe may grow cold and silent. But for now, the cosmic clock is still ticking, and the universe is still full of light. Every galaxy, nebula, and shining star we see today is proof that we are living in a young and active universe, still far from its quiet and frozen future. The night sky is not just beautiful: it is evidence that the universe still has time left.

ASTRONOMICAL EVENTS

The Arietids Meteor Shower 2026 The Mysterious Daytime Shooting Stars

The Arietids Meteor Shower is one of the strongest meteor showers of the year, peaking around June 7. Unlike most meteor showers, the Arietids are mainly a daytime meteor shower, meaning most meteors occur when the Sun is above the horizon. They originate from debris left behind by a comet, most likely Comet 96P/Machholz. As Earth travels through this stream of dust and tiny rocky particles, the particles enter Earth's atmosphere at very high speeds around 39 km/s producing bright streaks of light called meteors. The shower's radiant point lies in the constellation Aries, which rises in the eastern sky before sunrise.



Position of the radiant in the constellation Aries.
Credit: theskylive.com

Observers who are in India can sometimes spot a few Arietids during the dark pre-dawn hours, especially low in the eastern horizon around 4:00–5:00 a.m. Under ideal conditions, the shower can produce nearly 50–60 meteors per hour, making it scientifically significant despite being difficult to observe visually. The meteors are usually fast and bright, occasionally leaving glowing trails behind them.

The Bootids Meteor Shower – A Rare and Unpredictable Sky Event



Position of the radiant in the constellation Bootes.
Credit: theskylive.com

The Bootids Meteor Shower is a rare and unpredictable meteor shower that peaks around June 27 each year. Unlike major annual showers that appear regularly with high activity, the Bootids are known for their unusual behavior. Some years they produce only a few meteors, while in certain years they suddenly create spectacular meteor outbursts. The shower originates from debris left behind by Comet 7P/Pons-Winnecke. As Earth moves through this stream of dust and rocky particles, the particles enter Earth's atmosphere at speeds of around 18 km/s, producing glowing streaks of light.

The shower's radiant point lies in the constellation Boötes, visible in the northern sky during the night. Observers in India and other Northern Hemisphere regions can best view the Bootids after midnight until dawn, away from city lights and under dark sky conditions. Under normal conditions, the shower may produce only 1–10 meteors per hour, but during rare outbursts it can display many more. The meteors are generally slow moving and sometimes leave glowing trails, making them interesting targets for skywatchers and astronomers.

A Celestial Gathering: Three Planets Meet in the Evening Sky

On the evening of June 12, 2026, skywatchers will have the opportunity to witness a beautiful celestial event often referred to as a planetary alignment or planet parade. During this event, Mercury, Venus, and Jupiter will appear grouped closely together in the western sky shortly after sunset, forming a striking visual arrangement against the fading twilight.

Why Do Planetary Alignments Occur?

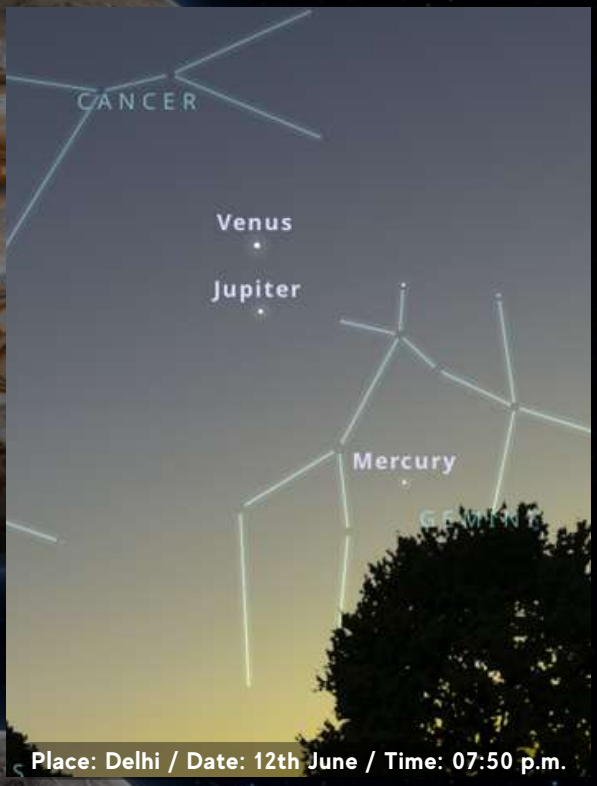
All planets in our Solar System orbit the Sun along a nearly flat plane called the ecliptic plane. As the planets move around the Sun at different speeds and distances, there are times when the planets are actually separated by millions of kilometers in space, but their positions along the same orbital plane create the illusion that they are lined up from our point of view on Earth.

Although such alignments are not perfectly straight in space, they create a spectacular sight for observers on Earth.

What Will Be Visible?

Among the three planets, Venus will be the brightest and easiest to identify. Often called the Evening Star, Venus will shine brilliantly above the western horizon soon after sunset. Jupiter, the largest planet in the Solar System, will also be clearly visible nearby with its steady golden glow.

Mercury, however, will be more challenging to spot because it will appear lower in the sky and closer to the horizon. Since Mercury is always seen near the Sun, it is usually visible only during short periods after sunset or before sunrise. Observers with a clear western horizon and favorable weather conditions will have the best chance of seeing all three planets together.



Place: Delhi / Date: 12th June / Time: 07:50 p.m.

Best Time and Observation Tips

The alignment will be best observed about 30–45 minutes after sunset. Choosing a location away from bright city lights will improve visibility, especially for Mercury. No special equipment is required to enjoy the event, though binoculars may help in locating the planets more easily.

Planetary alignments remind us that the Solar System is constantly in motion. Watching multiple planets appear together in the sky provides a deeper appreciation for the graceful movement of worlds orbiting the Sun. Events like the Twilight Planet Parade not only create memorable skywatching experiences but also inspire curiosity about astronomy and our place in the universe.

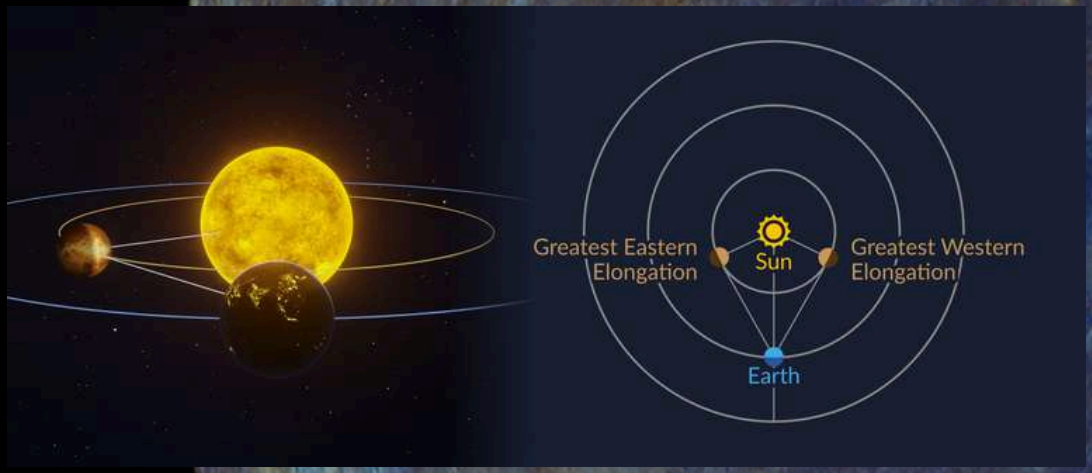
Mercury at Greatest Eastern Elongation

Mercury is often considered one of the most difficult planets to observe because it orbits very close to the Sun. Most of the time, the planet remains hidden in the Sun's glare, making it visible only for short periods just after sunset or before sunrise. However, during a greatest elongation, Mercury appears at its maximum angular distance from the Sun in the sky, allowing observers to spot it more easily.

What is Greatest Eastern Elongation?

The term elongation refers to the apparent distance between a planet and the Sun as seen from Earth. When Mercury reaches Greatest Eastern Elongation, it appears east of the Sun in the sky. As a result, the planet becomes visible in the evening sky after sunset.

On June 15, Mercury will be positioned about 25 degrees away from the Sun, creating favorable viewing conditions for skywatchers. Since Mercury never strays far from the Sun, elongations provide the ideal window to observe the planet safely and comfortably.



How to Observe Mercury?

Observers should begin looking toward the western horizon shortly after sunset. Mercury will appear as a bright, star-like object shining low in the twilight sky. A location with a clear and unobstructed western horizon is essential, as the planet sets relatively quickly after the Sun.

Although it can be seen with the naked eye under clear skies, binoculars may help locate it more easily. However, observers should always wait until the Sun has completely set before using binoculars or telescopes to avoid eye damage.

Mercury Through a Telescope

Through a telescope, Mercury displays phases similar to the Moon and Venus. Around greatest eastern elongation, the planet usually appears as a half-illuminated disk, providing a fascinating demonstration of planetary motion and orbital geometry.

Historically, Mercury has fascinated astronomers for centuries because of its rapid movement across the sky. Ancient civilizations often associated it with swift messengers and gods of speed. Even today, observing Mercury remains exciting because of its rarity and the challenge involved in spotting it.

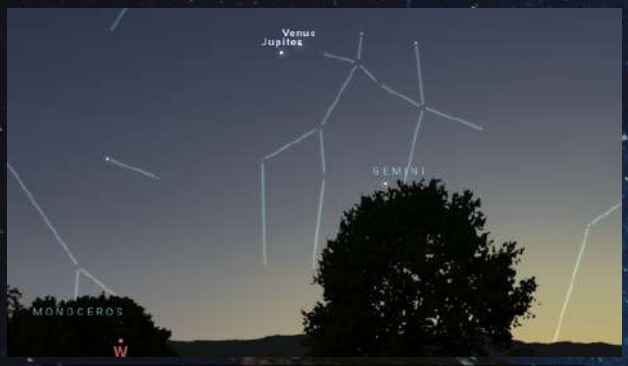
CONJUNCTIONS FOR THE MONTH

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

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

Conjunction of Venus and Jupiter

On June 9, Venus appears close to Jupiter in the western evening sky shortly after sunset. Venus shines brilliantly at magnitude −3.9, while Jupiter glows nearby at magnitude −1.8. Look low above the western horizon during twilight for this striking planetary conjunction.



Place: New Delhi / Date: 09th June / Time: 08:00 p.m.

Conjunction of Moon and Saturn

On June 10, the Moon appears close to Saturn in the eastern pre-dawn sky. Saturn shines at magnitude +1.0, while the Moon glows brightly nearby, creating a beautiful conjunction in the dawn sky. Look toward the eastern horizon before sunrise for the best view of the pair.



Place: New Delhi / Date: 10th June / Time: 04:00 a.m.

Conjunction of Moon and Mars

On June 13, the Moon appears close to Mars in the western evening sky after sunset. Mars shines with its distinct reddish-orange glow at magnitude +1.5, while the Moon creates a beautiful pairing nearby. Look toward the western horizon during twilight for the best view of this attractive conjunction.



Place: New Delhi / Date: 13th June / Time: 04.30 a.m.

Conjunction of Venus and Beehive Cluster

On June 19, Venus appears close to the Beehive Cluster in the western evening sky. Venus shines brilliantly beside the soft glow of the star cluster. Also known as Praesepe (M44), it is one of the nearest and brightest open star clusters visible from Earth. The event can be seen with the naked eye under clear skies, while binoculars will reveal the cluster's stars in greater detail.



Place: New Delhi / Date: 19th June / Time: 08.00 p.m.

STUDENTS CORNER

THE QUEST TO FIND ALIENS

SHAUNAK AMIN



We always love some fun alien films. But in reality we are unaware of aliens. So, what if we search for them or at least learn how to.

What can these Aliens actually be like?

It depends on the imagination of a person. Some will think that aliens are the classic big-eyed green beings, maybe a snake body like how some authors imagined or maybe some cubical shaped beings, it can be anything. But we can be assured that they will not be identical to the earthlings if they don't live in a world like ours. The shape and size depend on the surroundings of the being. This brings us to the next question, what are the favourable surroundings for the existence of aliens?

The Parameters used by us

What will we try to look in a planet to find if there is alien life? The parameters will most probably be oxygen, a suitable temperature, a planet in the zone of habitability and some form of water. Parameters given above are standard. But as we have earlier discussed, there is very less chance that there will be aliens identical to humans. Then it makes sense to consider many more parameters. We must understand that alien life can surely be beyond boundaries of our imagination and that makes aliens hard to find.

The Actual way to find Aliens

Well, to be honest, there is actually no single way to find aliens. Aliens can be creatures who instead of inhaling oxygen, might be inhaling argon gas. Or maybe a gas which we haven't discovered. Or they might not even respire! They can be a rhombus, cylinder or cone or a leaf shaped creature.
What if they eat Iron or some crystals for survival?
Therefore, we cannot keep some restricted boundaries for the sake of finding aliens.



All these ideas bring us to the following conclusion:

It is tough to find aliens!

Yes, this is the truth, we have to work very hard to find aliens. We found the biggest black hole in our Observable Universe till now, the biggest star and the biggest exoplanet till now. But we still don't know if there are any aliens in our own solar system! In order to find aliens, we need to expand our imagination and find the most versatile characteristics which can help us detect alien life.

CELLULAR COSMOS: THE UNIVERSE WITHIN AND BEYOND

SHOURYA KOTHARE

What if the universe you admire in the night sky isn't just something far away, but a reflection of something within us? What if the smallest unit of life the cell mirrors the grand structure of the cosmos itself?

We are taught in biology that cells form tissues, tissues build organs, organs create systems, and systems make a body. But when we look at this hierarchy through a cosmic lens, it begins to resemble something far more profound a layered universe of existence, expanding from the microscopic to the infinite.Imagine a cell as a universe. Within it, countless processes unfold communication, energy transfer, growth, and regulation just like stars forming, galaxies evolving, and forces interacting in the cosmos. Each cell is complete in itself, yet part of something greater.

When multiple cells come together, they form tissues. These can be imagined as a multiverse a collection of many "universes," each functioning individually yet connected. Just like the idea of a multiverse suggests multiple realities and dimensions, tissues represent unity within diversity. Tissues then combine to form organs, which can be seen as a metaverse—an integrated system where different layers of existence interact and create higher meaning. Organs are not just structures; they are coordinated worlds working in harmony.

Multiple organs work together to form organ systems, which can be imagined as a xenoverse a powerful network of interconnected entities, each contributing to the survival and functioning of the whole. This level represents complexity, coordination, and interdependence at its peak. All organ systems together form a body, a megaverse a complete and self sustaining entity. Within a body, countless processes occur simultaneously, just like in a vast cosmic structure where everything exists in balance.

Now shift your perspective outward. A body exists on a planetary surface, much like we live on Earth. This surface can be imagined as an archverse a platform where life unfolds, evolves, and experiences reality.

Many such planets form a solar system, which can be compared to an omniverse a system containing multiple worlds, each unique yet bound by a central force. Expanding further, many solar systems come together to form a galaxy, like our home, the Milky Way. A galaxy can be thought of as an outerverse vast, mysterious, and filled with countless possibilities. Beyond galaxies lie clusters and superclusters massive structures stretching across unimaginable distances. These can be seen as representations of infinity itself, where scale loses meaning and imagination struggles to keep up.

All of this together forms the universe a trans infinity, a realm so immense that it contains everything we know, everything we can imagine, and perhaps even what we cannot. And yet, there may still be something beyond—realities and structures that exist outside our comprehension.

This perspective reveals a beautiful symmetry: the smallest reflects the largest. The structure of a cell and the structure of the universe may not be so different after all. Both are systems within systems, worlds within worlds, bound by patterns we are only beginning to understand.

Just as a cell may never fully comprehend the body it belongs to, we too may be a small part of something far greater.

So the next time you look up at the stars, pause for a moment and wonderare you observing the universe... or are you witnessing a reflection of the same patterns that exist within you?
Because perhaps, in the grand design of existence, the cosmos is not just around us.....
it is within us.

COSMIC CALENDAR

JIYA PAROCHE

Have you ever wondered years in just one year? Wait 13.8 Billion years. How can we understand the 13.8 Billion year history of the universe in a simple and interesting way? The universe is so vast and ancient that it becomes difficult to imagine its timeline. To solve this problem, the famous scientist Carl Sagan introduced a creative idea called the Cosmic calendar.

The Cosmic calendar is a model that compresses the entire history of the universe into just one single year from January 1 to December 31. In this calendar each unit of time represents a huge span of real years. This makes it easier for us to visualize how events unfolded over billion of years.

How is that possible?

1 second = 438 years
1 minute = 26,000 years
1 Hour = 1.6 million years
1 Day = 37.8 million years
1 week = 265 million years
1 month = 1.15 Billion years
1Year = 13.8 billion years

This means that even a single second in this calendar represents hundreds of years in real life, which shows how fast time moves in this model.

January: Big bang - The beginning of everything
The year begins with the Big Bang on January 1 at midnight. This is the moment where space, time, matter and energy come into existence. The universe starts expanding rapidly, and the foundation for everything is created.

February: First stars appear
During February, the first stars begin to form and shine. These play an important role in shaping the by producing elements needed for planets and life.

March: Formation of the Milky Way
In March, our galaxy the milky way is formed this galaxy becomes the home of our solar system in the future.

April to June: Growth of the universe
Between April and June, galaxies continue to form and grow. The universe becomes more structured and stars and cosmic systems develop further. The expansion of the universe continues during this time.

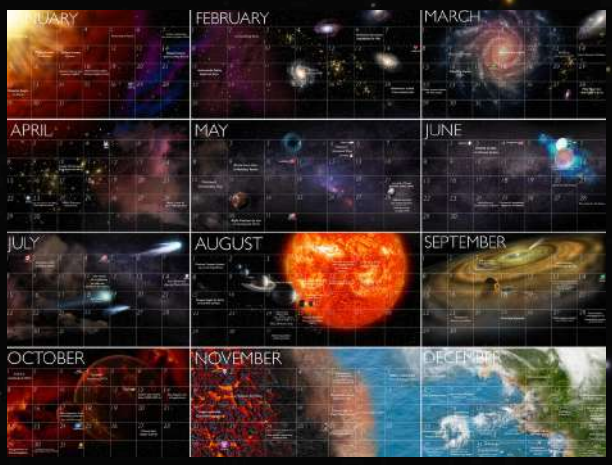
July to August: Formation of the Solar System
In these months, the elements required for planets are formed. Gradually, the Sun and the Solar System begin to take shape, preparing for the formation of Earth.

September: Birth of Earth
In September, Earth is formed. Soon after oceans develop and simple life begins in the form of microscopic organisms. This marks the beginning of life on our planet.

October: Early life evolves
During October, life begins to evolve slowly. Simple organisms develop to perform photosynthesis which changes Earth's atmosphere and makes it suitable for more complex life forms.

November: Complex life appears
In November, plants and animals begin to evolve. Life becomes more advanced and diverse, leading to the development of different species.

December: Dinosaurs and Humans
December is the busiest and most exciting month in the Cosmic calendar.
December 25: Dinosaurs appear and dominate the Earth
December 30: A massive asteroid causes their extinction
December 31: Humans appear in the final hours
Infact, all of human civilization from ancient cultures to modern technology takes place in just the last few minutes and seconds before midnight.



Conclusion: The cosmic calendar gives us a new perspective on time and existence. It shows that the universe is extremely old, while humans are very recent. Despite this, humans have developed the ability to study and understand the universe through fields like astronomy.

This model reminds us that we are a small part of a vast universe, yet we are special because we can explore and learn about it.

We may have arrived in the final moments of the Cosmic year, but we are the ones who can understand it's story.

ASK THE UNIVERSE

What happens when something falls into a blackhole? (Question from Akshara grade 7)

A black hole has such strong gravity that anything crossing its boundary, called the event horizon, cannot escape, not even light. As an object falls in, gravity stretches and compresses it in a process called "spaghettification." To an outside observer, the object appears to slow down and fade near the event horizon due to time dilation. But for the falling object, it continues inward toward the singularity, where current physics can no longer fully explain what happens.

I want to know that how many dwarf planets does this universe have? (Question from Vivaan Rawal grade 6)

The exact number of dwarf planets in the universe is unknown and impossible to count because the universe contains billions of galaxies, each with enormous numbers of planetary systems. In our own Solar System, the Dwarf planet category currently includes five officially recognised dwarf planets: Pluto, Ceres, Eris, Haumea and Makemake.

Astronomers think there may be hundreds more dwarf planets in our Solar System alone, especially in the Kuiper Belt beyond Neptune. Across the universe, the number is likely unimaginably huge.

The Opportunity rover was designed for 90 days then how was it supposed to live more around 15 years? (Question from Vetrivel. T grade 10)

Opportunity rover was originally designed for a mission of just 90 Martian days (sols) because engineers were unsure how long its batteries, wheels, electronics, and solar panels could survive in Mars' harsh environment. However, the rover far exceeded expectations and operated for nearly 15 years. Its long life was possible because it was built extremely well, NASA engineers drove and operated it carefully to reduce damage, and natural Martian winds occasionally cleaned dust from its solar panels, restoring power through "cleaning events." Opportunity also avoided severe environmental damage for many years. Its mission finally ended after a massive global dust storm in 2018 blocked sunlight from reaching the solar panels, causing the rover to lose power and contact with Earth.

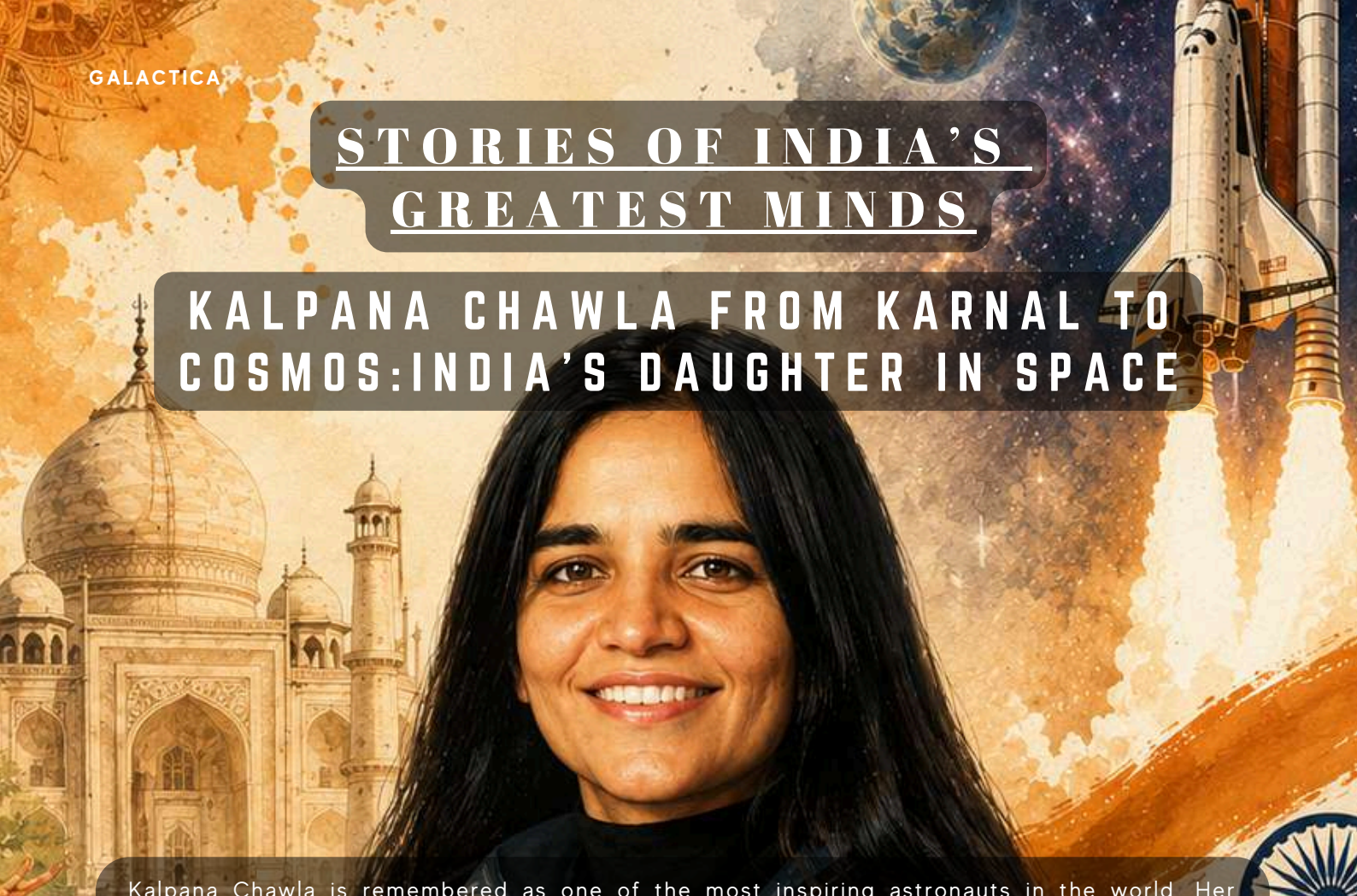
What is dark matter and dark energy?

Dark matter is a mysterious form of matter that does not emit, absorb, or reflect light, making it invisible. Scientists know it exists because its gravity affects galaxies and the motion of stars. It acts like an unseen "cosmic glue" helping hold galaxies together. About 27% of the universe is thought to be dark matter.

Dark energy is an unknown form of energy believed to be causing the expansion of the universe to speed up. Instead of pulling things together like gravity, it seems to push space apart. Dark energy makes up about 68% of the universe. The ordinary matter we can see – stars, planets, gas, and people makes up only about 5% of the universe.

STORIES OF INDIA'S GREATEST MINDS

KALPANA CHAWLA FROM KARNAL TO COSMOS:INDIA'S DAUGHTER IN SPACE



Kalpana Chawla is remembered as one of the most inspiring astronauts in the world. Her journey from a small town in India to outer space proved that dreams can become reality with determination and hard work. She encouraged students, especially young girls, to believe in science, education, and their own abilities. Her life story continues to motivate people to follow their passions fearlessly.

Where was Kalpana Chawla born?
Kalpana Chawla was born in Karnal, Haryana, India. As a child, she enjoyed watching airplanes fly across the sky and was fascinated by the mysteries of space. Her strong interest in aviation and science encouraged her to study engineering. She later moved abroad for higher education and continued working toward her dream of exploring space.

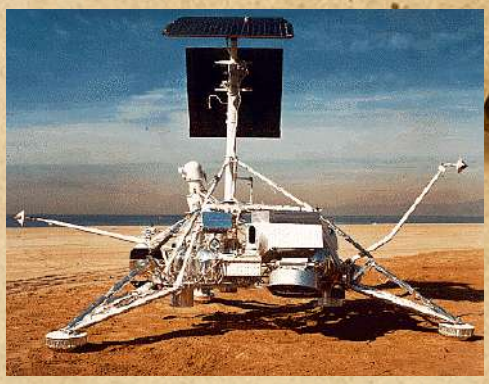
Why is Kalpana Chawla famous?
She became famous for becoming the first woman of Indian origin to travel into space. Working with NASA, she participated in important space missions aboard the Space Shuttle Columbia. Her success showed the world that dedication and confidence can help overcome any obstacle.

What challenges did she face?
Kalpana faced intense training, academic pressure, and competition while pursuing her career. Even when situations became difficult, she remained focused and determined to succeed in the field of space science.

Why is she remembered today?
Although the Columbia mission ended tragically in 2003, Kalpana Chawla's legacy lives on. She continues to inspire millions as a symbol of courage, ambition, and the power of dreaming big.

HISTORICAL EVENTS OF JUNE

SURVEYOR 1 MOON LANDING



On June 2, 1966, Surveyor 1 became the first American spacecraft to successfully make a soft landing on the Moon. Operated by NASA, the mission tested landing techniques and examined the lunar surface before the Apollo human missions. Surveyor 1 transmitted thousands of images and scientific measurements back to Earth, helping scientists understand the Moon's soil and terrain. Its success proved that spacecraft could safely land on the lunar surface. The mission became a major technological milestone during the Space Race and directly supported preparations for future astronaut landings on the Moon. (Image Credits: alchetron.com)

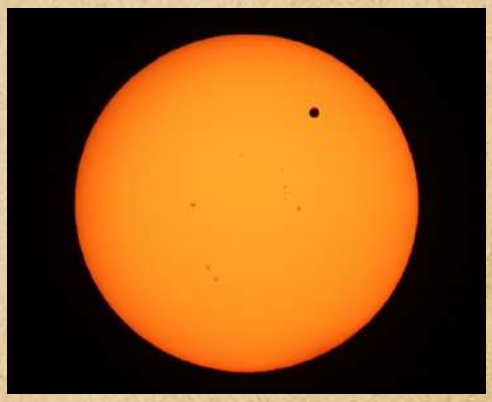


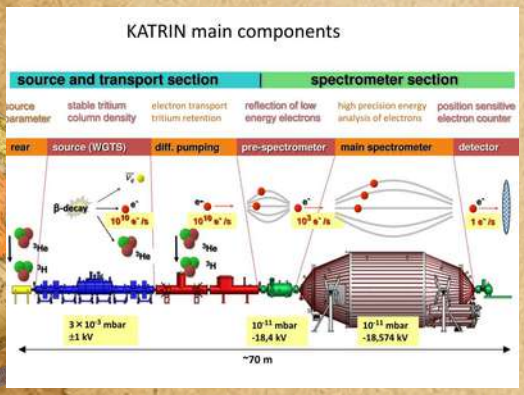
EDWARD WHITE SPACEWALK

On June 3, 1965, astronaut Edward White performed the first American spacewalk during the Gemini 4 mission. Floating outside the spacecraft for about 23 minutes, White used a handheld maneuvering device to move through space while connected by a tether. His successful extravehicular activity demonstrated that astronauts could safely work outside spacecraft, a skill essential for future lunar missions and construction of orbital stations. The achievement represented a major advancement for the American space program during the Space Race and helped prepare astronauts for complex operations later performed during the Apollo missions. (Image Credits: cdn.britannica.com)

TRANSIT OF VENUS

On June 5, 2012, skywatchers around the world observed the rare Transit of Venus, during which Venus passed directly between Earth and the Sun. Viewed safely through solar filters, Venus appeared as a tiny black dot slowly moving across the Sun's bright disk. Such transits occur in pairs more than a century apart, making the event extremely rare. Historically, astronomers used Venus transits to calculate the distance between Earth and the Sun. The 2012 transit was especially significant because the next transit of Venus will not occur until the twenty-second century, making it a once-in-a-lifetime astronomical experience for most observers. (Image Credits: astroasheville.org)





KATRIN EXPERIMENT

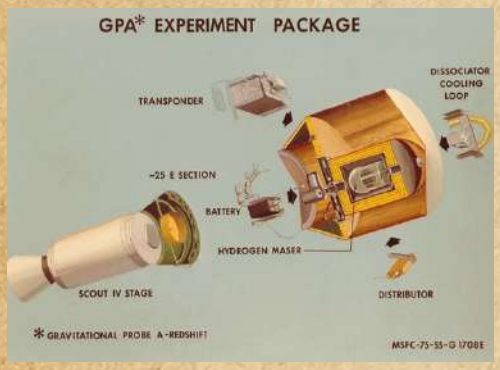
On 11 June 2018, the KATRIN Experiment officially began scientific measurements in Germany to determine the mass of neutrinos, among the smallest and most mysterious particles in the universe. The experiment studies electrons released during tritium beta decay using extremely precise instruments. Determining neutrino mass is important for understanding particle physics, dark matter, and the evolution of the universe after the Big Bang. KATRIN is considered one of the world's most advanced physics experiments and may help scientists answer fundamental questions about the structure and behavior of matter throughout the cosmos. (Image Credits: slideserve.com)

HISTORICAL EVENTS OF JUNE

VALENTINA TERESHKOVA LAUNCH



On June 16, 1963, Soviet cosmonaut Valentina Tereshkova launched aboard Vostok 6, becoming the first woman to travel into space. During her nearly three-day mission, she orbited Earth 48 times and spent more time in space than all previous American astronauts combined at that point. Her mission demonstrated that women could withstand the physical and psychological conditions of spaceflight. Tereshkova's achievement became a historic milestone in human space exploration and inspired generations of women worldwide to pursue careers in astronomy, aerospace engineering, aviation, and scientific research during the modern space age. (Image Credits: sciencemuseum.org.uk)



GRAVITY PROBE A

On June 18, 1976, Gravity Probe A was launched by NASA to test a prediction from Albert Einstein's theory of general relativity. The spacecraft carried a highly accurate hydrogen maser clock aboard a suborbital rocket to measure how gravity affects the flow of time. Scientists compared the clock's behavior in space with clocks on Earth and confirmed Einstein's predictions with remarkable precision. The experiment provided strong evidence for gravitational time dilation, an effect now essential in technologies such as GPS navigation systems and modern satellite communication networks worldwide. (Image Credits: en.wikipedia.org)

SALLY RIDE IN SPACE



On June 18, 1983, astronaut Sally Ride became the first American woman to travel into space aboard Space Shuttle Challenger during the STS-7 mission. A physicist and mission specialist, Ride helped operate the shuttle's robotic arm and conducted scientific experiments in orbit. Her successful mission represented an important moment in American space history and expanded opportunities for women in STEM fields. Sally Ride later became a major advocate for science education and encouraged students, especially girls, to explore careers in physics, astronomy, engineering, and space science across the United States. (Image Credits: nasa.org)



LUNAR RECONNAISSANCE ORBITER LAUNCH

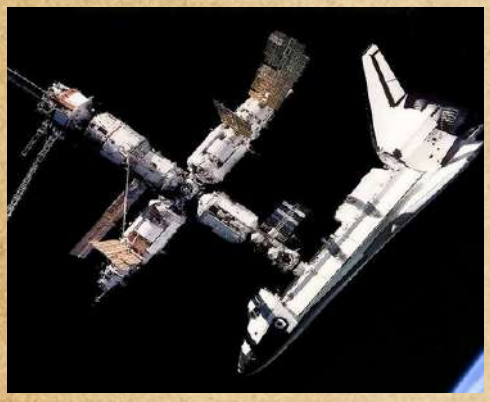
On June 18, 2009, Lunar Reconnaissance Orbiter was launched by NASA to study the Moon in unprecedented detail. The spacecraft carried advanced instruments to map the lunar surface, measure temperatures, search for water ice, and identify safe landing sites for future missions. Its high-resolution images greatly improved scientific understanding of lunar geology and resources. The mission became one of NASA's most important lunar exploration projects and continues to provide valuable data for future human exploration under programs such as Artemis, which aims to return astronauts to the Moon in the modern era of space exploration. (Image Credits: science.nasa.gov)

HISTORICAL EVENTS OF JUNE

IRIS LAUNCH



On June 27, 2013, NASA launched the IRIS mission to study the Sun's atmosphere in unprecedented detail. IRIS, short for Interface Region Imaging Spectrograph, was designed to examine how energy moves through the Sun's lower atmosphere and contributes to solar eruptions. The spacecraft captured high-resolution images and data about solar plasma, magnetic fields, and ultraviolet emissions. Understanding these processes is important for predicting space weather events that can affect satellites, communication systems, astronauts, and power grids on Earth during periods of intense solar activity. (Image Credits: science.nasa.gov)



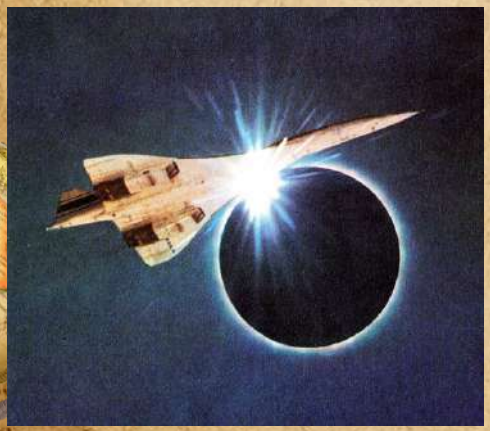
SPACE SHUTTLE ATLANTIS DOCKING WITH MIR

On June 29, 1995, Space Shuttle Atlantis successfully docked with the Russian Mir during the STS-71 mission. This marked the first docking between an American Space Shuttle and a Russian space station. The mission symbolized growing international cooperation after the Cold War and allowed astronauts and cosmonauts to exchange supplies, experiments, and operational experience. The successful docking helped both countries prepare for long-duration human spaceflight and future cooperative missions. It also became an important step toward the later construction and operation of the International Space Station. (Image Credits:my.wealthyaffiliate.com)

TUNGUSKA EVENT

On June 30, 1908, a massive explosion occurred over the Tunguska region of Siberia in Russia, an event now known as the Tunguska Event. Scientists believe the explosion was caused by an asteroid or comet fragment that exploded in Earth's atmosphere before reaching the ground. The blast flattened nearly 80 million trees across more than 2,000 square kilometers of forest. Although no impact crater was found, the energy released was estimated to be hundreds of times greater than the Hiroshima atomic bomb. The Tunguska Event remains the largest known asteroid-related explosion in recorded human history and increased interest in planetary defense studies. (Image Credits:wasimmarketingpro.blogspot.com)





CONCORDE ECLIPSE OBSERVATION

On June 30, 1973, scientists aboard the supersonic aircraft Concorde observed a total solar eclipse for a record duration of about 74 minutes. By flying along the eclipse path at very high speed, the aircraft allowed astronomers to remain inside the Moon's shadow far longer than possible from Earth's surface. This extended observation helped scientists study the Sun's corona, solar plasma, and magnetic structures in exceptional detail. The experiment demonstrated how aviation technology could support astronomical research. It remains one of the most famous eclipse observation missions ever conducted in the history of modern astronomy. (Image Credits: photo.stackexchange.com)

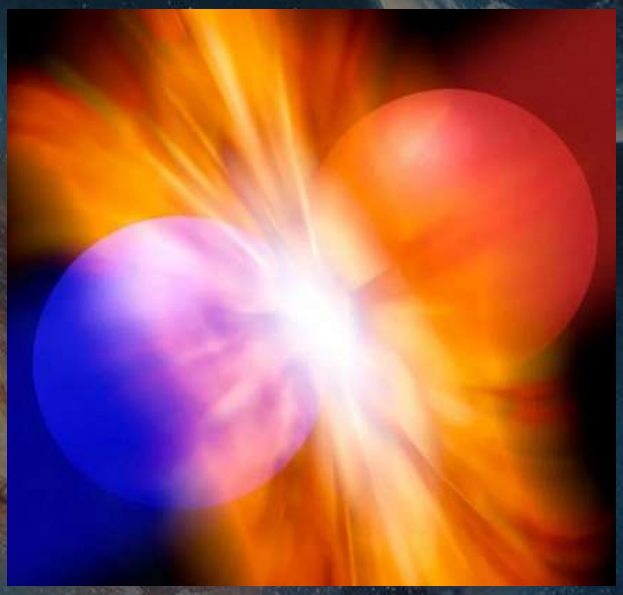
ASTRONOMY & SPACE TERM

ANNIHILATION

WHEN MATTER MEETS ANTIMATTER

Annihilation is a process in which a particle and its corresponding antiparticle collide and destroy each other, converting their mass into pure energy. This phenomenon is one of the most fascinating predictions of modern physics.

For example, when an electron meets its antiparticle, the positron, both disappear and release energy in the form of gamma rays. This follows Mass–energy equivalence, which states that mass can be converted into energy. Annihilation occurs naturally in space and is also studied in particle physics laboratories. Scientists use it to better understand the nature of matter, antimatter, and the origins of the universe.



This powerful process demonstrates the deep connection between matter and energy and plays an important role in modern astrophysics and cosmology.

BARYOGENESIS

THE ORIGIN OF MATTER IN THE UNIVERSE

Baryogenesis is a scientific theory that explains how matter came to dominate over antimatter in the early universe. According to current understanding, the Big Bang should have produced equal amounts of matter and antimatter. If that had happened, both would have annihilated each other completely, leaving behind only energy.



However, the universe we see today is filled with matter, including stars, planets, galaxies, and living beings. Scientists believe that, in the first moments after the Big Bang, a tiny imbalance occurred, causing slightly more matter to form than antimatter. After most matter and antimatter annihilated each other, the small amount of leftover matter became everything that exists today.

Although the exact mechanism is still not fully understood, baryogenesis is considered one of the most important ideas in modern cosmology because it helps explain why anything exists at all.

ASTROPHOTOGRAPHY BY SPACE TEAM



Leo constellation captured and marked by Mr. Sebin Sebastian, Educator, STEPL.

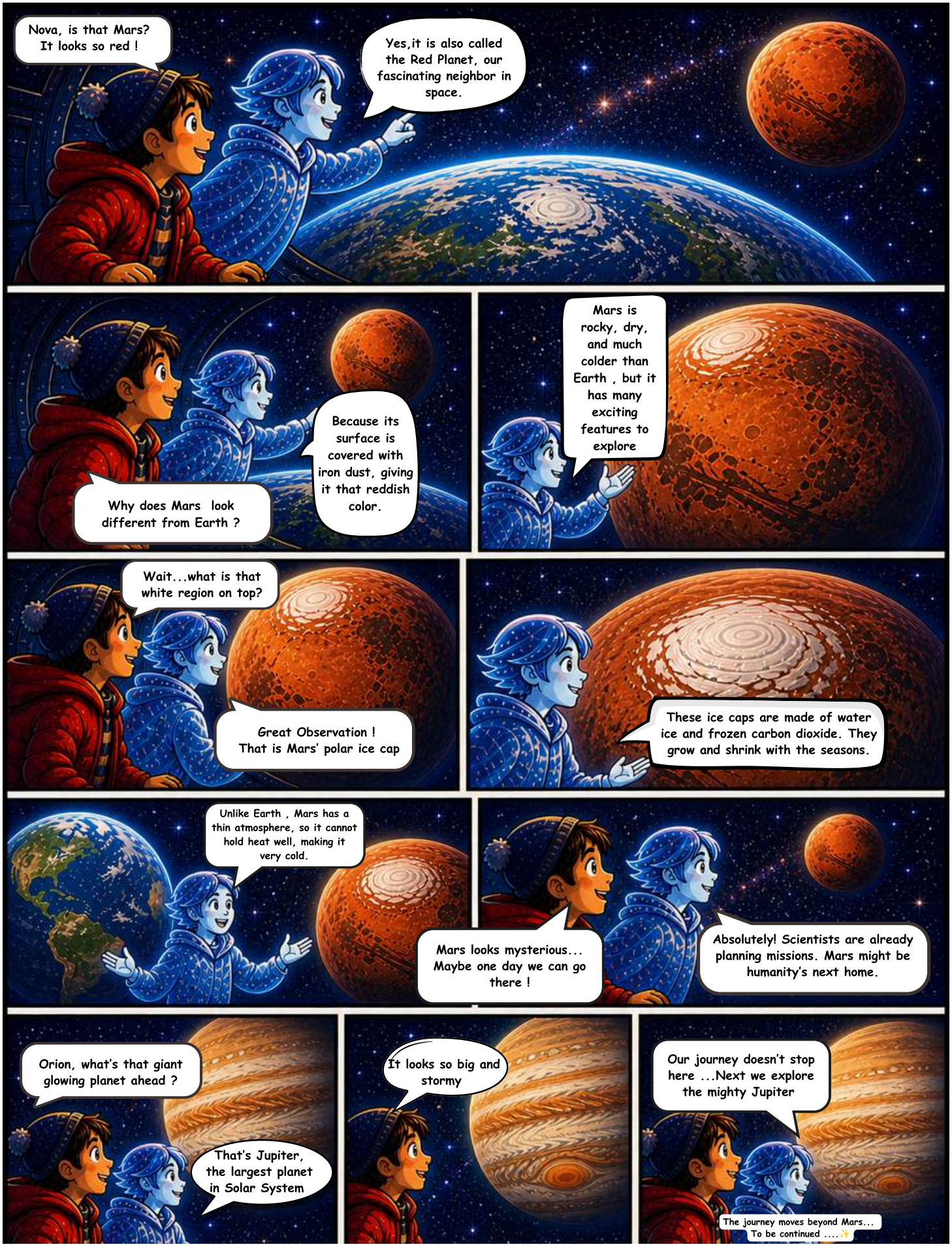


Gemini constellation captured and marked by Mr. Sebin Sebastian, Educator, STEPL.



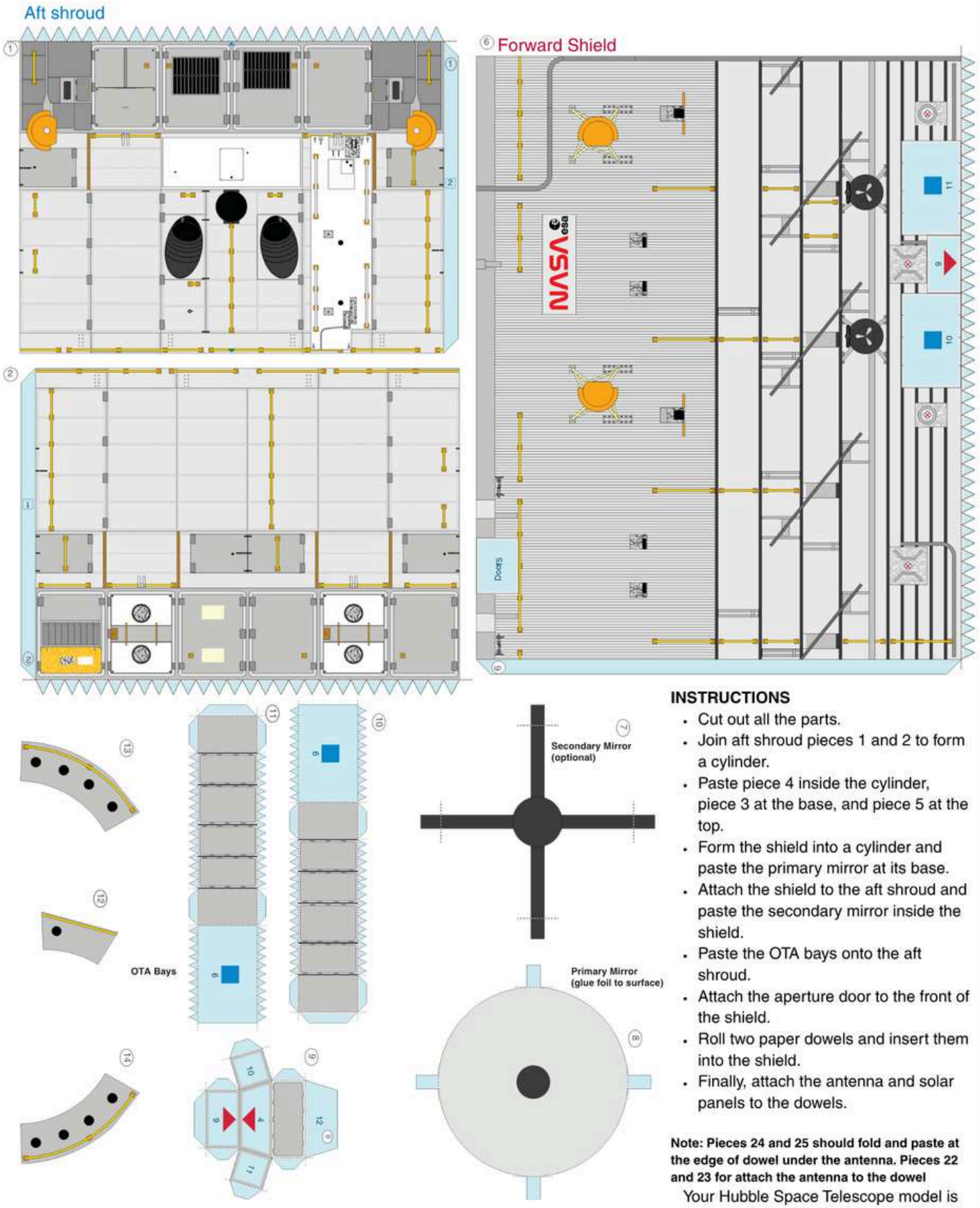
Star trail over Sun Temple, Mahoba captured by Mr. Ranjith Kumar E, Regional Manager, STEPL.

COSMIC JOURNEY- THE RED NEIGHBOR



MISSION: DO IT YOURSELF

HUBBLE SPACE TELESCOPE



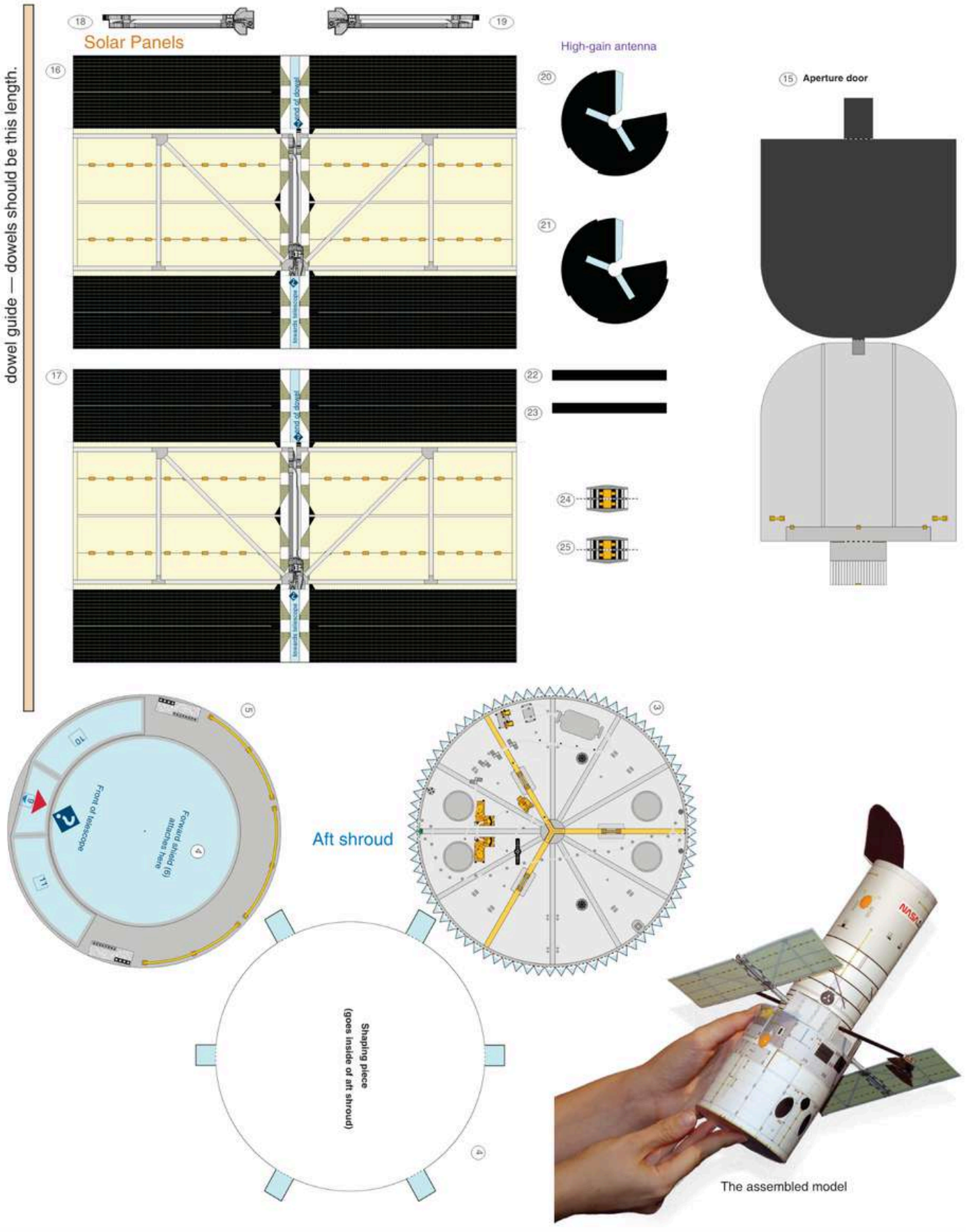
INSTRUCTIONS

- Cut out all the parts.
- Join aft shroud pieces 1 and 2 to form a cylinder.
- Paste piece 4 inside the cylinder, piece 3 at the base, and piece 5 at the top.
- Form the shield into a cylinder and paste the primary mirror at its base.
- Attach the shield to the aft shroud and paste the secondary mirror inside the shield.
- Paste the OTA bays onto the aft shroud.
- Attach the aperture door to the front of the shield.
- Roll two paper dowels and insert them into the shield.
- Finally, attach the antenna and solar panels to the dowels.

Note: Pieces 24 and 25 should fold and paste at the edge of dowel under the antenna. Pieces 22 and 23 for attach the antenna to the dowel

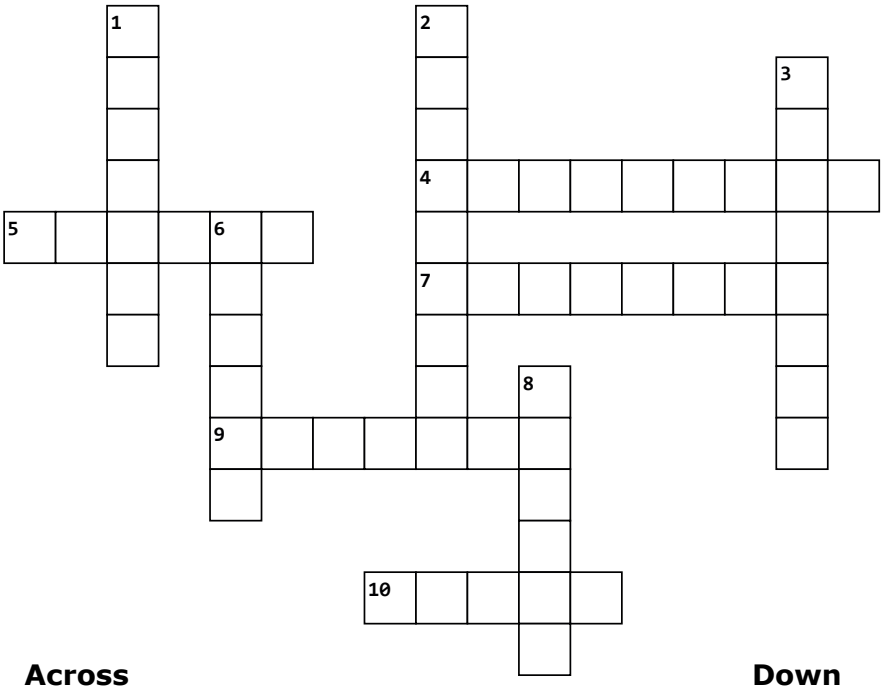
Your Hubble Space Telescope model is ready!

MISSION: DO IT YOURSELF



TRAIN YOUR BRAIN

CROSSWORD



Across

4. What was the name given to the Orion spacecraft used in Artemis II?
5. Which famous comet is associated with the Eta Aquarid Meteor Shower?
7. Which region of Mars explored by Curiosity is rich in clay-bearing rocks?
9. Which national agency approved the mission for private space activities?
10. Which spacecraft carried Rakesh Sharma into space?

Down

1. What were galaxies once mistakenly called?
2. Which astronaut became the first woman to travel to lunar distance?
3. Which Union Minister announced the space laboratory initiative?
6. Which telescope provided the galaxy images for Space Warps project?
8. Which element was first discovered in the Sun before Earth?

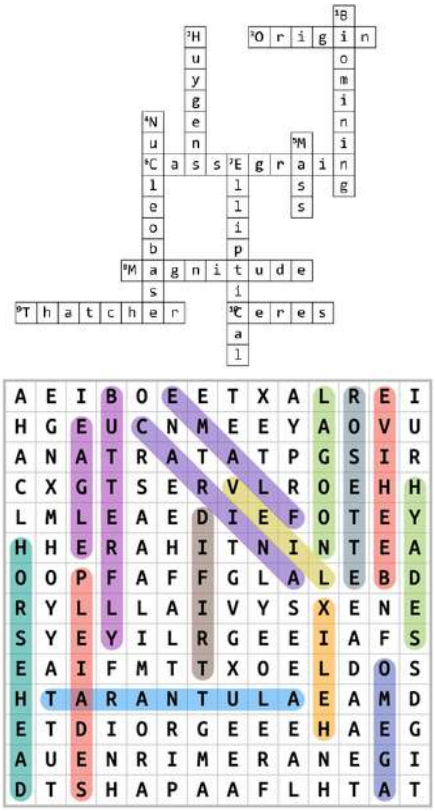
Astronomy Word Puzzle

Asteroids

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

LAMBERTA
PSYCHE
FORTUNA
IRIS
SYLVIA
PALLAS
JUNO
BAMBERGA
VESTA
CERES
EUNOMIA
THISBE
INTERAMNIA
DAVIDA
HYGIEA

Answers for last month puzzles.



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

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