SCIENCE CENTRE NEWS LETTER

SCIENCE CENTRE

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WHAT'S NEW IN SCIENCE?

NASA's Boeing Star liner Crew flight test launch.

A United Launch Alliance Atlas V rocket with Boeing's (it is an American Multinational Corporation that designs, manufactures and sells Airplanes, rockets, satellites and missiles worldwide.) Starliner spacecraft aboard was launched from Space Launch Complex 41 at Cape Canaveral Space Force Station, in Florida, United States on 5th June 2024.

NASA (National Aeronautics and Space Administration) Astronauts Butch Wilmore and Sunita Williams are safely in orbit on the first crewed flight test aboard Boeing's Starliner spacecraft bound for the International Space Station. As part of NASA's Boeing Crew Flight Test, the Astronauts lifted off at 10:52 a.m. EDT (Eastern Daylight Time) on a ULA (United Launch Alliance) Atlas V rocket. The flight test will help validate the transportation system, launch pad, rocket, spacecraft, in-orbit operations capabilities and return to Earth with Astronauts aboard.

Starliner autonomously docked to the forward-facing port of the International Space Station's Harmony module at 1:34 p.m EDT on 6th June 2024. Butch Wilmore and Sunita Williams will help to verify the Spacecraft is performing as intended by testing the Environmental Control System, Displays and Control System.

After a safe arrival at the Space Station, they joined the Expedition 71 crew of NASA Astronauts Michael Barratt, Matt Dominick, Tracy C. Dyson, Jeanette Epps and Roscosmos cosmonauts Nikolai Chub, Alexander Grebenkin, and Oleg Kononenko.

Main Source/Author: http://www.nasa.gov/news-release/liftoff-nasa-astronauts-pilot-first-starliner-crewed-test-to-Station/by Tiernan P. Doyle
Image: NASA/Joel Kowsky, NASA TV

SCIENTIST OF THE MONTH

Dr G. Satheesh Reddy

Dr G. Satheesh Reddy was born on July 1, 1963 in Mahimaluru, Atmakur, Nellore district of Andhra Pradesh. He did Bachelor in Electronics and Communication Engineering from Jawaharlal Nehru Technological University (JNTU), Anantapur and received M.S (Master of Science) and Ph.D (Doctor of Philosophy) degree from Jawaharlal Nehru Technological University (JNTU), Hyderabad.

Dr. Reddy was the Chairman of the Governing Body of the Aeronautical Development Agency and the Scientific Adviser to the Minister of Defence, India in 2015. He is an Indian Aerospace Scientist who served as the thirteenth Chairman of the Defence Research and Development Organisation (DRDO) from 2018 to 2022.

Dr. Reddy has done India's first successful test of an Anti-Satellite (ASAT) Missile (Mission Shakti). He was involved in the development of the world's longest-range gun ATAGS (Advanced Towed Artillery Gun System), Anti-Radiation Missiles, Smart Air Field Weapons, Smart Bombs, and Missile Assisted Torpedo Release Systems.

Dr. Reddy had received the Homi J. Bhabha Gold Medal in 2013, the National Systems Gold Medal in 2015, the National Aeronautical Prize in 2016 and American Institute of Aeronautics and Astronautics (AIAA) Missile Systems Award in 2019.

Main Source and Image: https://en.wikipedia.org

SCIENCE FACTS JULY 2024

1 July 1929	American Biologist Gerald Edelman (Co- winner of the 1972 Nobel Prize in Physiology or medicine for work on the immune system) was born.
1 July 1941	American Scientist Alfred G. Gilman (Co-winner of the 1994 Nobel Prize in Physiology or Medicine for their discovery of G-proteins and the role of these proteins in signal transduction in cell) was born.
2 July 1862	English Physicist William Henry Bragg (Co-winner of the 1915 Nobel Prize in Physics for their services in the Analysis of Crystal Structure by means of X-rays) was born.
4 July 2005	Successful collision of NASA's satellite "Deep Impact" with comet into the space was held at the distance 13.04 million km from the Earth.
5 July 1891	American Chemist John Howard Northrop (Co- winner of the 1946 Nobel Prize in Chemistry for Isolation, Crystallization, and study of enzymes, proteins and viruses) was born.
6 July 1885	Louis Pasteur had successfully tested the vaccine against rabies on humans.
9 July 1929	American-born physicist Ben Roy Mottelson (Winner of the 1975 Nobel Prize in Physics for his work on the non- spherical geometry of atomic nuclei) was born.
10 July 1902	German Chemist Kurt Alder (Known for Diels – Alder reaction) was born.
10 July 1920	American Physicist Owen Chamberlain (Co- winner of the 1959 Nobel Prize in Physics for the discovery of the antiproton, a sub atomic antiparticle) was born.
10 July 1962	Telstar, the world's first communications satellite was launched into the orbit.
11 July	World Population Day. (by U.N.)
12 July 1913	American Physicist Willis Lamb (Winner of the 1955 Nobel Prize in Physics for his discoveries concerning the fine structure of the Hydrogen Spectrum) was born.
12 July 1928	American Chemist Elias James Corey (Winner of the 1990 Nobel Prize in Chemistry for his development of the theory and methodology of organic synthesis, specially retrosynthetic analysis) was born.
14 July 1965	The 'Mariner 4' flyby of Mars took the first close-up photos of another planet.
15 July 1921	American Chemist Robert Bruce Merrifield (Winner of the 1984 Nobel Prize in Chemistry for the invention of solid state peptide synthesis) was born.
16 July 1888	Dutch Physicist Fritz Zernike (Winner of the 1953 Nobel Prize in Physics for his invention of the phase- contrast microscope) was born.
16 July 1994	Comet 'Shoemaker – Levy -9' collided with Jupiter. Impacts continue until July 22nd
18 July 1853	Dutch Physicist Hendrik Lorentz (Co-winner of the 1902 Nobel Prize in Physics for the discovery and theoretical explanation of the Zeeman effect) was born.
18 July 1980	Launching of Indian satellite "Rohini RS-1" into the Space.
19 July 1938	Indian astrophysicist Jayant Narlikar was born.
21 July 1969	Neil Armstrong and Edwin Buzz Aldrin become the first men to walk on the Moon, during the Apollo 11 mission.
24 July 1969	Successful landing of "Appolo-11" in the pacific Ocean.
28 July 1925	American Scientist Baruch S. Blumberg (Co-winner of the 1976 Nobel Prize in Physiology or Medicine for his work on the Hepatitis B virus) was born.
29 July 1898	American Physicist Isidor Isaac Rabi (Winner of the 1944 Nobel Prize in Physics for his discovery of nuclear magnetic resonance) was born.
31 July	American Chemist Paul D. Boyer (Co-winner of the 1997 Nobel Prize in Chemistry for research on the enzymatic mechanism underlying the biosynthesis of adenosine triphosphate) was born.

U. N. : United Nations

WHO -World Health Organization

UNESCO - United Nations Educational Scientific & Cultural Organization

Answers: 1) b 2) a 3) b 4) b 5) c

Timings

Tuesday to Sunday

& Public Holidays

9.30 am to 4.30 pm

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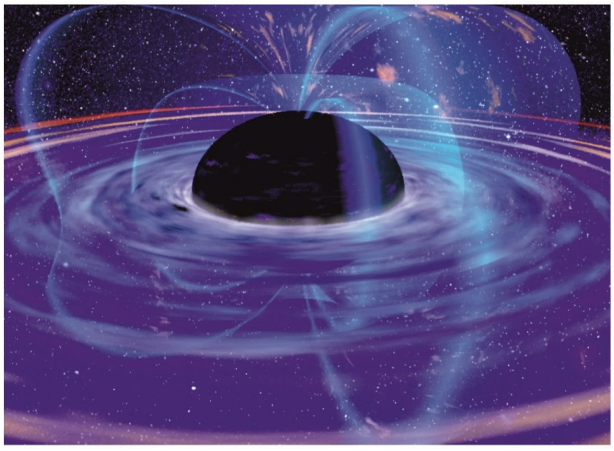
बहुजनहिताय बहुजनसुखाय

What is Black Hole?

A Black Hole is a cosmic body of extremely intense gravity from which nothing, not even light, can escape. A black hole can be formed by the death of a massive star. When such a star has exhausted the internal thermonuclear fuels in its core at the end of its life, the core becomes unstable and gravitationally collapses inward upon itself and the star's outer layers are blown away in Space. The Crushing Weight of constituent matter falling in from all sides compresses the dying star to a point of zero volume and infinite density called the 'Singularity'.

Details of the structure of a Black Hole are calculated from Albert Einstein's General Theory of Relativity. The Singularity constitutes the centre of a black hole and is hidden by the object's "surface," the Event Horizon. Inside the event horizon the escape velocity (i.e., the velocity required for matter to escape from the gravitational field of a cosmic object) exceeds the speed of light, so that not even rays of light can escape into space. The radius of the event horizon is called the Schwarzschild radius, after the German astronomer Karl Schwarzschild, who in 1916 predicted the existence of collapsed stellar bodies that emit no radiation. The size of the Schwarzschild radius is proportional to the mass of the collapsing star. For a black hole with a mass 10 times as great as the Sun, the radius would be 30 km (18.6 miles).



Only the most massive stars those of more than three solar masses become Black Holes at the end of their lives. Stars with a smaller amount of mass evolve into less compressed bodies, either white dwarfs or neutron stars.

Black Holes usually cannot be observed directly on account of both their small size and the fact that they emit no light. They can be "observed," however, by the effects of their enormous gravitational fields on nearby Celestial body.

Some Black Holes apparently have Nonstellar origins (a celestial body that behaves like a star even though it is not a star). Various Astronomers have speculated that large volumes of interstellar gas collect and collapse into Supermassive Black Holes at the centres of quasars and galaxies. A mass of gas falling rapidly into a black hole is estimated to give off more than 100 times as much energy as is released by the identical amount of mass through nuclear fusion. Accordingly, the collapse of millions or billions of solar masses of interstellar gas under gravitational force into a large Black Hole results into the enormous energy output of quasars and certain galactic systems.

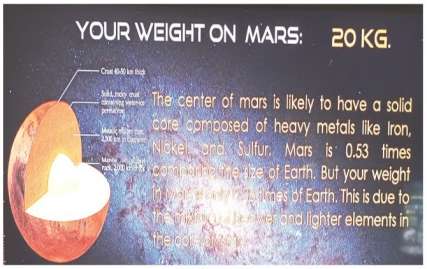
One such Supermassive Black Hole, Sagittarius A*, exists at the centre of the Milky Way Galaxy. Observations of stars orbiting the position of Sagittarius A* demonstrate the presence of a Black Hole with a mass equivalent to more than 40,00,000 Suns. For these observations, American astronomer Andrea Ghez and German Astronomer Reinhard Genzel were awarded the 2020 Nobel Prize for Physics. Supermassive Black Holes have been detected in other galaxies as well. In 2017, the Event Horizon Telescope obtained an image of the supermassive black hole at the centre of the M87 galaxy. That Black Hole has a mass equal to six and a half billion Suns but has only 18 billion km (11 billion miles) radius. It was the first Black Hole to be imaged directly. The existence of even larger Black Holes, each with a mass equal to 10 billion Suns, can be inferred from the energetic effects on gas swirling at extremely high velocities around the centre of NGC 3842 and NGC 4889, galaxies near the Milky Way.

Main Source: https://www.britannica.com/science/black-hole

Image: www.wikipedia.com

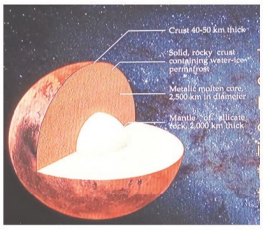
KNOW THE EXHIBIT

Your Weight Varies



The centre of the Mars is likely to have a solid core composed of heavy metals like Iron, Nickel and Sulfur. The Mars is 0.53 times smaller compared to the size of the Earth. But person's weight on the Mars is only 0.38 times less than the Earth. This is due to the mixture of heavier and lighter elements in the core of the Mars. On the Mars, the Sun appears about half the size as it does on the Earth.

For years, the Mars has water in the form of ice. The first sign of trickling water are dark strips or stain on crater wall and cliffs seen in Satellite images. Due to the atmosphere of Mars, this water would have to be salty to prevent it from freezing or vaporizing.



The largest volcano of the Mars Olympus Mons is nearly 100 times larger than Mauna Loa, Hawaii, U.S (United States) the largest Volcano on the Earth and 2.5 as tall as Mount Everest, Asia, highest peak on the Earth.

This exhibit is situated at "Entering Space Gallery" between Fun Science Gallery and Power of Play Gallery at the first floor of Science Centre.

SCIENCE PROJECT

Surat Municipal Corporation had organized 'Science Fair-2023' at the Art Gallery, Science Centre Surat on 18th and 19th August, 2023 for the students of Std. 8 to 12. G.D. Goenka International School had participated in the Science Fair with their project on "River Rakshak" under the sub theme of "Safe and Sustainable City"

The aim of the project was to collect micro plastics from river remotely with the help of mobile application to save our ecosystem.

River Rakshak robot uses motor blades to generate a current which moves micro plastics towards the collection system. The node MCU (Micro Controller Unit) [is an open-source Luna (programming Language) based firmware (micro code or program) and development board (is printed circuit board with a microcontroller/microprocessor mounted on them with other hardware components) specially targeted for IOT (The Internet Of Things describes device with Sensors, Software, Processing ability and other technologies that connect and exchange data with other devices and systems over the Internet or other communication networks) based applications] and the mobile application work together to control the movements of Robot and motor blade operation, making the process efficient and controllable. It is powered by on board batteries. This eco-friendly solution is poised to make a significant impact in the fight against water pollution.

Main Source: 1. meaning of node MCU: nsk.electronics.in/node MCU% 20ESP8266
2. meaning of development board: robocraze.com/blogs/post/advantage-of-development-boards#
3. meaning of IOT: en.m.wikipedia.org/wiki/Internet_of_things

QUIZ

1. Rocket propulsion technology works on the following scientific principle?

(a) Laws of reflection of Sound (b) Newton's law of Motion (c) Law of Thermodynamics (d) Ohm's Law

2. What is the reason for the oil rising in the lamp wick?

(a) Capillary action (b) Diffusion of oil through wick (c) Oil is very light (d) Surface tension

3. Why does the boiling point of water decrease at high altitudes?

(a) Because of high temperature (b) Because of low atmospheric pressure
(c) Because of low temperature (d) Because of high atmospheric pressure

4. Which one of the following is an insulator?

(a) Copper (b) Wood (c) Mercury (d) Aluminium

5. Which one among the following is not an electro–magnetic wave?

(a) X–Ray (b) R–Ray (Roentgen Ray) (c) Cathode Ray (d) Infrared Ray

Main Source: My study247.com/general science/Physics