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SCIENCE CENTRE

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WHAT'S NEW IN SCIENCE?

India to get hydrogen train soon: The science that powers it on the tracks.

India is taking a giant leap toward a cleaner future as the first indigenous hydrogen fuel cell trainset is gearing up for its debut.

Recently approved for pilot operations on the Jind to Sonapat section in Haryana, this 10-car train is more than just a new mode of transport.

It represents a bold shift for Indian Railways as the nation moves to replace traditional diesel engines with cutting-edge technology that emits only water vapour.

Many commuters might wonder how a train can run on hydrogen without burning it like fuel in a car. The secret lies in a component called a hydrogen fuel cell. You can think of a fuel cell as a clever energy box that generates electricity through a controlled chemical reaction. It takes hydrogen stored in tanks on the train and mixes it with oxygen pulled from the air. This process does not involve

combustion or fire. Instead, it uses a thin membrane, a specialist material that acts like a microscopic gatekeeper, to separate electrons from hydrogen atoms. This flow of electrons creates a steady stream of electricity that powers the train motors.

Because it relies on this electrochemical process rather than burning diesel, the only byproduct at the tailpipe is pure water vapour. This is why it is often called a zero-emission transport solution, provided the

hydrogen itself is produced using green energy.

Engineers at the Integral Coach Factory in Chennai designed this train from the ground up, ensuring that every safety feature, from high-tech leak detectors to flame sensors, meets rigorous international standards.

Source: <http://www.indiatoday.in/science/story/hydrogen-train-jind-sonapat-railway-project-technology-explained-india-2921939-2026-06-04>.

Author: Radifah Kabir, on 4th June 2026



SCIENTIST OF THE MONTH

Dr. Shyam Swarup Agarwal

Dr. Shyam Swarup Agarwal was born on July 5, 1941 at Bareilly, Uttar Pradesh. He was the son of Shri Satya Swarup Agarwal. He did his graduation in Science from Lucknow University in 1958. He did his M.B.B.S. from the King George Medical College, Lucknow in 1963 and then M.D, F.R.G.P.

Dr. Agarwal has immensely contributed towards D.N.A. replication, lymphocyte biology and in understanding predisposition to disease. He published many research articles in

Journal of Malaria, Journal of Bioscience Indian Journal of Haematology and the National Medical Journal. He served as a professor in the Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow.

Dr. Agarwal received the M.P. Mehrotra Oration Award in 1981, the Lajwanti Madan Oration Award in 1985, the Shanti Swarup Bhatnagar Prize in 1986 and the Kamala Menon Research Award in 1986. He died on 2 December, 2013.



Main Source: 101, Great Indian Scientists Book, By Shyam Dum



Timings

Tuesday to Sunday
& Public Holidays
9.30 am to 4.30 pm

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SCIENCE FACTS JULY 2026

1 July 1929	: American Biologist Gerald Edelman (Co-winner of the 1972 Nobel Prize in Physiology/ Medicine for work on the immune system) 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.
6 July 1885	: Louis Pasteur had successfully tested the vaccine against rabies on human.
8 July 1895	: Russian Physicist Igor Tamm (Co-winner of the 1958 Nobel Prize in Physics for the discovery and the interpretation of the Cherenkov effect) was born.
9 July 1894	: Soviet Physicist Pyotr Leonidovich Kapitsa (Co-winner of the 1978 Nobel Prize in Physics for his basic inventions and discoveries in the area of low-temperature Physics) was born.
10 July 1902	: German Chemist Kurt Alder (Co-winner of the 1950 Nobel Prize in Chemistry for their discovery and development of the diene synthesis) 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
11 July	: World Population Day. (by U.N.)
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.
12 July 1935	: Japanese Biochemist Satoshi Omura (Co-winner of the 2015 Nobel Prize in Physiology/ Medicine for their discoveries concerning a novel therapy against infections caused by roundworm parasites) was born.
14 July 1965	: The 'Mariner 4' flyby of Mars takes 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 phase 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.
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.
19 July 1938	: Indian astrophysicist Jayant Narlikar was born.
19 July 1945	: Scottish Chemist/Physicist Richard Henderson (Co-winner of the 2017 Nobel Prize in Chemistry for developing cryo- electron microscopy for the high-resolution structure determination of biomolecules in solution) 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.
25 July 1922	: German Chemist John B. Goodenough (Co-winner of the 2019 Nobel Prize in Chemistry for the development of lithium-ion batteries) was born.
25 July 1956	: American Chemist Frances H. Arnold (Co-winner of the 2018 Nobel Prize in Chemistry for the directed evolution of enzymes) was born.
28 July 1925	: American Scientist Baruch S. Blumberg (Co-winner of the 1976 Nobel Prize in Physiology/ 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.
30 July 1947	: French Virologist Françoise Barre-Sinoussi (Co-winner of the 2008 Nobel Prize in Physiology/Medicine for their discovery of human immunodeficiency virus) was born.
31 July 1918	: 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. c 4. a 5. b

SCIENTIFIC QUESTION

What is Big Bang?(future):(part-9)

The future of the solar system is dominated by the gradual aging of the sun, which will eventually trans-form into a Red giant and later a white dwarf. While the system is currently stable, over billions of years, it will undergo dramatic changes that will lead to the destruction of some planets and the displacement of others.

The sun's increasing luminosity will disrupt Earth's carbon cycle, leading to the extinction of most plant life approximately 600 million years from now.

A runaway greenhouse effect will occur as the sun becomes 10% brighter, causing Earth's oceans to evaporate completely within~ 1 Billion years.

The Milky way and Andromeda galaxies will collide. While individual star Systems like ours are unlikely to suffer direct collisions, the solar system may be flung into a new orbit on the outskirts of the resulting galaxy around ~ 4 Billion years from now.

The sun will exhaust its hydrogen fuel expand into Red giant. It will swallow Mercury and Venus and its outer layers may reach Earth's orbit 5 Billion years.

The sun will shed its outer layers as a

planetary nebula leaving behind a small, hot core known as a white ~7.5-8 Billion years.

Over Vast timescales, gravitational interactions with passing stars will likely strip away any remaining planets, leaving the Sun's remnant as a solitary cooling white dwarf around ~ 100 Billion years.

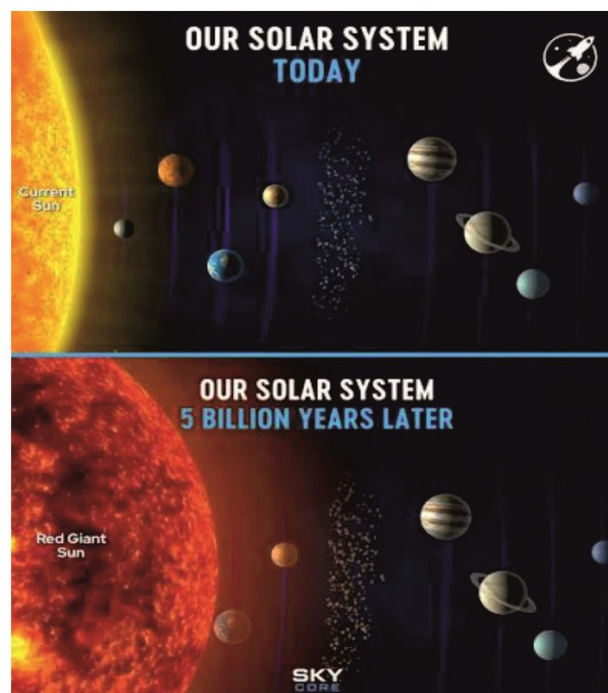
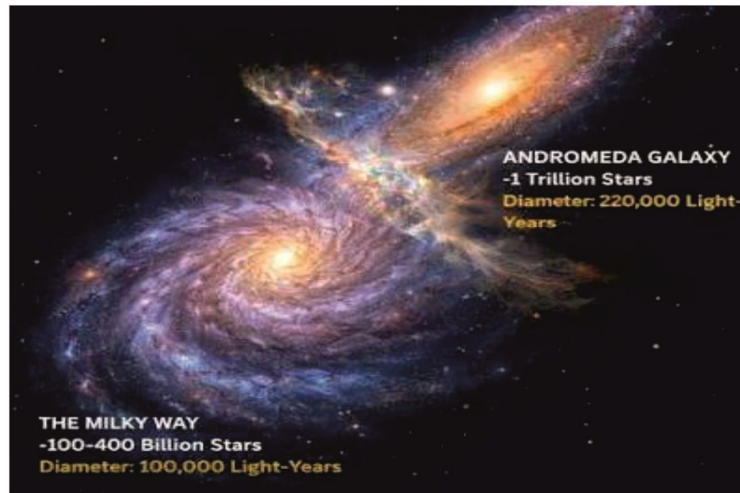
The Fate of the Planets.

Mercury & Venus: Likely engulfed by the sun during its Red giant phase.

Earth: Uncertain; it may be swallowed by the sun or roasted into a barren airless rock if its orbit drifts outward.

Outer Planets: Their orbits will likely expand as the Sun loses mass and they will continue to orbit the white dwarf sun for billions of years.

The Moon: May eventually be torn apart by Earth's gravity to form a ring system if it's orbit decays, or it may be lost if the Earth is engulfed.



Main Source and Image: NASA Science Wikipedia
BBC Sky at Night, Planetary Society

SCIENCE FAIR-2026

Surat Municipal Corporation is going to organize "Science Fair-2026 at Art Gallery, Science Centre on 12th and 13th August 2026. There are two groups in Science Fair:

Group A: Students of Std. 8 to 10 and

Group B: Students of Std. 11 and 12 .

The theme of the 'Science Fair-2026' is ***"Use of Technology for Brighter Future"***.

The Sub-theme for the Science Fair is as follows:

- 1) Use of Artificial Intelligence model in Science/Maths
- 2) Technology in the field of Health and Wellness
- 3) Technology to build a Sustainable Future

Interested School can download the form from www.suratmunicipal.gov.in and submit it via e-mail.

KNOW THE ENTERING INTO SPACE GALLERY EXHIBIT

International Space Laws(Selected)

Data regarding the sensing of the Earth's surface from space shall make available technical assistance to other interested states on mutually agreed terms. It will be used to promote the protection of the Earth's natural environment.

This exhibit is situated at "Entering Space Gallery" between Fun Science Gallery and Power of Play Gallery at First Floor of Science Centre.



QUIZ

1. What is the molecular formula of Ethane?
a) CH_4 b) C_2H_6 c) C_3H_8 d) C_2H_4
2. What is the molecular formula of Ethyne?
a) C_2H_2 b) C_2H_4 c) C_2H_6 d) C_2H_3
3. What is the molecular formula of Propyne?
a) C_3H_8 b) C_3H_6 c) C_3H_4 d) C_3H_9
4. What is the molecular formula of Propane?
a) C_3H_8 b) C_3H_6 c) C_3H_4 d) C_3H_9
5. What is the molecular formula of Propene?
a) C_3H_8 b) C_3H_6 c) C_5H_{10} d) C_5H_{12}

Main Source: Navneet MCQs Science and Technologies. Std 10