

# SCIENCE CENTRE NEWS LETTER

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## SCIENCE CENTRE

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### WHAT'S NEW IN SCIENCE?

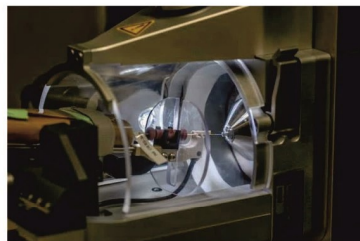
#### AI model finds the cancer clues at lightning speed.

Researchers at the University of Gothenburg, Sweden have developed an AI (Artificial Intelligence) model that increases the potential for detecting cancer through sugar analyses in human body. The AI model is faster and better at finding abnormalities than the current semi-manual method.

Glycans, or structures of sugar molecules in human cells, can be measured by Mass Spectrometry. One important use is that the structures can indicate different forms of cancer in the cells of human.

This process can take anywhere from hours to days for each sample and can only be carried out with high confidence by a small number of experts in the World, as it is essentially detective work learnt over many years.

When there are many samples to be analysed for cancer detection, this process is a bottleneck in the use of glycan analyses. Researchers have developed an AI model to automate this detective work. The AI model, named Candycrunch, solves the task in just a few seconds per test. The results are reported in a Scientific article in the



journal Nature Methods.

The AI model was trained using a database of over 5,00,000 examples of different fragmentations and associated structures of sugar molecules.

"The training has enabled Candycrunch to calculate the exact sugar structure in a sample in 90 per cent of cases," says Daniel Bojar, Associate Senior Lecturer in Bioinformatics at the University of Gothenburg, Sweden.

This means that the AI model could soon reach the same levels of accuracy as the sequencing of other biological sequences, such as DNA, RNA or

proteins. Because the AI model is so fast and accurate in its answers, it can accelerate the discovery of glycan-based biomarkers (A biomarker may be used to see, how well the body responds to a treatment for a disease or condition) for both diagnosis and prognosis of cancer.

#### Main Source/Author:

<https://www.Sciencedaily.com/releases/2024/07/240701131717.htm>

#### Image:

- <http://www.eurekalert.org/new-releases/1049861>
- [analytica-world.com/en/news/1183894/ai-model-finds-the-cancer-clues-at-lightning-speed.html](https://analytica-world.com/en/news/1183894/ai-model-finds-the-cancer-clues-at-lightning-speed.html)

### SCIENTIST OF THE MONTH

#### Mankombu Sambasivan Swaminathan

Mankombu Sambasivan Swaminathan was born on 7 August 1925 in Kumbakonam, Madras. He received B.Sc (Bachelor of Science) in Zoology from the University of Travancore (now the University of Kerala) Kerala, in 1944 and B.Sc in Agriculture from the University of Madras, Chennai in 1947. He received M.Sc (Master of Science) in Agricultural Science (Specializing in Genetics And Plant Breeding) from the Indian Agricultural Research Institute (IARI), Delhi, in 1949 and received a Ph.D (Doctor of Philosophy) degree from the School of Agriculture at the University of Cambridge, England in 1952.



Scientist, Geneticist, Administrator and Humanitarian. Swaminathan was a global leader of the "Green Revolution". He has been called the main architect of the "Green Revolution in India" for his leadership and role in introducing and further developing high-yielding varieties of Wheat and Rice.

M. S. Swaminathan received The Mendel Memorial Medal in 1965, The Padma Shri award in 1967, The Ramon Magsaysay Award in 1971, Padma Bhushan award in 1972, The Albert Einstein World Award of Science in 1986, The Inaugural Laureate of the World Food Prize in 1987 and Padma Vibhushan award in 1989. He died on 28 September, 2003

#### Main Source and Image:

[www.Science.org/https://en.m.Wikipedia.org](http://www.Science.org/https://en.m.Wikipedia.org)

M. S. Swaminathan was an Indian Agricultural

## SCIENCE FACTS AUGUST 2024



### Timings

Tuesday to Sunday  
& Public Holidays

9.30 am to 4.30 pm

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1 August 1885	Hungarian Chemist George de Hevesy (Winner of the 1943 Nobel Prize in Chemistry for his key role in the development of radioactive tracers) was born.
1 August 1924	Ukrainian-born Physicist Georges Charpak (Winner of the 1992 Nobel Prize in Physics for his invention and development of particle detectors ) was born.
2 August 1932	The positron (Antiparticle of the electron) was discovered by Carl D. Anderson.
3 August 1959	Japanese Scientist Koichi Tanaka (Co-winner of the 2002 Nobel Prize in Chemistry for developing a novel method for mass spectrometric analysis of biological micromolecules) was born.
6 August 1881	Prof. Alexander Fleming (Discoverer of Penicillin) was born.
8 August 1901	Ernest Lawrence (Inventor of Cyclotron) was born.
8 August 1902	English Physicist Paul Dirac (Co-winner of the 1933 Nobel Prize in Physics for the discovery of new productive forms of atomic theory ) was born.
9 August 1911	American Physicist William Alfred Fowler (Co- winner of the 1983 Nobel Prize in Physics for his theoretical and experimental studies of the nuclear reactions of importance in the formation of the chemical elements in the universe ) was born.
10 August 1902	Swedish Chemist Arne Tiselius (Winner of the 1948 Nobel Prize in Chemistry for his research on electrophoresis adsorption analysis, especially for his discoveries concerning the complex nature of the serum proteins) was born.
10 August 1913	German Physicist Wolfgang Paul (Co-winner of the 1989 Nobel Prize in Physics , who co-developed the non-magnetic quadrupole mass filter which laid the foundation for what is now called an ion trap) was born.
11 August 1926	Lithuanian-born Chemist Aaron Klug (Winner of the 1982 Nobel Prize in Chemistry for his development of crystallographic electron microscopy and his structural elucidation of biologically important nucleic acid-protein complexes) was born.
12 August 1887	Austrian Physicist Erwin Schrodinger (Co-winner of the 1933 Nobel Prize in Physics for the formulation of the Schrodinger equation ) was born.
12 August 1919	Well known Indian Scientist Dr. Vikaram Ambalal Sarabhai was born on this day.
13 August 1872	German Chemist Richard Willstatter (Who studied the structure of plant pigments) was born.
13 August 1913	Harry Brearley invented stainless steel.
15 August 1892	French Physicist Louis, De Broglie (Winner of the 1929 Nobel Prize in Physics for the wave-like behaviour of matter was first experimentally demonstrated in 1927 ) was born.
16 August 1845	French Physicist Gabriel Lippmann (Winner of the 1908 Nobel Prize in Physics for the invention of a method for reproducing colours by photography, based on the interference phenomenon) was born.
17 August 1870	Frederick Russell (Inventor of first successful typhoid fever vaccine) was born on this day.
23 August 1931	American microbiologist Hamilton O. Smith (Co-winner of the 1978 Nobel Prize in Physiology or Medicine for discovering type II restriction enzymes ) was born.
25 August 1900	German Physician and biochemist Hans Adolf Krebs (Co-winner of the 1953 Nobel Prize in Physiology or Medicine for his discovery of the citric acid cycle ) was born.
26 August 1906	Albert Sabin (Inventor of oral polio vaccine) was born on this day.
29 August	International Day against Nuclear Tests. (by U.N.)
30 August 1852	Dutch Physical and Organic Chemist Jacobus Henricus van't Hoff (The first winner of the Nobel Prize in Chemistry) was born.

U. N. : United Nations

WHO -World Health Organization

UNESCO - United Nations Educational Scientific & Cultural Organization

Answers: 1). C 2). B 3). A 4). B 5). B



# SCIENTIFIC QUESTION

## What are "Indigenous Technologies for *Viksit Bharat*" ?

The theme "Indigenous Technologies for *Viksit Bharat*" has been launched by Department of Science and Technology, Government of India for National Science Day 2024 to emphasize the importance of home-grown technologies and the efforts of Indian Scientists. This theme aims to promote public appreciation for Science, Technology and Innovation, highlighting the accomplishments of Indian Scientists in addressing challenges through indigenous technologies for overall well-being.

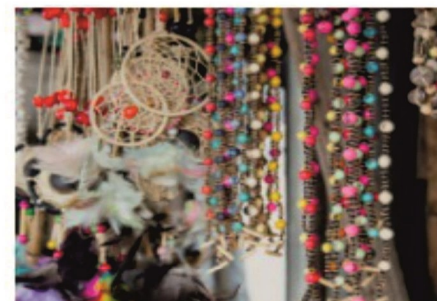
Indigenous technologies developed in India include:

- INS Vikrant: India's first indigenously developed aircraft carrier.
- ZyCOV-D: The world's first developed DNA vaccine by Zydus Cadila for Covid-19.
- CERVAVAC: India's first indigenously developed quadrivalent human papillomavirus vaccine against cervical Cancer.
- Aeronautical systems, missiles and electronic systems by the Defence Research and Development Organisation (DRDO).

Indigenous techniques can be classified as under:

### 1. INDIGENOUS TECHNOLOGIES TO IMPROVE HUMAN LIFE:

- Revolutionizing mobility with indigenous technologies
- Electric vehicles and smart public transportation systems
- Solutions for traffic management and congestion reduction
- Improving urban transportation
- Aadhaar: Biometric ID system revolutionizing services.
- Digital Payments: UPI transforming financial transactions.
- E-Governance Platforms: Digital India enhancing government services.
- Satellite Technology: ISRO bolstering communication and navigation.
- Language Technologies: Indic language computing aiding inclusivity.
- Cybersecurity Solutions: Indigenous firms combatting cyber threats.
- Blockchain Solutions: Startups innovating across sectors.



### 2. AGRICULTURAL TECHNOLOGIES:

- Drip irrigation systems and precision farming techniques
- Cropspecific technologies for Rice, Wheat and Pulses
- Post harvest technologies for storage and processing.

### 3. RENEWABLE ENERGY TECHNOLOGIES:

- Solar power, wind energy, hydroelectric power, and bioenergy solutions
- Innovations in solar panels, solar water heaters, and solar pumps
- Benefits of indigenous technologies in rural areas efficient Irrigation methods and Water purification technologies
- Tailoring solutions to local conditions
- Addressing water scarcity with indigenous technologies
- Rainwater harvesting systems and groundwater recharge techniques

### 4. HEALTHCARE TECHNOLOGIES:

- Low-cost medical devices and telemedicine solutions
- Mobile health apps and diagnostic tools for resource constrained settings
- Making medical services accessible and affordable

### 5. INDIGENOUS TECHNOLOGIES FOR REVIVAL OF INDIGENOUS CRAFTS:

- Improving indigenous crafts with indigenous innovations -
  1. Embroidery
  2. Wood Working
  3. Bell Making
  4. Rogan Painting [In this craft, paint made from boiled Castor oil or Linseed oil and vegetable dyes is laid down on fabric using a stylus (writing utensil)]
  5. Printing & Dyeing
  6. Namdha (Wool Felting)

**Main Source:** <https://www.slideshare.net/slideshow/indigenous-technologies-for-a-developed-india-pptx-2-pptx/268012653>;  
[https://wikipedia.org/wiki/Rogan\\_painting](https://wikipedia.org/wiki/Rogan_painting)

# KNOW THE EXHIBIT

## Your Weight Varies

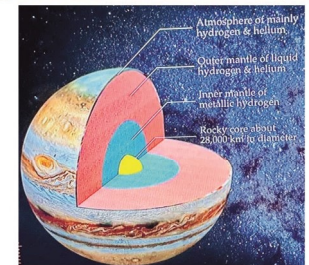
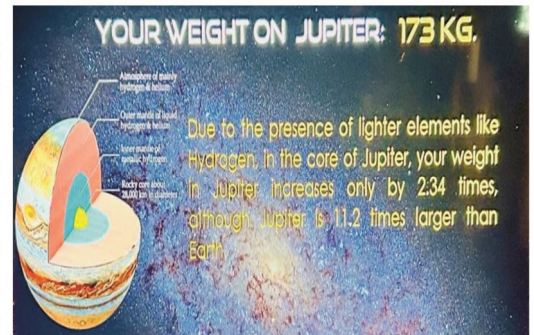
Due to the presence of lighter elements like Hydrogen, in the core of the planet Jupiter, person's weight on the planet Jupiter increases only by 2.34 times, although the planet Jupiter is 11.2 times larger than Earth.

Jupiter's Moon Ganymede is the largest Moon in the Solar System. Jupiter's Moon are sometimes called the "Jovian Satellites". Apart from Ganymede, the other larger Moons are Callisto, IO and Europa. Ganymede measures 5268 Km (Kilometer) across, making it larger than the planet Mercury.

Jupiter's atmosphere is special because it is the Solar System's largest planetary atmosphere. It is made up of Hydrogen and Helium, it is the same proportion as found in the Sun. Jupiter has the shortest day of all the planets. It turns on its axis once every 9 hours and 55 minutes. The rapid rotation flattens the Jupiter slightly, giving it an oblate shape.

Jupiter is the fourth brightest Celestial object in the Solar System. Sun, Moon and Venus are brighter than the planet Jupiter.

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



## SUMMER CAMP-2024

Surat Municipal Corporation is going to organize 'Science Fair-2024' at Art Gallery, Science Centre on 16<sup>th</sup> and 17<sup>th</sup> August 2024 having two groups:

- Group A: Students of Std. 8 to 10
- Group B: Students of Std. 11 to 12

Theme of the 'Science Fair-2024' is Indigenous Technologies for "Viksit Bharat", the Subtheme for the Science Fair is as follows:

1. Indigenous Technologies to improve Human life
2. Indigenous Technologies for Agriculture
3. Indigenous Technologies for Renewable Energy Sources
4. Indigenous Technologies for Health care Innovations
5. Indigenous Technologies for Revival of Indigenous Crafts

Interested Schools can download the form from [www.suratmunicipal.gov.in](http://www.suratmunicipal.gov.in) and submit the form on [sciencecentre@suratmunicipal.org](mailto:sciencecentre@suratmunicipal.org) / [divyesh\\_gameti@hotmail.com](mailto:divyesh_gameti@hotmail.com) before Dt. 01/08/2024.

## QUIZ

1. Which of the following is an example of a renewable Energy Source?

- A) Coal      B) Natural Gas      C) Solar Power      D) Nuclear Energy

2. What is the pH value of Pure Water?

- A) 5      B) 7      C) 9      D) 10

3. What is the function of the human Respiratory System?

- A) Transportation of oxygen in the blood      B) Digestion of food  
C) Pumping blood to the body      D) Excretion of waste products

4. Which of the following is a Greenhouse Gas?

- A) Oxygen      B) Carbon Dioxide      C) Nitrogen      D) Hydrogen

5. Which gas makes up the largest percentage of the Earth's Atmosphere?

- A) Oxygen      B) Nitrogen      C) Carbon Dioxide+      D) Hydrogen