

SCIENCE CENTRE NEWS LETTER

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SCIENCE CENTRE

WHAT'S NEW IN SCIENCE?

Fat burning during exercise varies widely between individuals

“The best heart rate for burning fat differs for each individual and often does not align with the “fat burning zone” on commercial exercise machines”, Icahn School of Medicine at Mount Sinai, New York, U.S (United States) researchers report.

Instead, the researchers said, clinical exercise testing - a diagnostic procedure to measure a person's physiological response to exercise - may be a more useful tool to help individuals achieve intended fat loss goals.

“People with a goal of weight or fat loss may be interested in exercising at the intensity which allows for the maximal rate of fat burning. Most commercial exercise machines offer a “fat-burning zone” option, depending upon age, sex, and heart rate,” says Hannah Kittrell at Icahn School of Medicine, New York, U.S (United States) in the Augmented Intelligence in Medicine and Science laboratory.

The term ‘FATmax’ is sometimes used to represent the exercise intensity and associated heart rate at which the body reaches its highest fat-burning

rate during aerobic exercise. At this point, fat is a significant fuel source and therefore this intensity may be of interest to those seeking to optimize fat loss during workouts.

As part of the study, the researchers compared heart rate at FATmax, as measured during a clinical exercise test, to predicted heart rate at percentages of maximal effort within the typically recommended “fat-burning zone.” In a sample of 26 individuals, the researchers found that there was poor agreement between measured and predicted heart rate, with a mean difference of 23 beats per minute between the two measures. This suggests that general recommendations for a “fat-burning zone” may not provide accurate guidance.

The researchers plan to study whether individuals who receive a more personalized exercise prescription demonstrate more weight and fat loss, as well

as improvement of metabolic health markers that identify health risks like type 2 diabetes, obesity, and heart disease or not.

Courtesy - Lourdes Convent High School



SCIENTIST OF THE MONTH

Dr. Paramsivam Natrajan

Dr. Paramsivam Natrajan was born on 17th September, 1940 in Tamil Nadu. He was graduated in Chemistry from University of Madras, Tamil Nadu in 1959 and started his career as a Lecturer at Government Arts College of Madras University, Tamil Nadu in 1959. In 1964, he joined Banaras Hindu University (BHU), Uttar Pradesh as a CSIR (Council of Scientific and Industrial Research) Junior Research fellow. After continuing at BHU for a year, he joined as a Lecturer at Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Pondicherry, where he stayed till 1970. He went to U.S (United States) as a Teaching Assistant at University of Southern California, simultaneously pursuing Doctoral studies under the guidance of John. F. Endicott. He secured Ph.D in 1971.

Dr. Natrajan returned to India in 1974 and joined Madras University, Tamil Nadu as a Reader in the Department of Physical Chemistry. In 1977, he became Professor incharge of the Postgraduate Centre of the University in Tiruchirappalli, Tamil Nadu. In 1991, he was deputed as the Director of Central Salt and Marine

Chemicals Research Institute (CSMCRI), Bhavnagar, Gujarat.

Focusing his researches on Photochemistry, Dr. Natrajan studied various areas of the discipline such as polymer dynamics using fluorescence, flash photolysis studies using picoseconds and femtosecond lasers and solar energy conversion. He demonstrated that micromolecular dye coatings of electrodes used in photoelectrochemical cells returned high current density.



The Council of Scientific and Industrial Research awarded him the Shanti Swarup Bhatnagar Prize in 1984. In 1999, he was awarded The Acharya P. C. Ray Memorial Award by the Indian Chemical Society, West Bengal. He was an elected

fellow of the Indian Academy of Sciences, Indian National Science Academy, International Union of Pure and Applied Chemistry, Tamil Nadu Academy of Sciences, Society of Bio-Sciences, Gujarat Academy of Sciences and a member of Sigma xi: The Scientific Research Society. He died on 18th March 2016 at Chennai, Tamil Nadu.

Courtesy - Lourdes Convent High School



Timings

Tuesday to Sunday
& Public Holidays
9.30 am to 4.30 pm

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SCIENCE FACTS SEPTEMBER 2023

1 September 1877	British Chemist and Physicist Francis William Aston (winner of the 1922 Nobel Prize in Chemistry for his discovery of isotopes in many non- radioactive elements and for his enunciation of the whole number rule) was born.
2 September 1853	German Chemist Wilhelm Ostwald (winner of the 1909 Nobel Prize in Chemistry for his scientific contribution to the fields of catalysis, chemical equilibria and reaction velocities) was born.
3 September 1869	Slovenian Chemist Fritz Pregl (winner of the 1923 Nobel Prize in Chemistry for making important contributions to quantitative organic microanalysis) was born.
4 September 1906	German Biologist Max Delbruck (Shared the 1969 Nobel prize in Physiology or Medicine for their discoveries concerning the replication mechanism and the genetic structure of viruses.) was born.
6 September 1766	John Dalton (Discoverer of Law of partial pressure & Thermal expansion) was born.
6 September 1892	English Physicist Edward Appleton (winner of the 1947 Nobel Prize in Physics for his seminal work proving the existence of the ionosphere) was born.
7 September 1917	Australian Chemist John Cornforth (winner of the 1975 Nobel Prize in Chemistry for his work on the stereochemistry of enzyme-catalysed reactions) was born.
8 September 1918	British Chemist Derek Harold Richard (co-winner of the 1969 Nobel Prize in Chemistry for contributions to the development of the concept of conformation and its application in chemistry) was born.
9 September 1922	German –born Physicist Hans Georg Dehmelt (co-winner of the 1989 Nobel Prize in Physics for co-developing the ion trap technique) was born.
10 September 1892	Arthur Holly Compton (Inventor of Compton effect) was born.
12 September 1897	French Physicist Irene Joliot-Curie (co-winner of the 1935 Nobel Prize in Chemistry for their discovery of induced radioactivity) was born.
16 September	“International Day for the preservation of the Ozone Layer”. (U.N)
17 September 1976	The first Space Shuttle, Enterprise, is unveiled by NASA.
18 September 1907	American Physicist Edwin McMillan (co-winner of the 1951 Nobel Prize in Physics who is the first to produce a transuranium element, Neptunium) was born.
19 September 1926	Japanese Physicist Masatoshi Koshiha (co-winner of the 2002 Nobel Prize in Physics for pioneering contributions to Astrophysics , in particular for the detection of cosmic neutrinos) was born.
21 September	"International Day of Peace"(U.N.).
21 September 1926	American Physicist Donald A. Glaser (winner of the 1960 Nobel Prize in Physics for his invention of the bubble chamber used in subatomic particle physics) was born.
22 September 1791	Michael Faraday (Discoverer of electromagnetic Induction) was born.
22 September 1888	The first issue of National Geographic Magazine is published.
23 September 1915	American Physicist Clifford Shull (co-winner of the 1994 Nobel Prize in Physics for the development of the neutron scattering technique) was born.
23 September 2023	Autumnal equinox: On this day, Day and night becomes equal on the Earth.
25 September 1866	American geneticist Thomas Hunt Morgan (winner of the 1933 Nobel Prize in Physiology or Medicine for discoveries elucidating the role that the chromosome play in heredity) was born.
28 September	“World Rabies Day”. (WHO)
29 September 1901	Enrico Alberto Fermi (Noble Prize winner in physics for his work on “Induced Radioactivity) was born.
<p>U. N. : United Nations</p> <p>WHO -World Health Organization</p> <p>UNESCO - United Nations Educational Scientific & Cultural Organization</p>	

Answers: 1) b, 2) b, 3) c, 4) a, 5) c, 6) d, 7) a

SCIENTIFIC QUESTION

Aurora Borealis (Nature's very own light show)

The Northern lights, or as we call them, Aurora Borealis, have been a part of this universe even before humans came into existence. It seemed to be jaw-dropping phenomenon. If you are on a trip to countries like Norway, Alaska or even Canada, keep your eye out, because you might experience a big surprise. If you're lucky enough, you will get to experience a phenomenon that seems surreal, but just so incredible.

For different countries, people created tales, myths and legends about this phenomenon, even though people were unaware of what it was called. It wasn't until the great Scientists, Galileo Galilei and Pierre Gassendi finally gave these mysterious lights a name. They dubbed the phenomenon Aurora Borealis or Northern dawn, after Aurora, the Roman goddess of morning and Boreas, the Greek God name of North wind.

When outermost layer of the Sun called corona, gets too hot, some electrons and protons shed off in the



form of plasma. They escape the Sun's boundary and form a cluster called the solar winds. The Earth's magnetosphere keeps these winds from entering directly into the Earth's atmosphere. But when they get too strong, they overpower the shield and enter through the Earth's poles. The lost protons and electrons get so

excited when reunited with their neutral atom, that they start emitting photons, which are tiny bursts of light.

The gases emit different light rays of different colors based on their composition and altitude. When the solar winds react with Oxygen at a high altitude, they emit a yellow green colour

whereas Nitrogen causes red colour at lower altitudes.

What's even more astonishing, is the fact that these very lights were seen in Ladakh for the first time on 22 and 23 April, 2023.

Courtesy - Lourdes Convent High School

KNOW THE EXHIBIT

Health in Space – Cardiac Problems

A study in the year 2014 on 12 Astronauts found that the heart becomes 9.4 percent more spherical after long exposure to micro gravity or weightlessness in Space. This could cause heart problems, especially on a deep space flight to Mars.

“The heart doesn't work as hard in Space, which can cause a loss of muscle mass and serious consequences after the return to Earth” said Dr. James Thomas of NASA.

So far, the change in shape reverts after the Astronauts come back to Earth but no one knows what the long term effects will be. Doctors already know that Astronauts experience dizziness when they return to Earth.

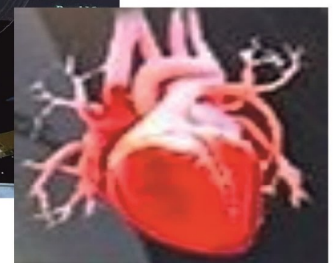
This exhibit is situated at “Entering Space Gallery” between Fun Science Gallery and Power of Play Gallery at the first floor of Science Centre.



Cardiac Problems



The heart doesn't work as hard in space, which can cause a loss of muscle mass. The heart becomes 9.4 percent more spherical after long exposure to microgravity, or weightlessness, in space. This could cause heart problems. So far, the change in shape reverts after the astronauts come back to Earth.



SCIENCE FAIR-2023

Surat Municipal Corporation had organized 'Science Fair-2023' on the theme 'Developing Progressive and Sustainable City' at Art Gallery, Science Centre Surat on 18th and 19th August, 2023 for the students of Std. 8 to 12, in which 290 students and 91 teachers from 59 Schools had participated. Mrs. Purnimaben Dawle, Cultural Commity Chairman, Surat Municipal Corporation inaugurated the Science Fair. 91 projects were displayed of following subjects:

1. Affordable & Clean Energy
2. Climate Change and its Impact
3. Good Health & Wellbeing
4. Sustainable Industrialization & Innovation
5. Safe and Sustainable City.



SCIENCE PROJECT

Lourds Convent High School had presented their project on 'Energy Production from Plastic' under the sub theme of 'Climate change and its Impact'.

The aim of this project is to reuse Plastic as much as possible and also destroy it at the same time.

In this project, the process to use plastic is simple. Plastic is burnt and it is converted into pure Air and then it is used for production of energy.



CHANDRAYAAN-3

'Vikram' Lander of Chandrayaan-3 made successful touched down and a soft landing on the Lunar South Pole region on 23rd August, 2023 at 6:04 pm IST (Indian Standard Time). A day after landing, Rover "Pragyaan" ramped down from the Lander "Vikram" to the Lunar surface and travelled 8 metres on the lunar surface. The Lander and the Rover with a mission life of one Lunar Day (14 Earth Days) have four (4) Scientific payloads (the scientific or technological instrument carried on board a satellite for the specific purpose) to carry out experiments on the Lunar surface.

