

# SCIENCE CENTRE NEWS LETTER

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## SCIENCE CENTRE

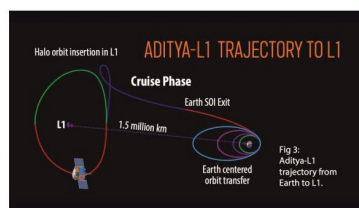
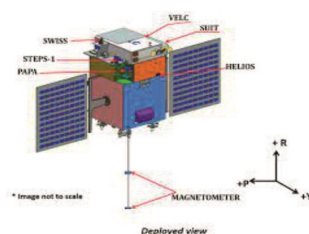
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### WHAT'S NEW IN SCIENCE?

#### Aditya L-1 (Solar Atmosphere Mission)

Aditya L-1 is a planned coronagraphy (a telescopic attachment designed to block out the direct light from a star or other bright object) spacecraft to study solar atmosphere, designed and developed by the Indian Space Research Organisation (ISRO). It will be inserted to about 1.5 million kilometre from the Earth in a halo orbit around the L1 Lagrange point between the Earth and the Sun where it will study the solar atmosphere, solar magnetic storms and its impact on environment around the Earth. A satellite placed in the halo orbit around the L1 point has the advantage of continuously viewing the Sun without any occultation or eclipse. This will provide a greater advantage of observing the solar activities and its effect on space weather. It is the first Indian mission dedicated to observe the Sun and it was launched aboard a PSLV-XL launch vehicle on 2<sup>nd</sup> September 2023 at 11:50 am IST (Indian Standard Time) from Satish Dhawan Space Centre, Sri Harikota, Andhra Pradesh. It successfully achieved its intended orbit nearly an hour later and separated from the fourth stage at 12:57 IST. The estimated cost of the mission is about rs. 378.53 crores.

The Aditya L-1 mission will



take around 109 Earth days after launch to reach the halo orbit around the L1 point, which is about 1,50,000 km (930,000 miles) from Earth. The 1500 kg satellite carries seven science payloads.

Aditya L-1 will be able to provide observations of Sun's photosphere (is a outer shell from which light is radiated), chromospheres (is the second layer of star's atmosphere) and corona (is the outermost layer of a star's atmosphere).

In addition, an instrument will study the solar energetic particles' flux reaching the L-1 orbit, while a magnetometer payload will measure the variation in magnetic field strength at the halo orbit around L-1. The mission will obtain near simultaneous images of the different layers of the Sun's atmosphere, which will reveal the ways in which energy may be channelled and transferred from one layer to another. Thus, Aditya L-1 mission will enable a comprehensive understanding of the dynamical processes of the Sun.

Courtesy - Suman High School No.10

### SCIENTIST OF THE MONTH

#### Dr. Satishchandra Maheshwari

Dr. Satishchandra Maheshwari was born on 4<sup>th</sup> October 1933 in Jaipur, Rajasthan. He graduated in Botany from St. Stephen's College of the University of Delhi in 1952. He secured his Master's Degree in 1954 and Doctoral Degree in 1958 from the same University. Dr. Maheshwari's post-doctoral research was on the embryology of Duckweeds (Lemnoideae is a subfamily of flowering aquatic plants known as Duckweeds) under B. M. Johri at University of Delhi and started his career at University of Delhi as a member of the faculty of Science in 1954. After 4 years of service, Dr. Maheshwari obtained a Fulbright Smith Mundt Fellowship in 1959 and travelled to the U.S (United States) to where he continued his research at Yale University and California Institute of Technology, United States. Returning to India, he resumed his career at University of Delhi and served as a Professor there as well as at Jaipur National University, Rajasthan till his superannuation from service.

One of the first significant contributions of Dr. Maheshwari was the discovery of RNA polymerase (is an enzyme that catalyzes the chemical reactions that synthesize

RNA from DNA templates) activity in chloroplasts (it conducts photosynthesis in plant and algal cells). In 1966, he, along with Sipra Guha Mukherjee, developed a new high-speed culture technique for producing homozygous (a cell is said to be homozygous when identical alleles of the gene are present on both homologous chromosomes) pure lines of haploid (7 number of complete set of chromosomes in a cell) plants which is now in practice for crop improvement and for commercial production of horticultural and ornamental of plants. He is the founder of the Department of Plant Molecular Biology at University of Delhi, the first such Department in India, where he established a unit for plant cell and Molecular Biology.



Dr. Maheshwari was awarded the Shanti Swarup Bhatnagar Prize by the Council of Scientific and Industrial Research in 1972 for his contributions to Biological Sciences. He was elected as a Homi Bhabha Fellow by the Indian Academy of Sciences in 1975 and Indian National Science Academy also elected him as their Fellow. He died on 12<sup>th</sup>

Courtesy - Suman High School No.10



### Timings

Tuesday to Sunday  
& Public Holidays  
9.30 am to 4.30 pm

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## SCIENCE FACTS OCTOBER 2023

1 October 1880	First electric lamp Factory opened by Thomas Edison.
2 October 1852	Scottish Chemist William Ramsay (winner of the 1904 Nobel Prize in Chemistry who discovered the noble gases) was born.
3 October 1904	American Chemist Charles J. Pedersen (Co-winner of the 1987 Nobel Prize in Chemistry for describing methods of synthesizing crown ethers) was born.
4 October	World Space Week (by U.N.)
4 October 1916	Russian Physicist Vitaly Ginzburg (Co-winner of the 2003 Nobel Prize in Physics for their pioneering contributions to the theory of superconductors and superfluids.) was born.
4 October 1957	Soviet Union launched first Artificial Earth Satellite named "Sputnik-1"
5 October 1882	American rocket scientist Robert Goddard was born.
6 October 1903	Irish Physicist Ernest Walton (Co-winner of the 1951 Nobel prize in Physics for their work on the transmutation of the atomic nuclei by artificially accelerated atomic particles) was born.
7 October 1885	Danish Physicist Niels Bohr (Who made foundational contributions to understanding atomic structure and quantum theory) was born.
7 October 1939	English Chemist Harold Kroto (Co-winner of the 1996 Nobel Prize in Physics for their discovery of fullerenes.) was born.
8 October 1917	English Biochemist Rodney Robert Porter (Co-winner of the 1972 Nobel Prize in Physiology or Medicine for determining the Chemical Structure of an Antibody) was born.
9 October 1852	German Chemist Hermann Emil Fischer (winner of the 1902 Nobel Prize in Chemistry in recognition of the extra ordinary services he has rendered by his work on sugar and purine syntheses) was born.
11 October 1884	German Chemist Friedrich Bergius (Co-winner of the 1931 Nobel Prize in Chemistry in recognition of their contributions to the invention and development of Chemical high- pressure methods) was born.
13 October 1773	The Whirlpool Galaxy is discovered by Charles Messier.
13 October 1884	Greenwich is established as universal time meridian of longitude.
14 October 1914	American Physicist Raymond Davis Jr. (Co-winner of the 2002 Nobel Prize in Physics who detected neutrinos emitted from the Sun) was born.
18 October 1967	The Soviet probe Venera 4 reaches Venus and become the first spacecraft to measure the atmosphere of a Planet other than Earth.
20 October 1891	English Physicist James Chadwick (Winner of the 1935 Nobel Prize in Physics for his discovery of the Neutron in 1932.) was born.
21 October 1833	Swedish inventor and founder of the Nobel Prize Alfred Nobel was born.
22 October 1881	American Physicist Clinton Davisson (Co- winner of the 1937 Nobel Prize Physics for his discovery of Electron Diffraction in the famous Davisson– Germer experiment) was born.
22 October 1903	American Geneticist George Wells Beadle (Co-winner of the 1958 Nobel Prize in Physiology or Medicine for their discovery of the role of genes in regulating biochemical events within cells.) was born.
22 October 2008	India had launched its first unmanned lunar mission Chandrayaan-1.
28 October 1914	British Biochemist Richard Laurence Millington Syge (Co-winner of the 1952 Nobel Prize in Chemistry for the invention of Partition Chromatography) was born.
30 October 1939	American scientist Leland H. Hartwell (Co-winner of the 2001 Nobel Prize in Physiology or Medicine for their discoveries of Protein Molecules that control the Division [Duplication]) was born.
31 October 1835	German Chemist Adolf von Baeyer (Winner of the 1905 Nobel Prize in Chemistry in recognition of his services in the advancement of organic chemistry and the Chemical industry, through his work on Organic Dyes and Hydroaromatic compounds) was born.
U. N. : United Nations WHO -World Health Organization UNESCO - United Nations Educational Scientific & Cultural Organization	

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



## SCIENTIFIC QUESTION

### Diabetes

Diabetes also known as Diabetes mellitus, is a group of diseases that affect how the body uses blood sugar (glucose). Glucose is an important source of energy for the cells that make up the muscles and tissues. It's also the brain's main source of fuel.

The main cause of diabetes varies by type but no matter what type of diabetes one has, it can lead to excess sugar (glucose) in the blood. Chronic diabetes conditions include type 1 diabetes and type 2 diabetes.

**Symptoms:** Diabetes symptoms depend on how high the person's blood sugar is. Some people, especially if they have type 2 diabetes, may not have symptoms. In type 1 diabetes, symptoms tend to come on quickly and be more severe. Some of the symptoms of type 1 diabetes and type 2 diabetes are as follows:

- Feeling more thirsty than usual.
- Urinating often.
- Losing weight.
- Presence of ketons in the Urine. Ketons are by product of the breakdown of muscle and fat that happens when there's not enough available insulin.
- Feeling tired and weak.
- Feeling irritable or having other mood changes.
- Having blurry vision
- Having slow-healing sores.
- Getting a lot of infection, such as gum, skin and vaginal infections.

**Causes:** To understand diabetes, it's important to understand how the body normally uses glucose.

**How insulin works:** Insulin is a hormone that comes from a gland behind and below the stomach (pancreas)

- The pancreas releases insulin into the blood stream.
- The insulin circulates in blood, letting sugar enter the cells.
- Insulin lowers the amount of sugar in the blood stream.
- As the blood sugar level drops, so does the secretion of insulin from the pancreas.

**The role of glucose:** Glucose- a sugar- is a source of energy for the cells that make up muscles and other tissues.

- Glucose comes from two major sources: food and the liver.
- Sugar is absorbed into the blood stream, where it enters with the help of insulin.
- The liver stores and makes glucose.
- When glucose levels are low, such as when person haven't eaten in a while, the liver breaks down stored glycogen into glucose. This keep person's glucose level within a typical range.

The exact cause of most types of diabetes is unknown. In all cases, sugar builds up in the blood stream. This is because the pancreas doesn't produce enough insulin. Both type 1 and type 2 diabetes may be caused by a combination of genetic or environmental factors. It is unclear what those factors may be.

**Risk factors:** Risk factors for diabetes depend on the type of diabetes. Family history may play a part in all types. Sometimes

family members of person with type 1 diabetes are tested for the presence of diabetes immune system cells (auto antibodies). If person has these auto antibodies, that person has an increased risk of developing type 1 diabetes. Type 2 diabetes is common in people who are overweight or obese.

**Complications arise due to diabetes:** Long-term complications of diabetes develop gradually. The longer person has diabetes – and less controlled person's blood sugar- the higher the risk of complications. Possible complications includes heart and blood vessel (cardiovascular) disease, nerve damage, kidney damage, eye damage, skin and mouth conditions such as bacterial and fungal infections, hearing impairment, Alzheimer's disease and depression.

**Prevention:** Type 1 diabetes can't be prevented. Type 2 diabetes can also prevent by eating healthy foods, get more physical activity and lose excess weight.

**Diagnosis:** type 1 diabetes symptoms often start suddenly and are often the reason for checking blood sugar levels. Because symptoms of type 2 diabetes come on more gradually. The American Diabetes Association (ADA) has developed screening guidelines. The ADA recommends that the following people be screened for diabetes:

- Anyone older than age 35.
- Women who had gestational diabetes.
- Anyone who has HIV (Human Immunodeficiency Virus)

**Tests for type 1 and type 2 diabetes:**

**A1C test:** It measures the percentage of blood sugar attached to haemoglobin. It is also called glycated haemoglobin test. The higher person's blood sugar levels, the more haemoglobin person have with sugar attached. An A1C level of 6.5% or higher on two separate tests means that person has diabetes A1C level below 5.7% is considered normal.

**Random blood sugar test:** A blood sample will be taken at a random time. No matter when person last ate, a blood sugar level of 200 milligrams per decilitre (mg/dL) – 11.1 millimoles per liter (mmol/L)- or higher suggests diabetes.

**Fasting blood sugar test:** A blood sample will be taken after person hasn't eaten anything the night before (fast). A fasting blood sugar level less than 100 mg/dL (5.6

mmol/L) is normal.

**Glucose tolerance test:** For this test, person fasts overnight. Then, the fasting blood sugar level is measured. After that person drink a sugary liquid and blood sugar levels are tested regularly for the next two hours. A blood sugar level less than 140 mg/dL (7.8 mmol/L) is normal. A reading of more than 200 mg/dL (11.1 mmol/L) after two hours means person has diabetes.

**Treatment:** Treatment for type 1 diabetes involves insulin injections or the use of an insulin pump, frequent blood sugar checks and carbohydrate counting. Treatment of type 2 diabetes mostly involves lifestyle changes, monitoring of person's blood sugar, oral diabetes drugs, insulin or both.





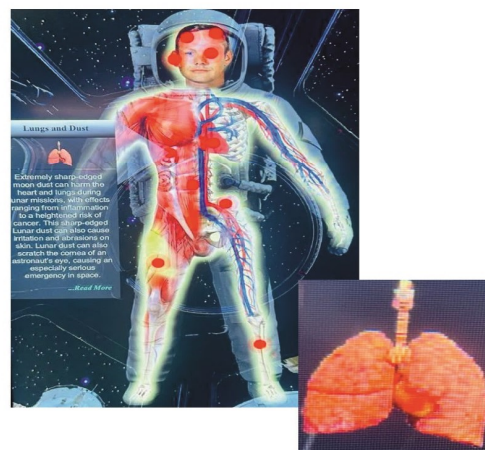
## KNOW THE EXHIBIT

The dust from other planets or asteroids can affect the health of Astronauts. Astronaut Harrison H. Schmitt experienced allergy caused by Moon dust during Apollo 17 Moon mission in December, 1972.

The most dangerous effect may be on the lungs if the fine particulates of Moon dust are inhaled. Extremely sharp edged Moon dust can harm the heart and lungs, with effects ranging from inflammation to a high risk of Cancer. It's somewhat like inhaling particles of asbestos.

This sharp-edged dust can also cause irritation and abrasions on skin. In fact, it's been known to wear through multiple layers on a boot of Kelvar-like material. Lunar dust can also scratch the cornea of an Astronaut's eye, causing an especially serious emergency in Space.

But researchers admit they can't duplicate the conditions of the Moon for their tests. For example, on Earth, the dust particles are no longer in a vacuum or exposed to radiation. This exhibit is situated at "Entering Space Gallery" between Fun Science Gallery and Power of Play Gallery at the first floor of Science Centre, which shows what happens on the health of an Astronaut when he comes back from space.



## SCIENCE PROJECT

Surat Municipal Corporation had organized 'Science Fair-2023' at Art Gallery, Science Centre Surat on 18<sup>th</sup> and 19<sup>th</sup> August, 2023 for the students of Std. 8 to 12. Suman High School No. 10 had participated their project on 'Hybrid vertical axis Highway Windmill' under the sub theme of 'Affordable and Clean Energy'.

The aim of the project was for getting affordable and clean energy with the help of large vehicle running on highways. In our daily life, we see that energy consumption is increasing and production of energy is decreasing. For that, with the help of vehicles passing on the highway, we can make India a "Smart Nation by Smart Roads".

The air pressure generated by a large vehicle moving on the highway that will cause the windmill to move in the perpendicular direction and it rotates. Electrical energy is generated with the help of a turbine connected to this rotating windmill. Here, we can also use solar energy. By combining solar panels with windmills, we can get hybrid affordable and clean energy by using wind energy and solar energy. We can get around 100 watt electric power by this project.

### Applications:

- We can get affordable and clean energy.
- It can be used in street lights and traffic signals
- Various monitoring system.
- Highway electrification
- To charge electrical vehicles.



## QUIZ

1. Beam of light striking the reflecting surface is called \_\_\_\_\_.  
a) Reflecting ray      b) Incident ray      c) Refracted ray      d) Normal ray
2. Band of seven colours is called \_\_\_\_\_.  
a) VIBGYOR      b) Spectrum      c) Dispersion      d) Reflection
3. Sound is a kind of \_\_\_\_\_.  
a) Work      b) Force      c) Energy      d) Pressure
4. What is called the number of vibrations made by a vibrating body in one second?  
a) Frequency      b) Noise      c) Loudness      d) Pitch
5. Naphthalene balls used to repel moth and insect is derived from what?  
a) Petroleum      b) Sugar      c) Coal Tar      d) LPG
6. Why the use of CNG in automobile is better than petrol?  
a) Cheaper      b) Less polluting      c) Cannot be adulterated      d) All of the above
7. Which of the following does not conduct electricity?  
a) Sugar solution      b) Vinegar solution      c) Lemon juice solution      d) Caustic soda solution