

# SCIENCE CENTRE NEWS LETTER

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## SCIENCE CENTRE

Volume 7, Issue 12

### WHAT'S NEW IN SCIENCE?

#### Stunning Green Comet visited the Earth

A Green Comet called C/2022 E3 (ZTF) or Comet ZTF was nearing its closest approach to Earth on 2<sup>nd</sup> February 2023.

Comet ZTF came within 26 million miles (42 million kilometres) of Earth, about one-third of the distance between Earth and the Sun. The Green Comet passed into our inner Solar System was about 50,000 years ago, it was the brightest during that time. Like other Comets, ZTF has a stunning Green hue. The

secret of the Comet's Green glow lies in a molecule called Diatomic Carbon C<sub>2</sub>. A Comet is essentially a galactic snowball, its body is made up of ice and dust. As it approached the Sun, the heat turns the ice into gas creating



an atmosphere around the Comet called Coma. As that atmosphere is bombarded with radiation from the Sun, the Carbon-based molecules in the cloud are torn apart to create C<sub>2</sub>, a simple but very unstable molecule, which is easily excited.

It means that the molecules can absorb some of the light from the Sun, in the form of Photons, to put it in an excited state. But the Universe always stays in order, so the molecules try to remain in their neutral state. When molecules reach to their excited state, it releases some energy by emitting Photons. This process is called fluorescence.

Courtesy - Shree Kanchanlal Mamawala Primary School No.-88

### SCIENTIST OF THE MONTH

#### Suman Kumar Dhar

Suman Kumar Dhar was born on 6<sup>th</sup> March 1968 in West Bengal, India. He graduated in Chemistry from Burdwan University, West Bengal in 1989 and completed Master's Degree in Biochemistry in 1992 from Kalyani University, West Bengal before securing a Ph.D in Molecular Biology from Jawaharlal Nehru University (JNU), New Delhi in 1998. After working briefly (1997-98) as a Research Assistant at the Department of Microbiology

of the University of Nebraska, Lincoln, Nebraska, U.S (United States), he did his Post-Doctoral studies at "Brigham and Womens Hospital of Harvard Medical School, Boston, Massachusetts which he completed in 2001. Returning to India the same year, he joined

Jawaharlal Nehru University as an Assistant Professor at the Special Centre for Molecular Medicine (SCMM) of the University in 2005 and became a Professor in 2011, finally reaching the position of the Chairperson of SCMM in 2011.

Suman Kumar Dhar's research history started since graduate studies when he worked on Entamoeba Histolytica, the protozoan which causes Amoebiasis (it is an infection of the intestine caused by a parasitic Amoeba Entamoeba Histolytica). Later at Harvard Medical School, his Post-Doctoral studies were centered on mammalian DNA



replication which assisted him to identify the ORC6 (origin recognition complex subunit six) and its role in viral DNA replication. He also identified geminin, a replication inhibitor, as a blocking factor of viral DNA replication, a discovery which earned him a US patent. Later, he studied the human pathogens (is a pathogen like microbe or micro-organism such as a virus, bacterium, prion or fungus that causes disease in humans), Helicobacter pylori [spiral (helical) bacterium usually found in stomach] and Plasmodium falciparum (is a unicellular protozoan parasite of humans that causes malaria in humans) and their DNA replication and cell cycle regulation.

He received the Senior International Research Fellowship of the Wellcome Trust in 2005. He was elected to the Guha Research Conference in 2007. He received the Wellcome Trust-DBT (Department of Biotechnology, Ministry of Science and Technology) Senior Research Fellowship in 2010. The National Academy of Sciences, India elected him as a fellow in 2011. Dhar was awarded the Shanti Swarup Bhatnagar Prize for Science and Technology by the Council of Scientific and Industrial Research in 2012.

Courtesy - Shree Kanchanlal Mamawala Primary School No.-88



### Timings

Tuesday to Sunday  
& Public Holidays

9.30 am to 4.30 pm

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## SCIENCE FACTS MARCH 2023

1 March 1910	British Chemist Archer Martin (inventor of Partition Chromatography) was born.
3 March 1838	American Astronomer, George W. Hill (who plotted the Moon's Orbit) was born.
3 March 1847	Mr. Alexander Graham Bell (Inventor of Telephone) was born.
4 March 1754	Benjamin Waterhouse (inventor of Smallpox Vaccine) was born.
6 March 1869	Dmitri Mendeleev presents the first periodic table to the Russian Chemical Society.
7 March 1996	The Hubble Space Telescope took the first picture of the surface of Pluto.
8 March	International Women's Day (by UN).
8 March 1618	Johannes Kepler discovered the Third Law of Planetary Motion.
8 March 1886	American Chemist Edward Calvin Kendall (awarded the 1950 Nobel Prize for Physiology of Medicine for their work with the hormones of the adrenalin gland) was born.
9 March 1934	Uri Gagarin (world's first Astronaut) was born.
10 March 1876	Mr. Alexander Grehambel experimented for the first time to talk on telephone with his Assistant Botish.
13 March 1781	Planet "Uranus" was discovered by well-known Astronomer Herschel.
14 March 1879	Sir Albert Einstein (discoverer of Theory of Relativity) was born.
16 March 1918	Co-discoverer of the Neutrino and 1995 Nobel Prize winner, American Physicist Fredrick Reines was born.
16 March 1926	Robert Goddard launches the first liquid-fueled rocket at Auburn, Massachusetts.
18 March 1965	Cosmonaut Alexey Leonov, leaving his spacecraft Voskhod-2 for 12 minute, become the first person to walk in Space.
20 March 2018	It is the day when Day and Night time becomes equal.(Vernal Equinox)
21 March	World Down Syndrome Day.
22 March	World Day for Water.
23 March	World Meteorological Day. (WMO)
24 March 1871	British Nuclear Physicist Earnest Rutherford is considered the Father of Nuclear Physics and won the Nobel Prize in Chemistry in 1908.
27 March 1845	Wilhelm Conrad Rontgen (Noble prize winner & inventor of invisible 'X' rays) was born.
29 March 1967	Making of world's biggest submarine "9 Redoubtable" by France, which is having weight of 7780 ton and length of 419 feet.
U. N. : United Nations	

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



## SCIENTIFIC QUESTION

### What is Hernia?

Hernia develops when an organ protrudes through an opening or weak area of muscle. The primary site for hernia is the abdomen, but it can also develop in the groins, thighs, near the belly button or even in the lungs. The symptoms of hernia include lower abdominal pain, cough and pressure in the abdomen. Surgery is the only option available to get rid of such a problem.

**Types:** Based on the location of the hernia, they are classified into five types.

- 1) Inguinal hernias that are found in the groin.
- 2) Umbilical hernias found at the navel.
- 3) Ventral hernias found on the abdominal wall.
- 4) Incisional hernias present at a previous surgery site.
- 5) Femoral hernias found right above the thigh.

Of all the hernias, almost 75% of the people suffer from an inguinal hernia and about 10% suffer from umbilical hernia.

**Causes:** An abdominal hernia is a soft swelling seen over the abdominal wall and is a condition that affects more to men than women. It's formed due to an area of weakness in the muscles of the abdominal wall. In its initial stages, it is seen when the person is either standing, walking, coughing or lifting heavy objects and disappears when the person lies down. At this stage, it can still be pushed back into the abdomen. When it becomes hard and cannot be pushed back, it causes a problem.

**Risk Factors:** Even though statistically males are more prone to the disease, it does not mean that women can't have them. Following are the factors that affects in causing hernia:

- Obesity
- Constipation
- Apply too much pressure while urinating
- A person having job for lifting heavy weights
- People in the family who suffer from this disease
- Had a recent surgery in the abdomen.

**Symptoms:** One of the most glaring and important symptoms is the formation of a bulge or lump on the surface of the body associated with pain. This usually happens only in areas like the stomach, groin or a part that had some kind of surgical procedure. Other signs include a painful swelling that does not reduce on its own, nausea, vomiting and abdominal bloating.

**Diagnosis:** In order to diagnose the condition, Doctor may do a

physical examination to understand the severity of the condition. If Doctor requires a better insight, he may suggest an Ultrasonography as well.

**Treatment:** Once diagnosed, the treatment options greatly depends on the severity of the symptoms and type of the hernia a person is suffering from. Most of the doctors frequently monitor the size of the hernia and its associated symptoms to see if it increases over a period of time. There are mainly two methods that a doctor can use – a non surgical method and a surgical one.

- **Non-surgical treatment:** In order to choose a non-surgical approach the doctor will see that there is not much swelling or bulging in the area. Doctor then uses external help like that of a supportive truss to push back the hernia.

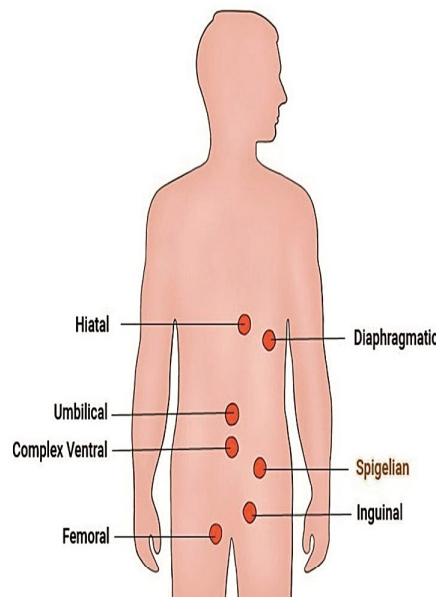
- **Surgical treatment:** Surgical intervention is used only in more complicated and severe cases. Two types of surgeries can be performed – laproscopic and open surgery.

**Laproscopic surgery:** A Laproscopic surgery is conservative and involves the use of a camera and a scope inserted into the body to fix the hernia.

**Open surgery:** An Open surgery is more invasive and requires a large incision along the part where the hernia is present. This surgery strengthens the wall of the abdomen by the placement of a prosthetic mesh. This mesh acts as a bridge in the area of muscle weakness. The body tissues grow into the mesh thus repairing the muscle gap, strengthening the abdominal muscle and helps in repairing the hernia.

While anyone who is fit to undergo general anaesthesia can have a hernia repair surgery. The choice of using an Open surgery or Laparoscopic surgery greatly depends on the type of hernia. For example Laparoscopy is especially performed for an inguinal hernia, since they usually tend to be recurrent. A Laparoscopic approach is better for quick recovery and is less invasive.

**Complications:** Apart from being extremely painful and uncomfortable, it can lead to twisting or torsion of the part that come out of the herniated space. If that is not treated at the earliest, the organ can die and become gangrenous (dead tissue caused by an infection or lack of blood flow) which can then lead to the spread of toxins throughout the body, a condition also known as septicaemia.



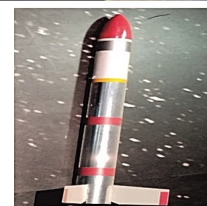
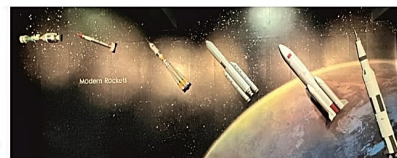


## KNOW THE EXHIBIT

### Modern Rocket - SS 520

During 2<sup>nd</sup> World War, Japan developed gliding manned missile bomber 'Kamaikaz', which became a nightmare to the US (United States) Naval Force. After defeat in World War II, Japan was banned from any major rocketry activity. After the ban was lifted Japan formed two Institutes in 1966: Institute of Space and Astronautical Science (ISAS) and National Space Development of Japan. In 2003, these two agencies were merged to form Japan Aerospace Exploration Agency (JAXA). JAXA has developed its 'S' series of rockets, which are extremely small and light weight, capable of lifting a maximum payload of 140 kg (kilogram) at 800-1000 km (kilometre) altitude. The recent SS 520-5 has become the smallest orbital launching rocket launched on 3rd February, 2018. In the S-series rockets, the number of "S" indicates the number of stages and the following number details the diameter of the craft in millimetres. For example, the S-520 is a single stage rocket with a diameter of 520 mm.

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



## Global Science Opera workshop, Science centre Surat and Outreached Programme in Surat District Schools

Two days workshop on the theme "UNFORLD THE UNIVERSE" for Global Science Opera 2023 was organized by Surat Municipal corporation in collaboration with Manthan Educational Programme Society at Art Gallery, Science Centre Surat on 15<sup>th</sup> and 16<sup>th</sup> February, 2023. 36 students and 6 teachers from Fountain Head School, Jeevan Bharti Mandal School and R. D. Ghayal School from Surat had participated in this workshop. Janne Iren Robberstad, Head of Global Science Opera and Mr. Alex taught students about Story Telling on Science through various activities. Students were taught different skills using music, body language, poetic language, etc. in creative Story Telling. Participants of this workshop will prepare short Story on the theme of "UNFORLD THE UNIVERSE" by November, 2023 with the help of "Khoj Museum", Surat. This Story will be added with the other Stories prepared by students of different Countries and the final Story will publish at Global level. Thus School students of Surat will get recognition globally.



Global Science Opera workshop, Science Centre Surat

Moreover, "Khoj Museum", Surat has also organized Outreach Programme for rural area of Surat District from 15<sup>th</sup> February, 2023 to 24<sup>th</sup> February, 2023, in which students of 20 Schools were taught about "Sustainable Living for Sustainable Development". Under this theme Health, Energy and Organic Farming were explained to students.



Outreached Programme in Surat District Schools

## QUIZ

1. What was discovered in 'Rutherford's alpha ( $\alpha$ ) particles scattering experiment's result?  
a) Electron                      b) Proton                      c) Nucleus in the Atom                      d) Atomic mass
2. Who gave the first model of Atom?  
a) Neils Bohr                      b) Eugen Goldstein                      c) Rutherford                      d) Sir Joseph John Thomson
3. What does not there inside the Nerve Cell?  
a) Axon                      b) Nerve Endings                      c) Tendons                      d) Dendrites
4. What is Parenchyma Cells?  
a) Relatively Unspecified and Thin-Walled                      b) Thick Walled and Specified  
c) Lignified                      d) None of These
5. The Acceleration due to Gravity on the Earth depends upon what?  
a) Mass of the Body                      b) Mass of the Earth  
c) Shape and Size of the Body                      d) Volume of the Body
6. What is SI unit of Pressure?  
a)  $\text{Nm}^2$  (neuton.meter<sup>2</sup>)                      b) N/m (neuton/meter)  
c)  $\text{N/m}^2$  (neuton/meter<sup>2</sup>)                      d)  $\text{N}^2/\text{m}^2$  (neuton<sup>2</sup>/meter<sup>2</sup>)
7. When we change feeble sound to loud sound, What we increase?  
a) Frequency                      b) Amplitude                      c) Velocity                      d) Wave length