

SCIENCE CENTRE NEWS LETTER

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SCIENCE CENTRE

Volume 8, Issue 1

WHAT'S NEW IN SCIENCE?

Ultimate Optical Illusion! Moon, Jupiter and Venus in perfect alignment

On 22nd February 2023, night sky had put on a stunning show around the World, as the Moon, Planet Jupiter and Planet Venus temporarily united for synchronised celestially. These three bodies formed a captivating triangle shaped formation.

Jupiter, the biggest Planet in the Solar System and Venus, Earth's twin Planet, which were separated by a significant 29 degree at the beginning of February month, as of 20th February, the gap between them had closed to a mere 10 degree. They had



gradually drawing closer to each other at the end of February month to 2 degrees apart and

they were separated by only 0.52 degree on 1st March 2023. Planet Jupiter was visible at magnitude -2.1, while Planet Venus was shining brightly at magnitude -4.0 (minus prefix before the magnitude values indicates exceptionally bright objects as seen from Earth). During such conjunctions, the celestial bodies appeared to occupy the same space in the night sky due to their alignment, despite being millions of kilometres apart in reality.

Courtesy - Gopinath Malik Nagar Prathmik School No. 53

SCIENTIST OF THE MONTH

Dr. Sandip Trivedi

Dr. Sandip Trivedi was born on 5 April, 1963, India. He completed Master of Science in Physics from IIT (Indian Institute of Technology), Kanpur in 1985. He had been awarded Ph. D degree in 1990 from Caltech, Pasadena, U.S.A (United States of America).

Dr. Sandip Trivedi is an Indian Theoretical Physicist working as a Director at Tata Institute of Fundamental Research (TIFR) at Mumbai, India. He is well known for his contribution to string theory, in particular finding the first model of accelerated expansion of the Universe in low energy super symmetric string. (String theory is a theoretical framework in which point like particles of Particle Physics are

replaced by one-dimensional objects called strings. String theory describes how these strings propagate through space and interact with each other). His research area includes string theory, cosmology (it is a branch of Physics and Metaphysics dealing with the nature of Universe) and Particle Physics (it is the study of fundamental particles and forces that constitute matter and radiation).



Dr. Trivedi has won the prestigious Shanti Swarup Bhatnagar Award in the Physical Science in 2005. He was the recipient of the Infosys Prize 2010 in the category of Physical Science. He is also a recipient of the TWAS Prize (The World Academy of Science) in Physics in 2015.

Courtesy - Gopinath Malik Nagar Prathmik School No.-53



Timings

Tuesday to Sunday
9.30 am to 4.30 pm

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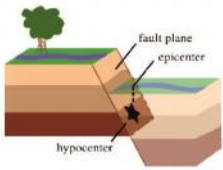
SCIENCE FACTS APRIL 2023

1 April 1962	Decimal weight measurement system was made compulsory in India.
1 April 1865	Austrian -born Chemist Richard Adolf Zsigmondy (made research in colloids) was born.
1 April 1976	Jovian - Plutonian gravitational effect is first reported by the Astronomer Patrick Moor.
2 April	World Autism Awareness Day. (UN)
3 April 1973	The first portable cell phone call was made in New York City, United States.
3 April 1984	Indian Astronaut Mr.Rakesh Sharma traveled into Space.
6 April 1911	German Biochemist Feodor Felix Konrad Lynen (made discoveries concerning the mechanism and regulation of cholesterol with Konard Bloch) was born.
6 April 1920	American Biochemist Edmond H. Fischer was born.
6 April 1965	Launch of "Early Bird", the first Communications Satellite to be placed in Geosynchronous Orbit.
7 April	World Health Day (WHO) (UN)
8 April 1818	German Chemist August Wilhelm Von Hofmann was born.
8 April 1911	American Chemist Melvin Calvin (Discoverer of Calvin Cycle) was born.
10 April 1927	American Scientist Marshall Warren Nirenberg was born.
11 April 1905	Albert Einstein revealed Special Theory of Relativity (special relativity)
12 April	International Day of Human Space Flight (UN)
12 April 1955	The Polio Vaccine, developed by Dr. Jonas Salk was declared safe and effective.
12 April 1961	First Russian Astronaut Yuri Gagarin traveled into Space.
14 April 2003	Human Genome Project was completed with 99% of the human genome sequenced to an accuracy of 99.99%
15 April 1874	German Physicist Johannes Stark (discoverer of the Doppler effect in canal rays and the splitting of spectral lines in electric field) was born.
16 April 1867	Wilbur Wright (co-inventor of the first manned aeroplane) was born.
20 April 1927	Swiss Physicist Karl Alexander Muller (worked for superconductivity in ceramic materials) was born.
22 April	International Earth Day.
22 April 1909	Italian Neurologist Rita Levi-Montalcini (co-discoverer of nerve growth factor NGF) was born.
23 April 1858	German Physicist, Max Planck (who wrote the Planck Constant) was born.
25 April	World Malaria Day (WHO)
30 April 1895	French Scientist Mr. Rontgen discovered X-rays.
U. N. : United Nations	
WHO : World Health Organization	
UNESCO : United Nation Educational Scientific and Cultural Organization	

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

SCIENTIFIC QUESTION

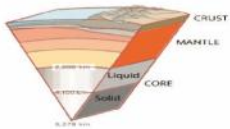
How Earthquake Occurs?



An Earthquake happens when two blocks of the Earth suddenly slip past one another. The surface where they slip is called the fault or fault plane. The location below the Earth's surface where the Earthquake starts is called the hypocenter and the location directly above it on the surface of the Earth is called the epicentre.

Sometimes an Earthquake has foreshocks. These are smaller Earthquakes that happen in the same place as the larger Earthquake that follows. Scientists can't tell that an Earthquake is a foreshock until the larger Earthquake happens. The larger, main Earthquake is called the mainshock. Mainshocks always have aftershocks that follow. These are smaller Earthquakes that occur afterwards in the same place as the mainshock. Depending on the size of the mainshock, aftershocks can continue for weeks, months, and even years after the mainshock.

What causes Earthquakes and where do they happen?



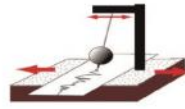
The Earth has four major layers:

the inner core, outer core, mantle and crust. The crust and the top of the mantle make up a thin skin on the surface of the Earth. But this skin is not all in one piece – it is made up of many pieces like a jigsaw puzzle covering the surface of the Earth. Not only that, these puzzle pieces keep slowly moving around, sliding past one another and bumping into each other. These puzzle pieces are called tectonic plates and the edges of the plates are called the plate boundaries. The plate boundaries are made up of many faults, and most of the Earthquakes around the World occur on these faults. Since the edges of the plates are rough, they get stuck while the rest of the plate keeps moving. Finally, when the plate has moved far enough, the edges unstuck on one of the faults and there is an Earthquake.

Why does the Earth shake when there is an Earthquake?

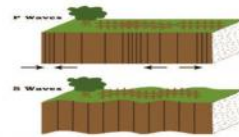
While the edges of faults are stuck together and the rest of the block is moving, the energy that would normally cause the blocks to slide past one another is being stored up. When the force of the moving blocks finally overcomes the friction of the jagged edges of the fault and it unsticks, all that stored up energy is released. The energy radiates outward from the fault in all directions in the form of seismic waves like ripples on a pond. The seismic waves shake the Earth as they move through it and when the waves reach the Earth's surface, they shake the ground and anything on it.

How are Earthquakes recorded?



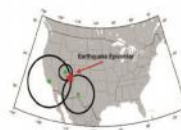
Earthquakes are recorded by instruments called seismograph. The recording they make is called a seismogram. The seismograph has a base that sets firmly in the ground and a heavy weight that hangs free. When an Earthquake causes the ground to shake, the base of the seismograph shakes too, but the hanging weight does not. Instead the spring or string that it is hanging absorbs all the movement. The difference in position between the shaking part of the seismograph and the motionless part is recorded.

How can Scientists tell where the Earthquake happened?



Seismograms is useful for locating Earthquakes too and being able to detect the P wave and the S wave. P waves are also faster than S waves and this fact is what allows us to know where an Earthquake was. To understand how this works, compare P waves as lightning and S waves to thunder when lightning occurs. Light travels faster than sound, so during a thunderstorm you will first see the lightning and then you will hear the thunder. If you are close to the lightning location, the thunder will boom right after the lightning, but if you are far away from the lightning location, you can count several seconds before you hear the thunder. The further you are from the storm, the longer it will take between the lightning and the thunder.

P waves are like the lightning and S waves are like the thunder. The P waves travel faster and shake the ground where you are first. Then the S waves follow and shake the ground also. If you are close to the Earthquake area, the P and S wave will come one right after the other, but if you are far away, there will be more time between the two.



By looking at the amount of time between the P and S wave on a seismogram recorded on a seismograph, Scientists can tell how far away the Earthquake was from that location. However, they can't tell in what direction from the seismograph the Earthquake was, only how far away it was. If they draw a circle on a map around the station (seismograph), they know the Earthquake lies somewhere on the circle, where the radius of the circle is the determined distance to the Earthquake. Scientists use a method called triangulation to determine exactly where the Earthquake was. It is called triangulation because a triangle has three sides and it uses three seismographs to locate an Earthquake. If you draw a circle on a map around three different seismographs the intersection of those three circles is the epicentre, where the radius of each circle is the distance from that station (seismograph) to the Earthquake.

KNOW THE EXHIBIT

Modern Rocket - Apollo-Soyuz Test Project (USA-USSR)

After 2nd World War, USA (United State of America) and USSR (Union of Soviet Socialist Republics) emerged out as two nuclear powered rival countries. Their shadow war continued for the next nearly 40 years. In the back drop of cold war situation, the search of peace did not lose its interest. In 1970, Soviet Academy of Science President Mstislav Keldysh, responded to NASA (National Aeronautics and Space Administration) administrator Thomas O. Paine's letter and proposed a Cooperative Space Mission. The mission was docking of Soyuz with Apollo in the

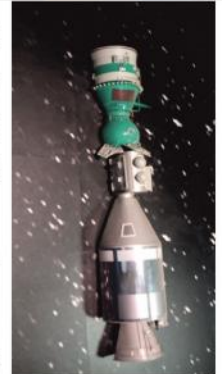


space. Both side grabbed this mission as political act of peace. From the very first day of space research, USA and USSR propagated independently with completely different technologies. The technological barrier was extremely hard to come across. It took 3 long years for them to plan and prepare to come on the same platform. The total docking system of the two space craft in space were engineered for Apollo and Soyuz separately in USA and USSR through exchange critical data and drawings. At the time of space flight the Astronauts were:

Apollo Astronaut: Thomas P. Stafford (Commander), Vance D. Brand (Command Module Pilot), Donald K. Slayton (Docking Module Pilot)

Soyuz Astronaut: Alexy Leonov (Commander), Valeri Kubasov (Flight Engineer).

On July 15, 1975, a Soyuz space craft lifted from Baikonur Launch Center, Central Asia. Hours later, Apollo Astronauts were launched from the Kennedy Space Center, Florida, USA. They crossed all the barriers and Apollo was docked with Soyuz using a specially designed docking system. On 17th July, 1975 the Soyuz commander announced that "Soyuz and Apollo are shaking hands now." For the next two days, the Astronauts and Cosmonauts visited each other's space craft exchanged gifts and made television broadcasts to Earth. The mission included both joint and separate scientific experiments. They engineered an eclipse of the Sun by Apollo so that Soyuz can take photographs of the Solar Corona. On 21st July, 1975 Soyuz landed on Kazakhstan and Apollo splashed down in the Pacific Ocean on 24th July. That was the last flight for Apollo series.



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

QUIZ

1. CNG is the abbreviate form of which of the following phrases?

- a) Combined Natural Gas
- b) Compressed Natural Gas
- c) Confirmed Natural Gas
- d) Condemned Natural Gas

2. 'Goitre' is a disease of what?

- a) Adrenal Gland
- b) Pancreas
- c) Thyroid Gland
- d) None of these

3. Where the hormones are formed in human body?

- a) Endocrine Glands
- b) Exocrine Glands
- c) Kidneys
- d) None of these

4. What is the hearing range of human ear?

- a) 20 Hz to 20,000 Hz
- b) Less than 20 Hz
- c) More than 20,000 Hz
- d) 20 Hz to 25,000 Hz

5. What is equal to 1 hertz (Hz)?

- a) 1 vibration per minute
- b) 10 vibrations per minute
- c) 60 vibrations per minute
- d) 600 vibrations per minute

6. Above what dB (decibel) the sound becomes physically painful?

- a) 60
- b) 40
- c) 120
- d) 80

7. What image is formed by Camera?

- a) Real
- b) Virtual
- c) Real and Virtual both
- d) None of these