

SCIENCE CENTRE NEWS LETTER

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I.A.S.
Municipal
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Editor

A. M. Dube
Addi. City Eng.(Civil)

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P. T. Science College



SCIENCE CENTRE

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WHAT'S NEW IN SCIENCE

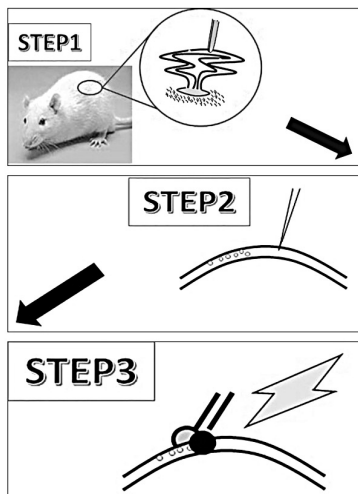
What is CRISPR?

CRISPR technology is a simple yet powerful tool for editing genomes. It allows researchers to easily alter DNA sequences and modify gene function. Its many potential applications include correcting genetic defects, treating and preventing the spread of diseases and improving crops. In popular usage, "CRISPR" (pronounced "crisper") is shorthand for "CRISPR-Cas9." CRISPRs are specialized stretches of DNA. The protein Cas9 (or "CRISPR-associated") is an enzyme that acts like a pair of molecular scissors, capable of cutting strands of DNA.

CRISPRs:

"CRISPR" stand for clusters of regularly interspaced short palindromic repeats. It is a specialized region of DNA with two distinct characteristics: the presence of nucleotide repeats and spacers. Repeated sequences of nucleotides- the building block of DNA- are distributed throughout a CRISPR region. Spacers are bits of DNA that are interspersed among these repeated sequences.

In the case of bacteria, the spacers are taken from



viruses that previously attacked the organism. They serve as a bank of memories, which enables bacteria to recognize the viruses and fight off future attacks. This was first demonstrated experimentally by Rodolphe Barrangou and a team of researchers at Danisco, a food ingredients company. In a 2007 paper published in the journal of Science, the researchers used *Streptococcus thermophilus* bacteria, which are commonly found in yogurt and other dairy cultures, as their model. They observed that after a virus attack, new spacers were incorporated into the CRISPR

region. Moreover, the DNA sequence of these spacers was identical to parts of the virus genome. They also manipulated the spacers by taking them out or putting in new viral DNA sequences. In this way, they were able to alter the bacteria's resistance to an attack by a specific virus. Thus, the researchers confirmed that CRISPRs play a role regulating bacterial immunity.

Courtesy : Shree Ram Ganesh Gadkari Primary School No.-243

SCIENTIST OF THE MONTH

Subhash Kak

Subhash Kak was born to Ram Nath Kak and Sarojini Kak in Srinagar on 26 March, 1947. He completed his BE from Regional Engineering College, Srinagar (Presently National Institute of Technology, Srinagar) and Ph.D. from Indian Institute of Technology Delhi in 1970, where he was immediately offered a faculty position.

His research is in the field of cryptography, random sequences, artificial intelligence, quantum mechanics and information theory. He proposed test of algorithmic randomness and a type of instantaneously trained neural networks (INNs) (which he and his students have called "CC4 network" and others have called "Kak neural networks"). He was the first to formulate the discrete and the number theoretic Hilbert transforms. He claims to be amongst the first to apply information metrics to Quantum systems. He also proposed a hierarchy of language of communication in biological systems, fast matrix

multiplication algorithm for cross-wired meshes and use of repeating decimals and other random sequence for error correction coding. In quantum information, he proposed the principle of veiled nonlocality.

Kak has studied the Indus script for its possible connections with Brahmi script and produced a new analysis of the earliest astronomy of India. He has parallels and differences between Greek and Indian physics and in particular, done a new translation of Kanada's Vaisheshika surta. He was the author of "In search of the cradle of civilization" and "The Architecture of Knowledge". He is regent's professor and a previous Head of Computer Science Department at Oklahoma State University. He was member of Indian Prime Minister's Science, Technology and Innovation Advisory Council



appointed

Courtesy :

Shree Ram Ganesh Gadkari Primary School No.-243



Timings

Tuesday to Friday
9.30 am to 4.30 pm

Saturday - Sunday
& Public Holidays
11.00 am to 6.30 pm

Address

Science Centre
City Light Road,
Surat - 395 007

Contact

0261 - 2255947
+91 97277 40807

Fax No.
91-261-2255946

E mail
sciencecentre@suratmunicipal.org

Web Site
www.suratmunicipal.gov.in



SCIENCE FACTS MARCH 2019

1 March	Self Injury Awareness Day.
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.
3 March 1969	India's first Rajdhani Express train having speed of 140 km/h traveled for first time between Delhi and Hawrah.
4 March 1754	Benjamin Waterhouse (inventor of Smallpox vaccine) was born.
6 March 1937	Valentina Tereskowa (Lady Astronaut who was the first lady to enter into the space) was born.
8 March	International Women's Day (by UN).
8 March 1879	German physicist and chemist, Otto Hahn (Discoverer of radiothorium and actinium) 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 1789	George Simon Ohm (discoverer of Ohm's Law) was born.
18 March 1858	German engineer, Rudolf Diesel (inventor of diesel motor) was born.
21 March 2016	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 1854	Start of Telegram era in India by delivering first telegram from Kolkata to Agra.
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 (S611)" by France, which is having weight of 7780 ton and length of 419 feet.

U. N. : United Nations

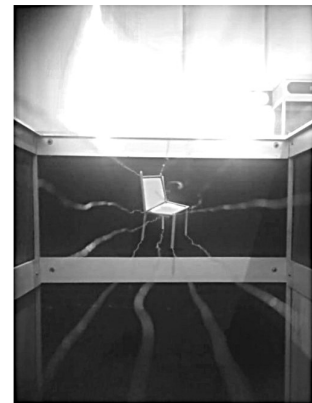
UNESCO United Nations Educational Scientific & Cultural Organization

KNOW THE EXHIBIT AT FUN SCIENCE GALLERY

2D projection of 3D Object

This is an optical illusion. Can you guess what it is?

You can see the uneven shaped object. Now look through the hole. You can see the 'Chair'. This illusion is caused by the conical projection of object at the hole. Here three dimensional objects are observed in two dimensions through the hole.



SCIENTIFIC QUESTION

How do we get more energy from Sun? (Part-2)

(A) Generating Electricity with Photovoltaic Cells:

One way to convert solar energy into electricity is through photovoltaic cells.

The word photovoltaic is derived from the Greek word phos, which means "light", and the word volt which is a unit of measure for electricity. photovoltaic panel can produce differing amounts of electricity depending on the intensity of the sunlight, the number of cells on the panel, and how the cells are connected together.

Photovoltaics, also known as PV cells, are becoming more and more familiar in our everyday landscape. The more cells you put together, the more power you can generate. An individual PV cell can provide a small amount of power for devices like watches and calculators. A small number of cells together can provide power to out-of-the-way places like road signs and power poles. Small buildings and houses are starting to generate some of their own power by installing photovoltaics on



the roof. Of course, solar plants use large number of PV cells to generate significant amounts of electricity for integrating power in to the grid.

When sunlight hits the photovoltaic cell, The n-type silicon layer releases electrons because it is "doped" with an element that has one too many electrons for its outer shell. The "extra electrons leave the n-side and find new "homes" in p-side, which is doped with an element that has one less

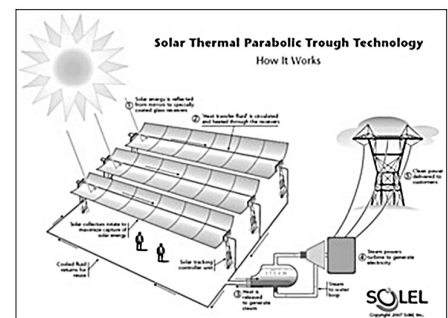
electron than fits in the outer shell, thus making an electric field. A photon of just the right energy hits the p-side and knocks the electrons out of the adopted homes, so that they "notice" that they are in an electric field, which makes them move. Rather than letting them go directly back to the n-side, they are diverted through a wire, making an electric current that can be used.

(B) Generating Electricity with Solar Power Plants: Solar power plants represent another way to generate electricity from solar energy. They function in a similar

fashion to regular power plants except they use concentrated sunlight- instead of fossil fuels- to generate heat to boil water to drive steam turbines.

MIRRORS: The solar field consists of specially designed solar collectors that use mirrors to gather and focus sunlight. The curved surface of the mirror concentrates the light towards a focal point. At that point, the concentrated light creates heat, or thermal energy.

HEAT: Pipes passing through the focal point carry fluid. The heat drives up the temperature of the fluid. The pipes



circulate the hot fluid to a steam generator where the heat of the fluid is transferred to water. The water becomes steam.

STEAM TURBINE: The force of the steam drives the rotation of the turbine. The rotating turbine transfers energy to the generator. The energy is translated into electricity in the generator and flown to the power grid for use of the public.

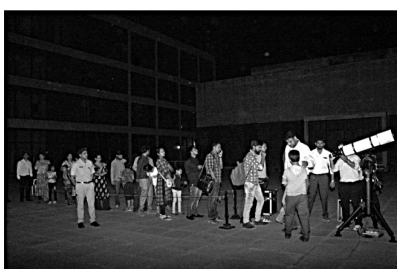
Courtesy :

Shree Ram Ganesh Gadkari Primary School No.-243

NIGHT SKY OBSERVATION

Super Moon

Science Centre, Surat had organized an event to view the 'Super Moon' through the telescope program at Science Centre on 19/02/2019 from 7:45 p.m to 9:30 p.m. In this program Moon was showed through Refractor telescope to visitors. Total 387 visitors have participated in this event.



SCIENCE PROJECT

Surat Municipal Corporation had organized 'Science Fair' at Ground Floor, Art Gallery, Science Centre, Surat on 03rd and 04th August 2018. Shree Ram Ganesh Gadkari Primary School No.-243 had presented their project on 'pollution free dissolution of idols/statue'.

In this modern era, Ganesh festival is celebrated by great pleasure in whole India. In every Alley Street and home, in whole India, idols of Ganpati bappa is establish and most of the idols of the Ganpati are made by POP. During the dissolution, this POP idols are dissolve in river, lake or sea. This idol made by POP cannot completely dissolve in water and it is harmful for environment and these idols are found to be riddles in mud and swamp. So that, the feelings of the devotees of Hinduism is tremendously hurt.

Aim for this project is to stop the wastage of water, save the aquatic animals and to save the environment. For dissolution, first weigh the idols of Ganesh. Now, take same weightage of NaHCO_3 and take water in which Ganesh idols can dissolve in NaHCO_3 . After dissolving the NaHCO_3 , let the idol immerse. In about 3 to 4 hours the POP idol will become soluble. CaSO_4 , which is soluble in POP transform into $\text{Ca}(\text{HCO}_3)_2$ and in a small proportion CaCO_3 will produced. CaCO_3 deposited at the bottom can be used in the cement industry.

The application of this project is to save environment, rescue the feelings of Hinduism and syncretization of religion and Science.



SCIENCE CENTRE

Science Centre forms the main part of the entire complex; it displays thematic galleries in the field of Science and Technology. The ground floor of Science Centre showcases 3D Theatre and Souvenir Shop. The first floor of Science Centre showcases Planetarium, Fun Science Gallery and Power of Play Gallery and second floor of Science Centre showcases Diamond Gallery, whereas Entering into Space, Cosmos Gallery under development.

3d Show	Tuesday to Friday (Time)	Saturday, Sunday & Holidays (Time)
English	09:15, 11:20, 12:00, 02:40, 04:00	11:20, 12:00, 02:40, 04:00
Hindi	10:00, 10:40, 12:40, 01:20, 02:00, 03:20	12:40, 01:20, 02:00, 03:20, 04:40, 05:20, 06:00
Science Centre + Planetarium + Museum + Diamond Gallery		
Above 18 Years	Rs. 100	
3 Years to 18 Years	Rs. 65	
Science Centre + Museum + Diamond Gallery		
Above 18 Years	Rs. 60	
3 Years to 18 Years	Rs. 40	
Science Centre + Planetarium + Museum + Diamond Gallery + 3D Show		
Above 18 Years	Rs. 120	
3 Years to 18 Years	Rs. 80	
Planetarium		
Tuesday to Friday		Saturday, Sunday & Public Holidays
09:30 to 10:20	English	11:30 to 12:20 Gujarati
10:30 to 11:20	Gujarati	12:30 to 01:20 English
11:30 to 12:20	Gujarati	01:30 to 02:20 Hindi
12:30 to 01:20	English	02:30 to 03:20 Hindi
01:30 to 02:20	Hindi	03:30 to 04:20 Gujarati
02:30 to 03:20	Hindi	04:30 to 05:20 English
03:30 to 04:20	Gujarati	05:30 to 06:20 Gujarati
3D Show		
Above 18 Years	Rs. 60	
3 Years to 18 Years	Rs. 40	