

# SCIENCE CENTRE NEWS LETTER

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## SCIENCE CENTRE

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### WHAT'S NEW IN SCIENCE

#### Long suspected theory about the moon holds water

A team of Japanese scientists led by Masahiro Kayama of Tohoku University's Frontier Research Institute for Inter disciplinary Sciences, has discovered a mineral known as moganite in a lunar meteorite found in a hot desert in northwest Africa. This is significant because moganite is a mineral that requires water to form, reinforcing the belief that water exists on the Moon. "Moganite is a crystal of silicon dioxide and is similar to quartz. It forms on Earth as a precipitate when alkaline water including SiO<sub>2</sub> is evaporated under high pressure conditions," says Kayama. "The existence of moganite strongly implies that there is water activity on the Moon." Kayama and his team analyzed 13 of the lunar meteorites using sophisticated methods to determine chemical compositions and structures of their minerals. These included electron microscopy for high-magnification, and micro-Raman spectroscopy to determine the structure of the minerals based on their atomic vibration. This is the first time that moganite has been detected in lunar rocks. The researchers say the meteorites probably came from an area of the Moon called Procellarum Terrane, and that the moganite was formed through the process of water evaporation in strong sunlight. Kayama's working theory is that deeper under the lunar surface, protected from the sun, crystals of water ice could be abundant. In recent years, space



missions have found evidence of lunar water or ice concentrated at the poles where sunlight appears at a very narrow angle, leading to pockets of cold traps. This is the first time, however, that the scientists have found evidence of abundant water ice in the lunar subsurface at mid and lower latitudes. Kayama's team estimates that the accumulation of water in the lunar soil is about 0.6

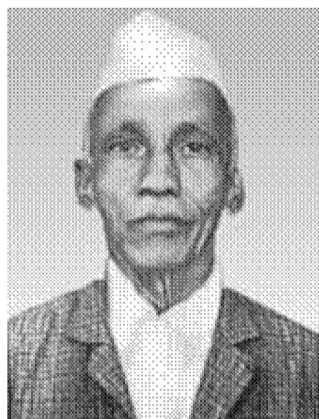
weight percent. If they are right, future lunar explorers would have easier access to the resource, which would greatly enhance the chances of the Moon hosting human settlement and infrastructure, and supporting a variety of industries within the next few decades. JAXA, the Japan Aerospace Exploration Agency, is said to be considering two future missions -- a lunar pole

landing mission in five years to look for water resources and a sample return mission from the far-side of the Moon in ten years. In addition to testing for water in other silica minerals found, Kayama and his team also plan to study water from solar wind to the regolith soils and volcanic eruptions from the lunar mantle. "Solar wind-induced water can give us new insight into the history of sun activity, and volcanic water provides us with information of lunar evolution together with water," says Kayama, about his lab's next project. "It's all very exciting."

### SCIENTIST OF THE MONTH

#### Dattathreya Ramchandra Kaprekar

Dattathreya Ramchandra Kaprekar was born on January 17, 1905 at Dahanu in Bombay in Maharashtra. He did his B.Sc. from the Ferguson College in 1929. He was renowned mathematician who discovered 'Kaprekar Constant' in 1946. It is the number 6174. To demonstrate how it is a constant, any four digit number can be selected in which all digits are not similar. The number is to be arranged in descending order and then reversed to make a new number. Now this new number is to be



subtracted from the earlier number. If this process is repeated with the remainders, eventually in eight steps or so, the constant 6174 is arrived at. He is also credited with the discovery of a set of new numbers called 'self numbers'. He is also known for his contributions to Delmo number. Dattathreya Ramchandra Kaprekar received the Wrangler R.P. Paranjpe Mathematical Prize in 1927



### Timings

Tuesday to Friday  
9.30 am to 4.30 pm

Saturday - Sunday  
& Public Holidays  
11.00 am to 6.30 pm

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## SCIENCE FACTS JANUARY 2021

2 Jan 1822	German Physicist Rudolph J. E. Clausius (Who researched Thermodynamics) was born.
2 Jan 1959	Soviet Union launched first man made Satellite "Lunik - 1".
4 Jan 1643	Sir Isaac Newton, great Physicist, Mathematician and Astronomer (who invented Newton's Law of Motion) was born.
4 Jan 1797	German astronomer Wilhelm Beer (who made the first moon map) was born
4 Jan 1809	Louis Braille (inventor of a reading system for the blind) was born.
5 Jan 1859	Dewitt B. Brace (inventor of the spectrophotometer) was born.
5 Jan 1900	Physicist, Dennis Gabor (inventor of holograph) was born.
7 Jan 1610	Galileo observed first time Jupiter and its four moons with telescope.
8 Jan 1942	English Physicist Stephen Hawking (who first revealed Black Holes and Baby Universes) was born.
10 Jan 1877	Frederick Gardner Cottrell (who invented the electrostatic precipitator) was born.
12 Jan 1899	Swiss Chemist, Paul H. Muller (who perform the first open heart surgery) was born.
15 Jan 1759	"The British Museum" world's oldest and biggest museum was opened for the people.
19 Jan 1736	James Watt (Inventor of Steam Engine) was born.
21 Jan 1743	John Fitch (who invented steam boat) was born.
21 Jan 1921	Barney Clark (who was the first person to receive a permanent heart) was born.
21 Jan 1954	America launched its first Atomic power operated Submarine named "Nautilus"
24 Jan 1880	Elisabeth Achelis (who invented the world calendar) was born.
25 Jan 1627	Robert Boyle (who wrote Boyle's Law of Ideal Gases) was born.
27 Jan 1834	Dmitri Mendeleev (who invented the periodic table of the elements) was born.

Ans:- 1. b 2. a 3. a 4. b, 5. b, 6. d, 7. d, 8. c

## KNOW THE EXHIBIT

### Involute:-

This exhibit is situated between Ticket window and Souvenir shop at Science centre.

An involute a curve traced by the free end of a thread unwound from a circle or a polygon, in such a way that the thread is always tight and tangential to the circle or the sides of the polygon. Depending on whether the involute is traced over a circle or a polygon, the involute is called an involute of circle or involute of polygon. These type of curves are used for designing teeth profiles of high power transmission gears.



## SCIENTIFIC QUESTION

### What is Nipah virus?

Nipah virus (NiV) is a zoonotic virus (it is transmitted from animals to humans) and can also be transmitted through contaminated food or directly between people. In infected people, it causes a range of illnesses from asymptomatic (subclinical) infection to acute respiratory illness and fatal encephalitis. The virus can also cause severe disease in animals such as pigs, resulting in significant economic losses for farmers.

#### Past Outbreaks

Nipah virus was first recognized in 1999 during an outbreak among pig farmers in, Malaysia. No new outbreaks have been reported in Malaysia since 1999.

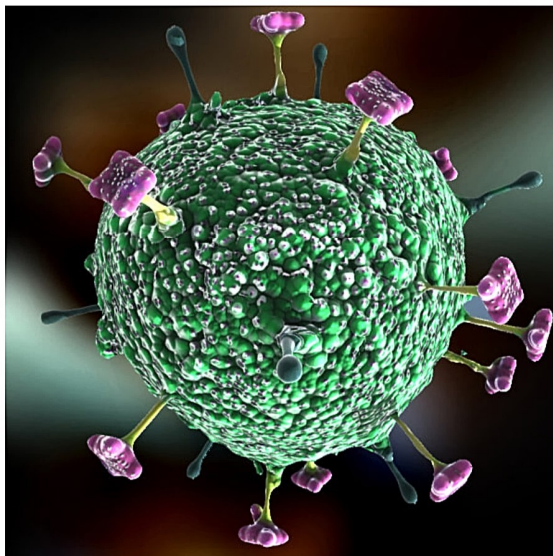
#### Transmission

During the first recognized outbreak in Malaysia, which also affected Singapore, most human infections resulted from direct contact with sick pigs or their contaminated tissues. Transmission is thought to have occurred via unprotected exposure to secretions from the pigs, or unprotected contact with the tissue of a sick animal. In subsequent outbreaks in Bangladesh and India, consumption of fruits or fruit products (such as raw date palm juice) contaminated with urine or saliva from infected fruit bats was the most likely source of infection.

#### Signs and symptoms

Human infections range from asymptomatic infection to acute

respiratory infection (mild, severe), and fatal encephalitis. Infected people initially develop symptoms including fever, headaches, myalgia (muscle pain), vomiting and sore throat. This can be followed by dizziness, drowsiness, altered consciousness, and



neurological signs that indicate acute encephalitis. Some people can also experience atypical pneumonia and severe respiratory problems, including acute respiratory distress. Encephalitis and seizures occur in severe cases, progressing to coma within 24 to 48 hours.

#### Diagnosis

Initial signs and symptoms of der accurate diagnosis and creates

Nipah virus infection are nonspecific, and the diagnosis is often not suspected at the time of presentation. This can hinder accurate diagnosis and creates challenges in outbreak detection, effective and timely infection control measures, and outbreak response activities. In addition, the quality,

quantity, type, timing of clinical sample collection and the time needed to transfer samples to the laboratory can affect the accuracy of laboratory results. Nipah virus infection can be diagnosed with clinical history during the acute and convalescent phase of the disease. The main tests used are real time polymerase chain reaction (RT-PCR) from bodily fluids and antibody detection via enzyme-linked immunosorbent assay (ELISA). Other tests used include polymerase chain reaction (PCR) assay, and virus isolation by cell culture.

#### Treatment

There are currently no drugs or vaccines specific for Nipah virus infection although WHO has identified Nipah as a priority disease for the WHO Research and Development Blueprint. Intensive supportive care is recommended to treat severe respiratory and neurologic complications.

## Science Quiz

1. What substance are nails made of?

- a. Melanin b. Keratin c. Calcium d. Magnetic

2. In terms of Electricity, What does DC stands for?

- a. Direct Current b. Direct Conductor c. Dual Current d. Dual Collector

3. What is the closet Planet to the Sun?

- a. Mercury b. Saturn c. Venus d. Mars

4. Which gas is obtained when potassium permanganate is heated?

- a. Carbon dioxide b. Oxygen c. Hydrogen d. Nitrogen

5. What is the fundamental component of a Substance?

- a. Molecule b. Atom c. Ion d. Compound

6. Which of the following is a combustible substance?

- a. A stone b. Glass c. Asbestos d. Wood

7. What is the temperature that can be attained in the box of a solar cooker?

- a. 100 C to 400 C b. 400 C to 600 C c. 600 C to 800 C d. 1000 C to 1400 C

8. Which of the following pollutes the soil to the maximum extent?

- a. Paper b. Excreta of animals c. Plastic d. The remains of trees

## Science Project

Surat Municipal Corporation had organized 'Science Fair' at Ground Floor, Art Gallery, Science Centre, Surat on 30th and 31st August 2019. Shri Durgaram Manchhaham Mehta Nagar Prathamik School No. 28 had presented their project on 'Air Purification Plant'.

The Aim of this project is to purify the Air.

The method is as follows: First take wooden stand. Fit the P.V.C pipe with dri-kalp. Joint with heavy altimeter. Place filter between Tri-kalp and P.V.C pipe. Fit the edges of P.V.C pipe and Tri-kalp with solution and place. Funnel (nozzle) on the top of pipe and plug the altimeter and on the switch. Switch turned on and fan rotates. Which will pull out the particles (dust) of outside air and particles (dust) will be deposited below. Clean air will come out on top.

The advantages of this project is to place this project in company and society also on cross-roads. So that dust can be removed and enhance the environment, this can prevent you from diseases of the lungs such as Asthma, Cough etc.

