SCIENCE CENTRE NEWS LETTER

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Issue 45

SCIENCE CENTRE

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WHAT'S NEW IN SCIENCE

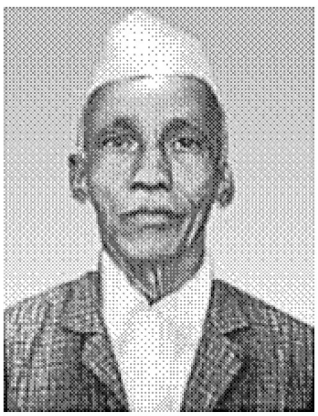
Melting Arctic Permafrost Releases Acid that Dissolves Rocks, Releases CO2

As temperature rise in the Arctic, permafrost (permanently frozen ground) is defrosting at an alarming rate. However the permafrost isn't the only thing in the Arctic that's melting. Exposed rock that was once covered in ice is dissolving, eaten away by acid. And the effects of this acid bath could have far-reaching impacts on global climate, according to a new study. Icy permafrost is rich in minerals, which are released when the ice melts. The minerals then become vulnerable to chemical weathering, or the breakdown of rock through chemical reactions, scientists recently reported. They investigated areas once covered by permafrost in the western Canadian Arctic, finding evidence of weathering caused by sulfuric acid, produced by sulfide minerals that were released when the permafrost melted. Another type of naturally occurring chemical erosion is caused by carbonic acid, and it also dissolves Arctic rock. But although carbonic-acid weathering locks carbon dioxide (CO_2) in place, sulfuric-acid erosion releases CO_2 into the atmosphere, and it does so in quantities that were not previously accounted for, researchers wrote in the study. Dramatic changes are underway in the Arctic, which is warming twice as fast as any other location on Earth. Sea ice is rapidly dwindling, which reduces the ocean's heat-reflecting cover, accelerating the rise of ocean temperatures. And polar bears, which depend on sea-ice cover to hunt for seals, are losing their hunting grounds, and have a harder time finding enough to eat. On land, melting permafrost is shaping new landscapes, through a process called thermokarst a term for thawing-driven erosion that originated in Russia, according to the U.S. Geological Survey (USGS). Thermokarst creates land formations such as lakes, pits and sinkholes, and it was previously unknown how this process could affect weathering of exposed minerals, and how that might then impact CO_2 release, according to the study. Over geologic timescales, weathering caused by carbonic acid can help to regulate climate, by trapping CO_2 and restricting its transfer into the atmosphere. But the researchers found that thermokarst in regions that were rich in sulfides drove production of sulfuric acid, rather than carbonic acid, and thereby released quantities of CO_2. An estimated 1,400 billion tons of carbon are stored in permafrost and as thawing continues and thermokarst activity intensifies, sulfide-rich regions will continue to transfer CO_2 from its icy tomb. However, how that will balance out against the permafrost regions that still produce carbon-trapping carbonic acid is unknown, according to the study.

Courtasy : Joyous English School

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

Courtasy : Joyous English School

SCIENCE FACTS JANUARY 2019

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 Cottnell (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. b, 3. d, 4. d, 5. c

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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KNOW THE EXHIBIT AT FUN SCIENCE GALLERY

Lissajous Figures

Fill the funnel with sand while keeping the hole at its bottom closed with your finger. Pull the sand filled funnel to one side and release gently. Observe that beautiful sand patterns generated as the bucket swings back and forth. The funnel is suspended by means of two strings connected to form a Y-Shape and hence is subjected to two simultaneous simple harmonic motions. The resultant motion is manifested in the form of Lissajous figures.

SCIENTIFIC QUESTION

Why Does the Moon Appear in the Daytime?

The moon does not produce its own light. We can only see the moon when Sun's light reflected from its surface. This means that whenever the moon reflects the sun's rays we can see iteven in the day time. The visibility of the moon during the daytime also depends on its angle and its distance from Earth. When the moon and sun are on the same side of Earth, the moon is visible during the day; when the moon and sun are on opposite sides of the Earth, the moon is not visible during the day, as the Earth is blocking sunlight from reaching the moon's surface. The reason we can see the moon and not stars during the day is because the sunlight reflected from the moon makes it 100,000 times brighter than the brightest star in the sky.

In our frame of reference on Earth, the Sun is in a fixed point in the sky where as the moon is orbiting the earth with a period of 27 days. As a consequence, we see the Sun appearing to travel from East to West in twelve hours and we do not see it for the next twelve hours, because it is on the other side of the earth. with the Moon, it is different, the Moon is orbiting the Earth. By the time the Moon makes one orbit of the earth, the Earth has votated on its axis 27 times meaning, the Sunn has risen and set 27 times too. consequautly, each day the Moon is in a different part of the sky with reference to the Sun. Because of Eart's rotation from west to east, the moon appears to travel from east to west in the sky 12 hours and because the moon is also orbiting the earth it appears to move from west to east at the rate of roughly 130 each day. When the moon is in the same region of the sky as the Sun, it is new moon- meaning the side facing us in darkness and when the moon is exactly opposite the Sun, then it is full moon-meaning the entire side of the moon facing us is lit by

Sunlight. The Sun and the moon are in the same area of the sky and we cannot see the moon because the Sunlight is on the other side of the moon, the side facing us is not lit and also because it is drowned in the bright Sunlight. They both rise and set at the same time. The next day, the moon 'rises' 50 minutes later and about 130 away from the Sun and can be seen only as a very thin 'crescent' because still the Sun is more or less behind the moon and only a very small portion of our side of the moon is lit. From then on, each day a little more of side of the moon is lit each day is a new 'phase' of the moon.

☐ Can You See a Full Moon During the Day?

A full moon only happens when the sun shines on the face of the moon unobstructed by the Earth. Thus, you cannot see a full moon during the day. If there is daylight, at least part of the sun's light is shining upon the Earth, which would mean the entirety of the moon's face would not be illuminated. A day on the moon is equal to 29.5 Earth days. This means from sunrise to sunset on the moon, 29.5 Earth days would pass. Two thing contribute to the moon being visible in daylight. First, it is bright enough that its light penetrates the scattered blue light of the sky. If you are looking at exactly the right spot with a telescope, you can also see the planets Mercury, Venus and Jupiter in daylight, plus a few of the brightest stars. Secondly, the moon must be high enough in the sky to be visible. Because of the Earth's rotation, the moon is above the horizon roughly 12 hours out of every 24. Since those 12 hours almost never coincide with the roughly 12 hours of daylight in every 24 hours, the possible window for observing the moon in daylight averages about 6 hours a day.

Courtasy : Joyous English School

Science Quiz

1. Which gas is obtained when potassium permanganate is heated?
a. Carbon dioxide b. Oxygen c. Hydrogen d. Nitrogen
2. What is the fundamental component of a Substance?
a. Molecule b. Atom c. Ion d. Compound
3. Which of the following is a combustible substance?
a. A stone b. Glass c. Asbestos d. Wood
4. 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
5. 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

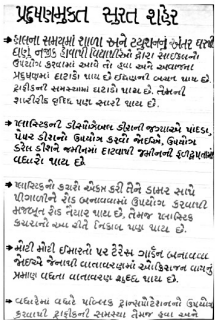
Surat Municipal Corporation had organized 'Science Fair' at ground floor, Art Gallery, Science Centre, Surat on 03rd and 04th August 2018. Sati Loyan Prathamik School no. 260 had presented their project on 'Pollution Free Surat City'.

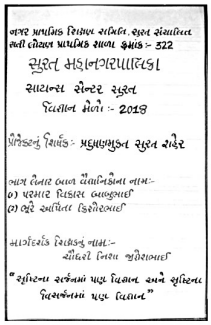
☐ In today life, the distance between school and Tuitions from the house is very near. So, if student use a cycle, air and sound pollution can be minimize and fuel can be saved. Traffic problems can be minimized. Physical growth of the child can be improved.

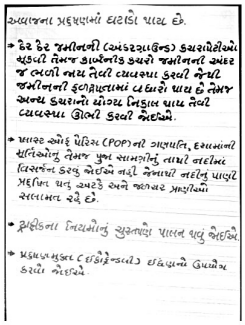
☐ In stead using a plastic disposable dish, use leaf and paper dish. Buried this used dish in soil to improve soil fertility.

☐ Collect the plastic waste and melt it with the asphalt to make strong Road and plastic waste also disposed by this way.

Ecofriendly fuel can be used.


પ્રદૂષણમુક્ત સુરત શહેર


સુરત મહાનગરપાલિકા
સાયન્સ સેન્ટર સુરત
વિજ્ઞાન મેળો :- 2018
પ્રોજેક્ટનું વિષયક :- પ્રદૂષણમુક્ત સુરત શહેર



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, Textile Gallery, Cosmos Gallery and Polar Science Gallery are 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	
Above 18 Years	Rs. 50
3 Years to 18 Years	Rs. 40
3D Show	
Above 18 Years	Rs. 60
3 Years to 18 Years	Rs. 40

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