



संस्कृति मंत्रालय  
भारत सरकार  
Ministry of Culture  
Government of India



नेहरु विज्ञान केन्द्र  
राष्ट्रीय विज्ञान संग्रहालय परिषद की इकाई  
संस्कृति मंत्रालय, भारत सरकार  
Nehru Science Centre  
A Unit of National Council of Science Museums  
Ministry of Culture, Government of India

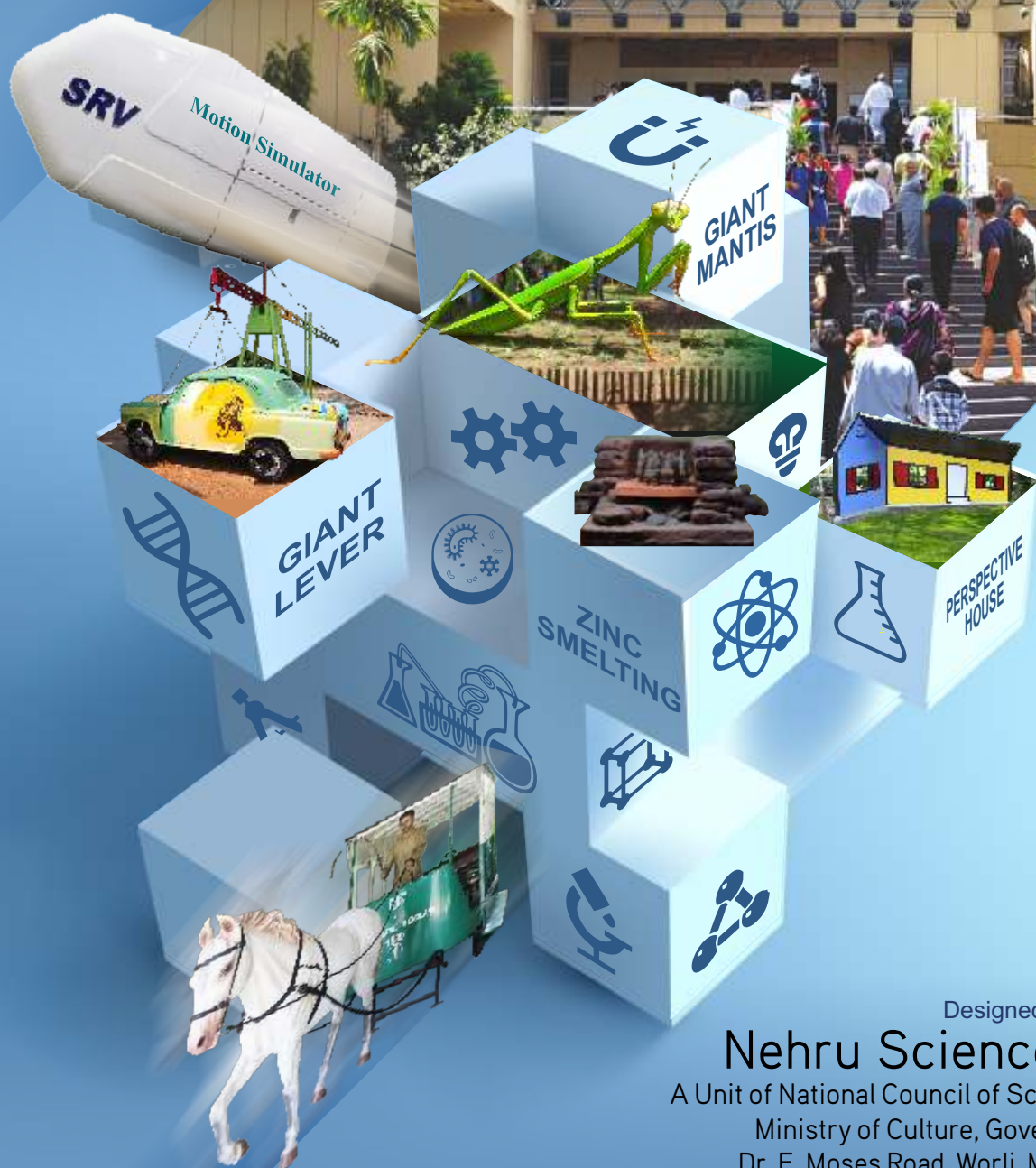
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Member News

# Sci- Mail

July to September 2023  
Vol. 26 No.3



Designed & Developed by

## Nehru Science Centre

A Unit of National Council of Science Museums

Ministry of Culture, Government of India

Dr. E. Moses Road, Worli, Mumbai- 400018

# From NSC, Mumbai

## Greetings from Nehru Science Centre Mumbai!!

We are all aware that National Education Policy 2020 has been adopted and implemented too at several stages. Its main focus is to make classroom teaching interesting, full of fun and eradicating rote learning by students. This also demands a change of mind-sets of students, teachers and even the parents in a positive way.

We need to impart our students' enthusiasm to learn in meaningful ways. Nehru Science Centre also follows this in its interactive exhibits, exhibitions, demonstrations and other activities as well. Our enthusiasm for students is so high that over the period we have been branded as a place for school children for formal science education. Frankly speaking, we are non-formal learning centres and are designed for all irrespective of age and educational background. We cater to toddlers and octogenarians with equal enthusiasm. We want our visitors to see the beauty of the world by understanding and appreciating science and technology.

We are sure you are all enjoying the monsoon – the life line of Indian Farmers and the agriculture community. You all must have experienced the thrills of lightning and thunder with the onset of monsoon in your region. Occasionally, it is awesome and frightening too. It can be said that the monsoon knocks on our door with alerts as if sending the message that I am here so be careful now. It is true also as many diseases also spread with the monsoon around us. So take very good preventive care of yourself in the season which brings relief from the scorching heat of summer.

In the Nehru Science Centre, have you visited the facility where you can witness the lightning and thunder live but without any clouds throughout the year? It is amazing in terms of experience and unique to Mumbai than any place in India so far. Students and visitors can enjoy this at a nominal price only in the sparkling high voltage facility. If you happen to be at NSC, please do visit the facility without fail. You will love the experience. Tickets for this show are available at the information counter.

Also on the occasion of World Earth Day, we have installed 03 new interesting exhibits in our children science park. Feel like Archimedes while lifting the heavy car weighing almost a ton at the Giant Lever. The perspective house will mesmerise you with its only 2 walls and half roof but giving you a complete house illusion confirming that seeing is always not believing. The larger than life size praying mantis will invite you to have a selfie with itself – an invitation difficult to turn down.

The summer vacation creative science workshops, organised in onsite and online modes got tremendous response. The popularity of these workshops and in order to extend their reach, last summer we associated with a very popular mall in Thane and organised these workshops successfully for almost 1000 students. Special exhibits and shows were also conducted. It was for the first time we went out for summer vacation.

World Earth Day, World Environment Day, National Technology Day, International Museum Day and International Asteroid Day were also commemorated by the Science Centre with active participation from our young budding scientists and the general public as well.

Please watch other activities also in this magazine, especially the contests, and DIY activity. Enjoy the rain by measuring it using the homemade rain gauge. Happy and safe Monsoon.

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## EXHIBIT AT THE CENTRE

### WALKING PIANO



Step into a world of musical magic at the "Walking Piano Exhibit" in the Sound and Hearing Gallery at the Centre. Realize the extraordinary interactive experience that awaits you, where each step you take on the floor creates a mesmerizing melody. Unleash your creativity and compose captivating melodies simply by walking across the floor. Don't hesitate to let your feet guide you and dance to your own music. Join us at this enchanting exhibit and immerse yourself in a symphony of movement and sound.



## What's New

### NASA sees 'Moon Lunar mining trial' within the next decade



NASA is looking to develop resources on the moon that initially include oxygen and water, and eventually may expand to iron and rare earths, and has already taken steps toward excavating moon soil till 2032.

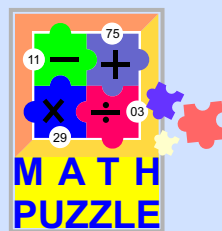
A key part of the mission is advancing commercial opportunities in space. The agency is looking to quantify potential resources, including energy, water and lunar soil, as a goal to attract commercial investment, said Gerald Sanders, a rocket scientist at NASA's Johnston Space Centre.

"We are literally just scratching the surface," he said. "NASA will send a test drill rig to the moon and plans a larger-scale excavation of moon soil, or regolith, and a pilot processing plant in 2032. The first customers are expected to be commercial rocket companies who could use the moon's resources for fuel or oxygen."

"The Australian Space Agency is involved in developing a semi-autonomous rover that will take regolith samples on a NASA mission as early as 2026", said Samuel Webster, an Assistant Director at the agency. "The rover will demonstrate the collection of lunar soil that contains oxygen in the form of oxides. Using separate equipment sent to the moon with the rover, NASA will aim to extract that oxygen", he added.

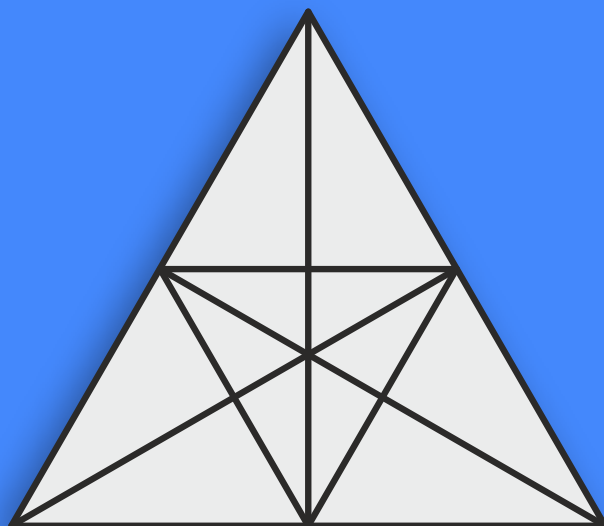
So this is a key step towards establishing a sustainable human presence on the moon, as well as supporting future missions to Mars.

Ref: The Hindu Newspaper : <https://www.thehindu.com/sci-tech/science/nasa-sees-moon-lunar-mining-trial-within-the-next-decade/article67018337.ece>



## Count the Triangles

How many triangles are there in this figure?



Send your answers to  
[librarian.nscm@gmail.com](mailto:librarian.nscm@gmail.com)

## Congratulations!

To all the winners of our Math Puzzle contest "A Prime Number Game" published in Vol 26 No. 2 With hundreds of brilliant minds winning the challenge. We are thrilled to announce the first five winners who astounded us by sending in the correct answers on the very same day of the publication!

**Shlok Chanchlani**, Std. 8th AVM Juhu, Mumbai  
**Gargi Jawale**, Std. 8th DAV Public School, Aundh, Pune.  
**Ritesh Kumar**, Std. 8th Sacred Heart School, Moga, Punjab.  
**Rajdeep Singh**, Std. 10th Sacred Heart School Moga, Punjab.  
**Ayush Khamari**, Std. 10th B.R. High School, Belpahar, Odisha.

The last date for Sending Answer is 31<sup>st</sup> July 2023.  
Best entry will be suitably awarded

Note :  
The contest is open to students up to std. X only



# Zinc Smelting in Ancient India



The history of zinc smelting in India dates back over 2,500 years, making it one of the earliest known locations for the production of zinc metal.

The evidence of zinc smelting in ancient India comes from archaeological findings, ancient texts, and scientific analysis of artefacts. One of the earliest instances of zinc smelting in India can be traced to the ancient city of Zawar, located in present-day Rajasthan. Excavations at Zawar have revealed ancient zinc mines, smelting furnaces, zinc distillation apparatus, zinc oxide crucibles, and other artefacts associated with zinc production, dating back to the 6th century BCE. These findings suggest that the people in the region had developed advanced techniques for

extracting and processing zinc ore. From the findings of the archaeological site of Zawar, it is estimated that roughly 60,000 tonnes of zinc were smelted at these sites over a span of 5 to 6 centuries. There is no evidence of such large-scale Zinc Production anywhere in the ancient world.

The smelting process used in ancient India involved heating the zinc ore, known as zinc blende or zinc sulfide ( $\text{ZnS}$ ), in a furnace. The ore was roasted to convert it into zinc oxide ( $\text{ZnO}$ ), which was then reduced to metallic zinc using charcoal as a reducing agent. The resulting zinc metal was then cast into ingots or moulded into various objects.

The production of zinc in ancient India was likely driven by the demand for brass, an alloy of copper and zinc. Brass was highly valued for its corrosion resistance, aesthetic appeal, and functional properties. The ancient Indians were skilled metalworkers and used zinc to create various objects, including jewellery, statues, utensils, and ornaments.

Ancient Indian texts also provide some insights into the knowledge and techniques of zinc smelting. The Rasaratnakara, a medieval Sanskrit text on alchemy, describes the process of producing zinc by heating zinc ore with organic materials. The text mentions the use of specific types of plants and their extracts as catalysts in the smelting process. Further more, the Charaka Samhita, an ancient Indian medical text, mentions the medicinal properties of zinc compounds, indicating the awareness of zinc in ancient India. It is worth noting that the importance of zinc in ancient India was primarily medicinal and therapeutic rather than industrial. Zinc was used in Ayurvedic medicine for treating various ailments and was recognized for its healing properties.

The knowledge and techniques of zinc smelting in ancient India were significant in the context of global metallurgy and were likely transmitted through trade and cultural exchange with neighboring regions. Indian zinc found its way to ancient Rome, where it was highly valued and used for various purposes, including the production of brass. The production of zinc in India declined during the medieval period and was largely forgotten until the modern era when zinc mining and smelting techniques were reintroduced.

In conclusion, zinc smelting in ancient India has a rich history dating back centuries. The archaeological evidence and ancient texts provide insights into the practices and techniques employed by ancient Indians in producing zinc. The smelting of zinc played a role in trade and medicinal applications, contributing to India's historical significance in the field of metallurgy.





# Indian Scientist



## Harish Chandra (1923-1983)

**Harish Chandra** was a renowned Indian American mathematician and physicist. Born in Kanpur, India, he developed a keen interest in mathematics from an early age. After receiving a bachelor's degree in physics and mathematics from the University of Allahabad, he shifted his focus to theoretical physics, inspired by physicist Paul Dirac.

Chandra pursued further studies in theoretical physics and mathematics, completing his PhD in mathematics in 1947. He made significant contributions to the field of representation theory, particularly in the study of semi simple Lie groups during his time at Columbia University from 1950 to 1963. He also held positions at Princeton University and the Institute for Advanced Study, where he continued his groundbreaking work.

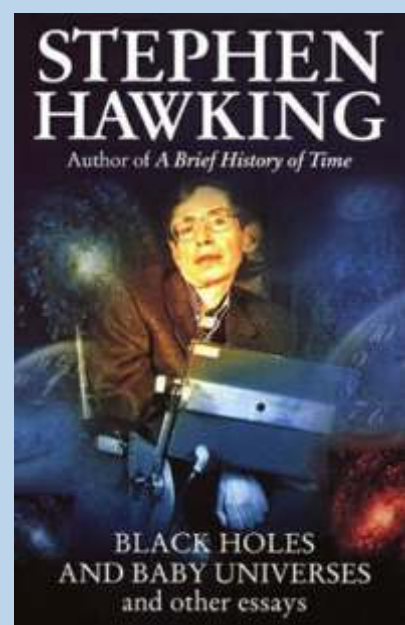
Throughout his career, Chandra received numerous accolades, including being a Fellow of the Royal Society of London and the National Academy of Sciences. He was awarded the Cole Prize by the American Mathematical Society in 1954 and the Srinivasa Ramanujan Medal by the Indian National Science Academy in 1974. Sadly, he passed away in 1983 in Princeton, New Jersey, after suffering from multiple heart attacks.

## Book Worth Reading In Library

### Black Holes and Baby Universes and Other Essays

The book "Black Holes and Baby Universes and Other Essays" by Stephen Hawking is a fascinating collection of essays that explores mind-boggling concepts like black holes and the mysteries of the universe. Hawking, a brilliant scientist, presents these complex ideas in a way that even non-experts can understand. The book takes you on a journey through the wonders of space, touching on topics such as time travel, the Big Bang, and the nature of reality. It's a captivating read that leaves you in awe of the vastness and beauty of the cosmos.

Overall, this book is a fascinating journey through space and time, written in a simple language that students can easily comprehend. Stephen Hawking's brilliance shines through every page, making it a must-read for anyone curious about the universe and our place within it. Prepare to be inspired and have your mind expanded by the wonders of astrophysics!



## DIY Rain Gauge

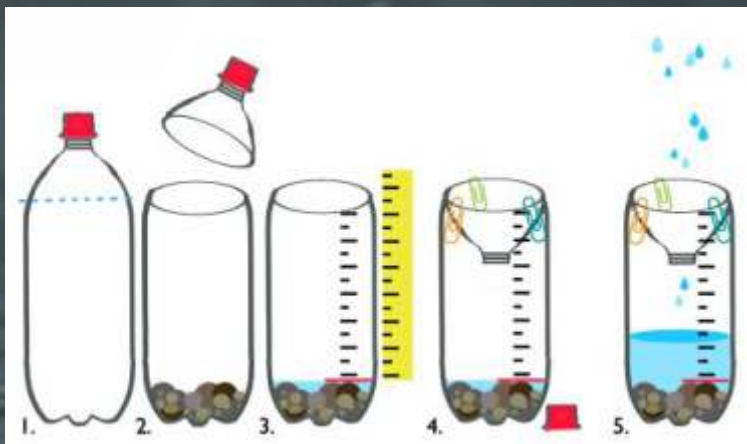
Monsoon is already arrived here in India and it has started raining in many regions here. Here we have an activity for Rainy season. Let's make a simple Rain Gauge – a device that measures the amount of precipitation (rain fall ) in a given time period.



### You Will Need:

- Empty two-litre clear plastic bottle
- Scissors
- A few handfuls of clean pebbles, gravel, or marbles
- Masking tape
- Water
- Ruler
- Permanent marker
- Rainy weather
- Paper and pencil

### What to do:



- Carefully use the scissors to cut the top of the bottle off at the wide part just below where it begins to get narrow.

- Put the pebbles in the bottom of the bottle—these will help keep it from getting blown over if it's windy.

- Remove the lid and turn the top of the bottle upside down. It's going to act like a funnel. Line up the cut edges and tape them together so the top part is held firmly in place.

- Use a long piece of tape to make a

straight vertical line from the top edge of the bottle to the bottom. Use the marker to draw a line on the vertical piece of tape just a little above the top of the pebbles. This will be the bottom of your rain gauge.

- Set the ruler against the vertical tape so that the "0" line lines up with the bottom mark. Use the marker to mark every cm (or, if you want to get fancy, every half cm) along the piece of tape. Then label the cm from bottom to top.

- Set the bottle on a level surface and pour some water in until it reaches the bottom mark. Your rain gauge is now ready to go!

- Put the rain gauge outdoors—you'll need to pick a really good spot! You want a place that's open to the sky and that's not likely to get too windy, where the gauge isn't likely to be disturbed. There shouldn't be anything hanging over the gauge that could either block any rain or make extra raindrops drip into the bottle (like a tree or a power line or the edge of a roof).

- Pay attention to the forecast. On a day that you're likely to get rain, make sure the water in the bottom hasn't evaporated below your bottom mark; if it has, refill it to that mark.

- If it rains within 24 hours, check your gauge and see how high the water is now. That's how much rain has fallen in the last day! On your piece of paper, make a note of the date and the amount of rain. Then read the newspaper or go online and find out the official amount of rainfall in your area for the day and make a note of it—see how closely your figure matches the official one!

- Repeat this experiment anytime it rains and continue to record the amount of rain each time. You can compile the data at the end of the rainy season and make a line graph. Can you spot any patterns?



# TREE TREASURE AT NSC



## MAHUA (Mowrah) or BUTTER CUP TREE

**Botanical Name:** MADHUCA LONGIFOLIA  
**Family:** SAPOTACEAE

'Madhucalongifolia' is commonly known as Mahua, Mowrah, Buttercup tree etc. It is an Indian tropical, fast-growing, evergreen tree, found largely in the central and north Indian plains and forests. It is cultivated in warm and humid regions for its oleaginous seeds, flowers and wood.

The tree is economically important, because of widespread uses of its flowers, fruits, seeds and timber. In India Madhya Pradesh is called the most astounding mahua developing state. Several parts of the tree, including the bark, are used for their medicinal properties.

In Ayurveda Mahua flowers are considered to be a cooling agent, carminative, galactagogue and astringent. It is also reported to be beneficial for heart, skin and eye diseases. The mahua flower is edible and is a food item for tribes. They use it to make medicinal syrup and fermented it to produce the alcoholic drink mahua, a country liquor. Many tribals consider the tree and the mahua drink as part of their cultural heritage. Mahua is an essential drink for tribal men and women during celebrations. Many varieties of food are prepared with the help of fruits and flowers. The leaves of mahua are fed on by the moth (*Antheraea paphia*) which produces tussar silk, a form of wild silk of commercial importance in India. Leaves, flowers, and fruits are also topped to feed goats and sheep.

The Tamils have several uses for mahua. When there is no cane sugar available, the flowers of mahua can be used, as it is very sweet. However, Tamil tradition cautions that excessive use of this flower will result in an imbalance of thinking and may even lead to lunacy.

Mahua flowers are also used to manufacture jam, which is made by tribal cooperatives in Maharashtra. Mahua fruit is valued for its seed which contains a high quantity of lipids, commercially known as Mahua butter. Mahua can also be used as fuel oil. It was reported that MAHUA FAME (fatty acid methyl esters) can be used as an alternative for biodiesel in India. Mahua biodiesel gives equally good performance and lower emissions, making it a good alternative fuel to operate diesel locomotives and irrigation pumps without any engine modifications. The seed cakes obtained after the extraction of oil constitute a good fertilizer for plants.

(Source: information obtained from Wikipedia, NIH and other related websites)

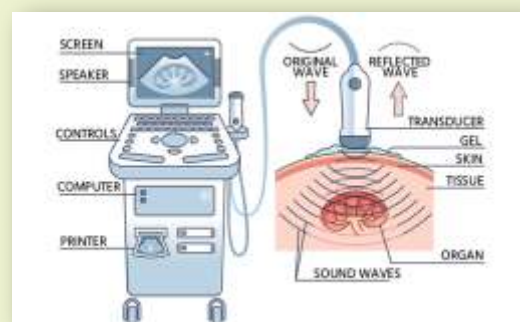
## Upcoming Programmes

- World Population Day - 11.07.2023
- Moon Landing Day - 20.07.2023
- Remembering Vikram Sarabhai (Birth Anniversary) - 12.08.2023
- National Sports Day - 29.08.2023
- Teacher's Day - 05.09.2023
- Engineer's Day - 15.09.2023
- World Ozone Day - 19.09.2023
- International Day of Scientific Culture - 28.09.2023



## How things work

### How does Sonography work?



Sonography, also known as ultrasound imaging, is a medical technique that allows doctors to see inside our bodies without invasive procedures. It utilizes high-frequency sound waves and their echoes to create images of internal structures. Similar to echolocation used by animals like bats and dolphins, as well as SONAR technology used by submarines, sonography provides valuable diagnostic information.

The process begins with the application of a special gel on the area of the body to be examined. This gel ensures there is no air between the ultrasound device and the skin, as air would hinder the sound waves from entering the body. It facilitates the smooth transmission of sound waves and enhances the clarity of the resulting images.

Next, a small device called a transducer is gently moved over the area of interest. The transducer plays a vital role in the process and operates based on the piezoelectric effect. It consists of an array of piezoelectric crystals that vibrate when an electric signal is applied, generating high-frequency sound waves known as ultrasound. Interestingly, these crystals can also work in reverse, converting detected high-frequency sound waves into electrical signals.

The transducer emits sound waves that travel through the body and bounce back when they encounter different tissues or structures. Although we cannot hear these sound waves, they reflect differently depending on the composition and density of the body part they encounter. For example, bones reflect sound waves strongly, while organs and tissues reflect them differently based on their density.

The transducer receives the bouncing sound waves and sends them to a computer. The computer analyzes these echoes and converts them into visual representations, which are displayed on a screen as sonograms. Ultrasound images can be displayed in 2D, 3D, or even 4D (which shows motion in 3D). These images serve as maps of the internal body structures, enabling doctors and technicians to examine organs, detect abnormalities, and assess overall health.

One of the major advantages of sonography is its safety and non-invasiveness. The procedure is painless and does not involve the use of radiation, unlike X-rays. It is a valuable tool for monitoring the growth and development of babies in the womb, assessing organ health, and diagnosing various medical conditions.

However, sonography does have limitations. Sound waves do not travel well through air or bone, which means that areas with gas or hidden by bone, such as the lungs or head, may not be effectively imaged using ultrasound alone. In such cases, other imaging techniques like CT scans, MRI scans, or X-rays may be necessary to visualize those areas.

Sonography remains an incredible tool that contributes to the diagnosis and monitoring of various medical conditions, ultimately helping to keep us healthy.

# Did You Know?

## Why does Mars look red in colour ?

Mars, the fourth planet from the Sun, has captivated human curiosity for centuries. Known as the "Red Planet," Mars stands out in our night sky with its distinct reddish hue. Scientists and stargazers alike have been fascinated by this remarkable color, prompting extensive research to unravel the reason behind Mars' crimson appearance.

As the second smallest planet in our solar system, Mars possesses a unique composition that sets it apart from other celestial bodies. The primary factor contributing to its reddish coloration is the presence of a significant amount of iron oxide, commonly known as rust. When sunlight reflects off Mars' surface, the iron oxide imparts a reddish tone to the planet, giving it its characteristic reddish glow.

During the formation of the solar system, various elements and compounds were scattered throughout space. Mars, being located close to the asteroid belt, experienced a higher accumulation of iron oxide during its early development. These iron-rich particles settled on its surface, resulting in the predominant reddish color we observe today.



## How do firecrackers produce colours ?



Firecrackers and fireworks have become synonymous with celebrations and entertainment, offering a captivating display of sound, light, and heat. These explosive devices operate through carefully orchestrated chemical reactions and precise engineering.

Firecrackers are compact explosive devices designed to produce a loud bang, creating a significant amount of noise. They consist of a tightly packed mixture of fuel and oxidizer. When ignited, the fuel and oxidizer react, releasing a burst of energy and generating the characteristic loud noise.

Fireworks, on the other hand, are more elaborate displays that incorporate a variety of effects, including bursts of colorful light in the night sky. Within a firework shell, there are compartments called stars. These stars contain a mixture of fuel,

oxidizer, and metal salts or compounds. When ignited, the stars are propelled into the air. As they heat up, the metal elements within the stars become excited, emitting light and producing vibrant colors.

Different metal elements yield distinct colors when heated. Copper creates blue, barium produces green, and strontium results in red. By combining various metal salts and compounds, fireworks create a mesmerizing display of colors and patterns.

In addition to the visual spectacle, fireworks generate sound and heat. The explosive combustion process produces a shockwave, resulting in the sound energy accompanying the display. The heat generated during the chemical reactions adds to the overall experience.

Firecrackers and fireworks have evolved over time, with advancements in chemistry and pyrotechnic engineering leading to more intricate and breathtaking displays. Safety measures and regulations ensure their responsible use, allowing people to enjoy the captivating effects while minimizing risks.

These displays, whether it's a crackling firecracker or a majestic fireworks show, continue to mesmerize audiences worldwide. They add a touch of wonder and excitement to celebratory occasions, offering a dazzling exhibition of sound, light and heat.



# In The Last Quarter...

April

2023

## International Day of Human Space Flight



International Day of Human Space Flight was celebrated at the Centre on April 12, 2023 in collaboration with Russian Centre for Science and Culture in Mumbai. The programme started with homage to Cosmonaut Yuri Gagarin by the Chief Guest, His Excellency Mr. Aleksei V Surovtsev, the Consul General of Russia in Mumbai along with other 70 invitees by offering flowers. The Centre organised an online quiz, an open house quiz, and a Chalte Chalte Quiz on the theme 'Space Flight' to celebrate the event. 772 students took the online quiz, and 89 of them submitted their answers. The Open House and Chalte Chalte Quiz drew 162 people.



## Inauguration of new attractions at Children Science Park



The Centre on 22.04.2023 inaugurated 03 new exhibits in the Children Science Park. The newly exhibits named Giant Lever, Perspective House & Praying Mantis were inaugurated by Dr. A. P. Jayaraman, Former Nuclear Scientist, BARC, Mumbai. 65 students, teacher and public were part of this inauguration.



## World Earth Day

As part of the World Earth Day celebrations, the Centre hosted a Webinar on the theme Invest in Right Choices by Dr. Anuradha Gupta, Prithvi Innovations, Lucknow. Inaugurated 03 new exhibits in the Children's Science Park, held an online pledge on the topic of saving the earth, a science film show on climate change, an online quiz on investing in our planet, a science sphere show on The Unique Blue Planet and a Chalte Chalte Quiz. 645 people participated in this commemoration.



# In The Last Quarter...

April

2023

## Vacation Creative Science Workshop

The Centre organized Vacation Creative Science Workshop from April to June 2023. The details of the programmes as per following:



### The Paper Pilot Workshop on 14.04.2023

An online workshop on the The Paper Pilot Workshop was organized by the Centre. 30 students participated in this workshop in which students were made aware of the basic principles of flight through the paper models of Harrier, Dart plane and bat plane.

### Kitchen Chemistry on 15.04.2023

An online workshop on the theme Kitchen Chemistry was organised. During this session, 17 students participated in experiments on secret writing, diffusion, natural acid-base indicators, chemical volcanoes, and other topics.



### Science Sparkle Workshop from 21.04.2023 to 23.04.2023

Participants in this workshop learnt the fundamentals of science while making simple science toys. 20 students were part of this workshop.

### Astrophotography Workshop from 29.04.2023 and 30.04.2023

The sessions are being organized for 20 registered participants. Participants will learn the fundamentals of night photography. They will also be given hand-on experience on how to set a camera to click better night sky images.





# In The Last Quarter...

April

2023

## Experiment Skill Test on 22.04.2023

The Centre in collaboration with Bombay Association for Science Education (BASE) organized yet another programme of Experiment Skill Test for 20 registered participants of 8th to 12th std. at the Centre. In the test, students were given experiment set-up in which they were supposed to do experiments in the presence of experts from the Centre and BASE. Through this programme their skill for performing the experiment and keen observation was tested.



May

2023

## Vacation Creative Science Workshop

The Centre organized Vacation Creative Science Workshop from April to June 2023. The details of the programmes as per following:

### Science Sparkle Workshop from 05.05.2023 to 07.05.2023

Participants in this workshop learnt the fundamentals of science while making simple science toys. 20 students were part of this workshop.



### Art and Craft Workshop - 08.05.2023 to 12.05.2023

Participants made and painted take-away dolls out of popsicle sticks and paper cups. 14 students were part of this workshop.



### Model Rocketry Workshop - 08.05.2023 to 12.05.2023, 15.05.2023 to 19.05.2023 & 29.05.2023 to 02.06.2023

3 batches of Model Rocketry were conducted during the month. Participants learnt about the basic underlying scientific principles in working of a Rocket. They learnt to make different parts of the rocket and also learnt about how to assemble those parts. They made and launched various models of chemically fueled and water rockets following the model rocketeers' safety code. 58 students were part of these workshops.

# In The Last Quarter...

May

2023



## **The Paper Pilot Workshop - 08.05.2023 to 12.05.2023 & 15.05.2023 to 19.05.2023**

Participants were given guided sessions on how to construct variety of paper Airplanes and were taught the basic fundamentals of flight. They made different models of Airplanes. 12 students were part of these workshops.



## **Astronomy Level I Workshop - 08.05.2023 to 12.05.2023 & 15.05.2023 to 19.05.2023**

Participants learnt various information about our solar system during this workshop with many hands-on activities. The concepts like rotation and revolution of the earth and moon, sun-earth-moon system, phases of moon, eclipses, and introduction to the solar system through PPT presentation were explained. Students made models to understand concepts like Earth's spin, precession, astrolabe star map, phases of the moon, eclipses, orbital tilt, constellation viewer and the scale model of the solar system. 37 students were part of these workshops.



## **Arduino Uno Workshop - 08.05.2023 to 12.05.2023 & 15.05.2023 to 19.05.2023**

Participants learnt about the Arduino platform, which consists of the Arduino Uno module as the hardware component and the Arduino Integrated development environment (IDE) as the software component. They learnt programming and also learnt how to integrate different types of sensors with Arduino Uno. 7 students were part of this workshop.



## **Clay Modelling Workshop - 15.05.2023 to 19.05.2023**

Under the guidance of an in-house expert, participants learnt how to make clay dough of proper consistency with natural modelling clay. They also learnt how to build stable structures. They made various models using the clay dough prepared by them in this fun-filled workshop. 16 students were part of this workshop.





# In The Last Quarter...

May

2023

## Chemistry Workshop - 15.05.2023 to 19.05.2023 & 29.05.2023 to 02.06.2023

Participants learnt about exothermic and endothermic reactions, how different markers alter colour, how a chemical transition occurs between states, and many other principles while experimenting with vibrant chemicals. 21 students were part of these workshops.



## Math Quest Workshop - 22.05.2023 to 26.05.2023

Participants learned numbers, shapes, models and hands-on activities, and made puzzles to understand Mathematics using the play-way method. They were also given problem-solving techniques for a better understanding of basic mathematical principles. 11 students participated in this workshop.

## Physics Frenzy Workshop - 22.05.2023 to 26.05.2023 & 29.05.2023 to 02.06.2023

Participants made simple science toys and did experiments through which they learnt many physics principles. 28 students were part of this workshop.



## Popular Science Lecture on 26.05.2023

Dr. Rajkumar S. Pant, Professor, Department of Aerospace Engineering, I.I.T, Bombay, Mumbai gave a popular science lecture on the topic 'How does a plane fly?' at the Centre on May 26, 2023, on the occasion of Paper Airplane Day. The lecture was conducted in a hybrid way –at the Centre for the physical audience and on Zoom for the virtual audience. The lecture began by outlining the fundamentals of flights. The speaker also covered some advanced techniques for a flight using PowerPoint presentations and also included a few case studies. There were 178 offline participants and 177 online viewers.

## Commemorating Paper Airplane Day

On May 26, 2023, the Centre celebrated Paper Airplane Day. 22 participants enrolled themselves in an online workshop titled "Birdy Paper Glider". Participants created paper airplanes including the Falcon, Super Glider, Rocket, Spin Plane, Hanger, and others. 81 participants successfully completed an online quiz with the theme of "planes."

## World No Tobacco Day

On May 31st, 2022 every year, World No Tobacco Day (WNTD) is observed all over the world following a different theme every year. The theme of this year is "We Need Food, Not Tobacco."

The Centre along with Tata Memorial Centre, and Action Council against Tobacco, India has announced the following events to spread awareness about this day:

- Online Painting Contest
- Short Film Contest
- Slogan Contest
- Quiz Contest

# In The Last Quarter...

May

2023



## Astronomy Olympiad

The Centre held an Orientation Cum Selection Camp (OCSC) at the Nehru Science Centre in Mumbai from May 8 to 26, 2023. 20 students were chosen for this camp based on their performance in the Indian National Junior Science Olympiad 2023. These students learned about many astronomical topics over their 19 days stay at the camp from renowned lecturers in the fields of astronomy and astrophysics. Students were taken on educational excursions to the Nehru Planetarium, Mumbai, the GMRT and NCRA in Pune. On May 26, 2023, the Valedictory ceremony was held in the dignified presence of Sh. Mayank Vahia, Rtd. Professor, TIFR. Based on the combined test scores, each participant received a certificate of



excellence, and the top three students were chosen to represent India at the 2nd International Olympiad on Astronomy and Astrophysics for juniors (IOAA-Jr.) 2023, which will be held in Volos, Greece from September 24 - 30, 2023.



## Commemorating 25th National Technology Day

The Centre organised various programmes during May 11 - 13, 2023 to commemorate the 25th National Technology Day. On May 11, 2023, Open House quiz and Chalte-Chalte (On the spot) quiz were conducted at the Centre for the visitors of the Centre. On 12th May an online quiz on the topic science and Technology in India was conducted. 143 participants participated in these quizzes. On May 13, 2023 the Centre in collaboration with Indian National Young Academy of Science (INIAS), Mumbai Chapter and Indian Nuclear Society (INS) organized a seminar titled 'Opportunities in Nuclear Sciences' to Commemorate a Quarter Century of Technological Excellence. The seminar was mainly focused to spread awareness of role of Nuclear Science in daily human life and to give information about the various career opportunities in the field of Nuclear Science. More than 500 students from all over India registered for the event. About 168 students from various universities attended the offline session at the Centre. The event was streamed on the YouTube channel of INIAS and was shared on the YouTube channel of NSC as well. Shri Mukesh Singhal, Former Director, Nuclear Power Corporation of India Ltd inaugurated the event. He briefed about the various peaceful uses of Nuclear Energy in his inaugural talk.





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## Commemoration International Museum Day

The Centre commemorated **International Museum Day**, a global event celebrated annually on May 18th, 2023. This year the Centre presented a distinctive exhibition titled "**My Own Collection**," which featured a captivating display of objects that left visitors enthralled. The exhibition showcased the remarkable collections of three distinguished individuals:

**Shri Abhay Phatak:** Rare Travel Memorabilia & Water Bottle Labels a rare travel memorabilia and water bottle labels provided a captivating glimpse into different cultures and destinations around the world. Visitors had the unique opportunity to delve into the rich history of travel through these unique artifacts.



**Shri Prasanna Vavhal:** Her Majesty Queen Elizabeth II Bank Notes

Shri Prasanna Vavhal's assortment of banknotes from various countries, all featuring Her Majesty Queen represented a fascinating aspect of numismatics. This collection allowed visitors to appreciate the intricate artistry and historical significance of currency.



**Shri N. Krishna moorthy Achary:** LIMCA Book of Record Holder: Objects with 786 Number

Shri N. Krishna moorthy Achary's collection of items and things bearing the number 786 presented a captivating exploration of numerology and its cultural significance. Visitors had the opportunity to discover the deep-rooted symbolism associated with this particular number.

The exhibition received overwhelming praise from the visitors, who expressed great admiration for this special exhibition. This International Museum Day event at Nehru Science Centre welcomed over 2,000 visitors throughout the day.



# In The Last Quarter...

June

2023

## World Environment Day

The Centre celebrated World Environment Day by hosting a variety of activities and competitions.

### •Exhibition 'Best out of Waste'

The Centre arranged an open exhibition showcasing innovative creations made from discarded plastics. The exhibition, themed "Beat Plastic Pollution," welcomed participants from all walks of life. Three students presented their projects, and the exhibition was visited by a total of 720 visitors on 05.06.2023.



### •Online Painting Competition

An online painting contest took place across three categories. Category A was open to students up to 4th grade, with the theme "Clean Environment." A total of 94 students submitted their paintings for this category. Category B targeted students from 5th to 7th grade, with the topic "Plastic Free World," attracting the participation of 59 students. The final category was for 8th to 10th grade students, who were tasked with creating artwork on the theme of "Plastic Pollution Crisis." In this category, 23 students submitted their artistic contributions.

## Teacher Training Programme



02 sets of teacher training programs were carried out for aspiring educators. These trainee teachers were provided with opportunities to familiarize themselves with the various facilities available at the Centre. Additionally, they created Teaching & Learning materials related to concepts such as the Archimedes Principle, Brain model, Electric motor, and Pythagoras theorem. Furthermore, a session on fostering innovative and out-of-the-box thinking was arranged for them. The initial batch, consisting



of 18 trainee teachers, took place from 19.06.2023, to 23.06.2023. The second batch, is in progress from 26.06.2022, to 01.07.2023, includes the participation of 58 trainee teachers.

## 9th International Day of Yoga

The Centre, in collaboration with The Art of Living, Mumbai, commemorated the 9th International Day of Yoga through both online and offline mode. This joint effort involved all satellite units in the western zone. The program was also live streamed on the Centre's Facebook page. Accomplished instructors demonstrated and explained various asanas to the audience. A total of 72 members participated via Zoom, and the Facebook reach extended to 1,266 individuals. Additionally, 53 staff members of NSC, Mumbai, attended the offline session.





# In The Last Quarter...

June

2023

## Commemorating Asteroid Day

Asteroid Day will be celebrated at the Centre by organizing various engaging activities, including a Popular Science Lecture, a Written Quiz, Open House Contest and a Science Film Show. The specifics of each program are provided below:



### Popular Science Lecture

On 30.06.2023, the Centre has organized an online Popular Science Lecture by Dr. Henry Throop, a Programme Scientist in the Planetary Science Division at NASA Headquarters. The lecture, titled 'Impact: Asteroid and Collisions in the Solar System and What NASA is doing to Protect the Earth,' garnered an impressive response, with 119 entries received so far for participation.



### Written Science Quiz

A written Science Quiz on the topic of Asteroids, Meteors, and Comets will be conducted by the Centre. A total of 120 students have registered so far to take part in this quiz.



### Science Film Show

A film centered around asteroids will be screened for 275 registered participants on 30.06.2023. Following the film, an Open House quiz based on the content of the film will be conducted.



## NSC - A Wonderland of Science

Science Park: Full of interactive exhibits on principles of energy, mechanics, perception & relics from the past: railway engines, tram cars, aircraft, electric power generator in park spread over 8 acres in green environment with over 200 species of plants and picnic area for school groups.



Permanent Exhibitions: The main building houses galleries full of exciting, interactive & interesting exhibits on topic relevant to school curriculum and for general public to make them appreciate Science with fun.



Reception • Science for Children • Sound & Hearing • Mirror Gallery  
Machined to Think • Evolution • Human and Machine  
Our Technology Heritage • Prehistoric Life • Hall of Nuclear Power  
Hall of Aviation & Space

## Regular Programmes / Activities

### SCIENCE ODYSSEY



The Science Odyssey facility with 18m dia Spherical Dome & fish eye lens projection system set up at the Centre, is the first of its kind in this region. It

provides an opportunity to learn science in an immersive ambience. special shows can be arranged on request.

**Now Showing: Journey to Space**

Check our website for updates:  
<https://nehrusciencesciencecentre.gov.in/>

### High Voltage Demonstration

Nehru Science Centre, Mumbai has set up the first of its kind High Voltage Demonstration facility titled '**Sparkling High Voltage Demonstration**' which is now opened for the visitors.

This new facility offers some impressive demonstrations with a 200kV AC transformer, spectacular display of sparks & sounds with a Large TESLA Coil producing up to 1.50 million-volts and many more supporting equipments like Lichtenberg Tree Formation set-up, Jacob's Ladder, Arcing Horns, etc. wherein visitors can see disruptive discharges through air, sliding discharges over a glass plate, the demonstration with Faraday's cage, artificially generated lightning, etc.

### Science On a Sphere

The state-of-the-art educational visualisation tool patented by the National Oceanic and Atmospheric Administration (NOAA), USA, is the first of its own kind in the western part of India. The **Science On a Sphere** provides real time atmospheric and climatic data that is projected on the 1.8 metre Spherical globe. The giant animated sphere appears to be floating in mid-air, and even rotating on its axis. You can see oceans & continents in their actual colours (just as our planet appears from outer space), Tropical rain forests, Currents of the oceans in motion, Moon, Jupiter and Mars. This amazing, cutting-edge technology, the SOS, was invented by NOAA to educate the audience on earth and space systems in a three-dimensional format. This technology is now available worldwide for science centres, museums, educational institutes etc.

### 3D Show

The visitors to the 3D Science Show will experience an out of the world immersive experience in which the near realistic visuals will appear to come out from the static screen right in front of their eyes. The shows would be conducted every hour at the Centre for the general public & school groups.

### Science Show

Exciting science demonstrations on Air, Sound, Chemistry is Fun and Fun with Physics etc. are organized regularly at the Centre thrice a day.

### Sky Observation Programme

Every Saturday & Sunday after Sunset  
(Weather permitting)

### Motion Simulator

Motion Simulator is a machine designed to provide a realistic imitation of the controls and operation of a vehicle, aircraft, or other complex systems, mainly used for training purposes. It creates the effect of being in same conditions like driving on a rough road, moving in space etc.

It gives visitors thrilling experience through 3D viewing on a 70" LED monitor. Presently it is screening the film "The Great Wall of China". Here you are guided by a crazy old man with a rocket-powered chariot. It's a 10 minutes thrilling bumpy ride! So don't miss.

Book your date for an exciting experience at Nehru Science Centre, Mumbai





You can book online  
Entry Ticket to  
Nehru Science Centre

<https://nscm.in/general-ticket/>

Follow the Steps:

1. Book your ticket
2. Go to Cart and confirm it is of correct type
3. Go to Checkout and pay using Net Banking, Credit Card, Debit Card or UPI app

**Book  
Online**

## Timing

**Nehru Science Centre**  
is open to public every day  
including Sundays and  
public holidays throughout

Opening hours:  
09.30 AM to 06.00 PM

Ticket Counter Timing:  
09.30 AM to 05.30 PM

Closed on Holi & Diwali.

# Entry fee per visitor to Science Centre & its special facilities.

Particulars	Amount
<b>Entry Ticket to Science Centre Only</b>	
• General Visitors	Rs.70/-
• Group of Visitors (15 or more)	Rs.60/-
• Students in organised group with authority letter	Rs. 20/-
• Students from Govt./Municipal Schools with authority letter	Rs. 10/-
• BPL card holders on producing the card	Rs. 5/-
<b>Entry Ticket ONLY to Science Park - General Visitors</b>	Rs.20/-
<b>Special shows - Science Odyssey</b>	
• General visitors	Rs.80/-
• Group of Visitors (15 or more)	Rs.70/-
• Students in organised group with authority letter	Rs.50/-
• Students from Govt./Municipal Schools with authority	Rs.25/-
<b>Motion Simulator Ride</b>	
• General visitors	Rs.50/-
• Group of Visitors (15 or more)	Rs.40/-
<b>3D Science Show / Science on Sphere</b>	
• General visitors	Rs.30/-
• Group of Visitors (15 or more)	Rs.25/-
• Students in organised group with authority letter	Rs.20/-
• Students from Govt./Municipal Schools with authority letter	Rs.10/-
<b>Science Film Show / Science Demonstration Lecture (on prior booking)</b>	Rs.10/-
<b>Package ticket for Science Centre &amp; Science Odyssey</b>	
• General visitors	Rs.130/-
• Group of Visitors (15 or more)	Rs.110/-
• Students in organised group with authority letter (Non-Member Schools)	Rs.60/-
• Students in organised group with authority letter (Member Schools)	Rs.50/-
• Students from Govt./Municipal Schools with authority letter	Rs.25/-
<b>Special Packages</b>	
• Science Centre, 3D show & SOS show for General visitors (Science Centre, Science Odyssey, Sparkling High Voltage, 3D show & SOS show)	Rs.100/-
• Students in organised group with authority letter (Non-Member Schools)	Rs.90/-
• Students in organised group with authority letter (Member Schools)	Rs.75/-
• Students from Govt./Municipal Schools with authority letter	Rs.40/-
<b>Family Packages</b>	
Science Centre, Science Odyssey, Sparkling High Voltage, 3D show, SOS show & Motion Simulator Ride.	
• Family of 4 members	Rs.600/-
• Family of 6 members	Rs.900/-
(Buy Family Ticket to Save & have lot of FUN)	
<b>Parking Charges</b>	
2 Wheeler	Rs.30/-
4 Wheeler	Rs.50/-
<b>Free Entry only to Science Centre :</b>	
Children up to 3.4 feet (102 cm) of height	
Defense & Paramilitary forces in uniform	
Physically challenged persons and ICOM members	
For other facilities visitors have to pay specified fee as per the category.	



"Learning gives creativity,  
creativity leads to thinking, thinking provides knowledge,  
and knowledge makes you great."  
- Dr. A. P. J. Abdul Kalam



संस्कृति मंत्रालय  
भारत सरकार  
Ministry of Culture  
Government of India



नेहरु विज्ञान केंद्र  
राष्ट्रीय विज्ञान संग्रहालय परिषद् की इकाई  
संस्कृति मंत्रालय, भारत सरकार  
Nehru Science Centre  
A Unit of National Council of Science Museums  
Ministry of Culture, Government of India

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