Ministry of Culture
Government of India

# Vigyan Connect

## January - March 2025


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Designed & Developed by

**Goa Science Centre**
(A unit of National Council of Science Museums)
Ministry of Culture, Government of India
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# OPENING NOTE

Dear Members and Science Enthusiasts,

Wish you all a Happy and Prosperous New Year 2026!

It is with immense pride and pleasure that we present the second issue of Vigyan Connect. On 19 December 2025, marking the 24th anniversary of Goa Science Centre, we formally began our Silver Jubilee celebrations (2001–2026)—a significant milestone in our 25-year journey of promoting scientific temper, curiosity, and innovation among the people of Goa and beyond.

The celebrations commenced with the launch of our spectacular science show, "Fire Fiesta", which received an overwhelming response. Owing to its popularity, the show will soon be included in our daily itinerary.

Goa Science Centre has been committed to making science interactive, engaging, and accessible. Over the years, the Centre has evolved into a vibrant hub of learning through hands-on exhibits, live demonstrations, workshops, outreach programmes, and teacher training initiatives etc. This was possible because of the continued support and enthusiasm of our visitors.

Science is best experienced through participation. We warmly invite students, teachers, families, and science enthusiasts to visit Goa Science Centre and take part in the wide range of activities, exhibitions, demonstrations, workshops, and special programmes being organised as part of our Silver Jubilee celebrations.

As we celebrate 25 years of service to science education, we look ahead with optimism and purpose. Let us commemorate this Silver Jubilee not only by reflecting with pride, but by moving forward with renewed enthusiasm for discovery, innovation, and learning

**Mrs. Manjula U. Yadav**
**(Project Co-ordinator)**


# CONTENT



## EXHIBIT AT THE CENTRE

### Colour Shadow

**What to Do?**

Stand in front of the screen and watch your shadow in colours. Your body casts shadows in three different places for three lights.

**What You See?**

You get a shadow in cyan where your body blocks the red light. You get a shadow in magenta where your body blocks the green light. You get a shadow in yellow where your body blocks the blue light. The rest of the screen is white as all three primary colours mix.

**How It Works?**

When all three lights mix, the screen looks white because these three coloured lights stimulate all three colour receptors on your retinas approximately equally, giving us the sensation of white. Red, green, and blue are therefore called additive primaries of light. With these three lights, you can make shadows comprising seven different colors: blue, red, green, black, cyan, magenta and yellow.

# BlueBird Block-2 Mission

December 24, 2025, the Indian Space Research Organisation (ISRO) achieved a major milestone in global collaboration with its successful launch of BlueBird Block-2 satellite aboard its heavy-lift LVM3-M6 rocket-nicknamed "Baahubali" for its remarkable thrust capability. The BlueBird Block-2 mission is a dedicated commercial launch undertaken by ISRO in partnership with NewSpace India Limited (NSIL) and the U.S. Company AST SpaceMobile. It carried the satellite int Low Earth Orbit (LEO) from Satish Dawan Space Centre located in Shiharikota, India.

LVM3, developed by ISRO, is a three-stage launch vehicle comprising of two solid strap-on motors, a liquid core stage and a cryogenic upper stage. Previously, this launch vehicle has successfully launched Chandrayaan-2, Chandrayaan-3 and two OneWeb missions carrying 72 satellites. This was the sixth operational flight of LVM3.

BlueBird block-2 mission is a part of global LEO constellation to provide space-based cellular broadband connectivity to smartphones. This will enable 4G and 5G voice calls, video calls, texts, streaming and data for everyone, everywhere, at all times. This will eliminate the need for additional antennas or specialised hardware on the ground. It is the largest commercial communication satellite ever deployed into low Earth Orbit and the heaviest payload launched by LVM3 from Indian soil.

# SciCraft

# Spinning Spiral

## You will need

- Paper sheet
- Skewer
- Scissors
- Modeling Clay
- Candles

## What to do?

**Step 1**: Cut a circle of 6 cm diameter on the paper sheet .
**Step 2**: Start at the center of a circle and draw a continuous circular line outward to form a spiral
**Step 3**: Cut along the spiral. Fold the central end of the spiral into a cone
**Step 4**: Take a rectangular piece of modeling clay of size 5cm*3cm to form the base
**Step 5:** Insert the blunt end of skewer into the base. Mount the spiral into the pointed end of the skewer
**Step 6:** Light two candles below the spiral and observe the spiral spinning.

## Science behind it

The candles warm the air directly above it. This hot air expands, its particles spread out, making it less dense than the cooler surrounding air. This lighter, warm air rises in a column, creating a convection current. The rising air pushes the paper spiral, causing it to spin.

# SciQ

Send your answers to
vigyanconnectgsc@gmail.com

## Quiz

1. Who is the Indian Mathematician known as 'The Man Who Knew Infinity' ?
2. Who is the inventor of zero ?
3. What is the value of golden ratio?
4. How can you make 45 using only 4?
5. Which number between 0 and 50 is spelled with its letters in perfect alphabetical order?

## Riddles

1. I'm an odd digit. But if you take away a letter from my name, I will become even. What number am I?

2. Why was the math book always so sad?

3. Why should you never argue with a 90-degree angle?


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# HISTORY OF SOLVING MYSTERY

## Terrella-Little Earth

Four Hundred years ago in England, there lived scientist named William Gilbert. While many knew him as Queen Elizabeth's physician, he loved studying mysterious forces that no one understood yet. He had more interest in magnetism and magnetic forces. At that time, People used compass but nobody knew why the needle of the magnet always pointed north. Some people even said it was magic. William was curious about this thing and he wanted to find the real reason why it happened.

One day, he took a natural magnet named lodestone and tried to rub a metal needle on it. Then, he put the needle on a small piece of wood and let it float on water. He noticed that the needle turned by itself and pointed north. There was a question in william's mind: 'why does this happen?' he thought about it and come up with an idea. He made a round ball of lodestone and named it "little Earth" when he put the needle near the ball, it pointed the same way as it did on real Earth. Then he came to a conclusion. The Earth itself was a giant magnet. The needle pointed north because it followed Earth's magnetic pull. This was the real magic of the needles. Thanks to William Gilbert, people could travel safely because they finally knew how a compass worked.

Source: Google.com

# HOW & WHY ?

## Robotic Vacuum Cleaner

A Robotic vacuum cleaner is an autonomous device. It is also known as robovac and is commonly used to clean the floor. It has very minimal manual intervention and the scheduled cleaning cycle makes them convenient and efficient. One can track progress and even control the Robot remotely though mobile apps.

The robot runs on a rechargeable battery and can run approximately 90-120 minutes. It has a motor which allow it to move around the house and collect the dirt into a built in dustbin. Many models also include a mopping function, where a water tank and microfiber pad gently wipes the floor in addition to vacuuming. It is also equipped with sensors such as cliff sensor to prevent the robot from falling off stairs, obstacle sensor (like infrared, ultrasonic or Radar) to detect and avoid furniture. It has a motor which allow it to move around the house and collect the dirt into a built in dustbin. Many models also include a mopping function, where a water tank and micro fiber pad gently wipes the floor in addition to vacuuming.

The robotic vacuum cleaner cannot fully replace traditional Vacuum Cleaners. The strong suction capability of traditional vacuum cleaners helps in deep cleaning of carpets and upholstery. However, Both types complement each other, ensuring efficient, thorough cleaning across different surfaces and needs in your home.

In conclusion, this advanced robotic vacuum cleaner simplifies daily life by efficiently handling cleaning tasks. It offers valuable support to working individuals, as well as to sectors such as hospitality and healthcare, by minimizing the need for human intervention while maintaining high standards of

# Science & Technology Heritage of India

## Iron Pillar Delhi

The Iron Pillar of Delhi is one of the world's most famous metallurgical curiosities. Located in the Qutb Complex in Mehrauli, it has stood for over 1,600 years without rusting, despite being exposed to the elements.

It is a metal structure 7.21 metres high with a 41-centimetre diameter that was constructed by Chandragupta II. The metals used in its construction have a rust-resistant composition. The pillar weighs more than six tonnes and is thought to have been erected elsewhere, possibly outside the Udayagiri Caves, and moved to its present location by Anangpal Tomar in the 11th Century.

The pillar has attracted the attention of archaeologists and materials scientists because of its high resistance to corrosion. The corrosion resistance results from an even layer of crystalline iron(III) hydrogen phosphate hydrate forming on the high-phosphorus-content iron, which serves to protect it from the effects of the Delhi climate.

It is composed of 98% pure wrought iron, but its defining characteristic is a high concentration of phosphorus (approximately 0.25%), which is significantly higher than the level found in modern steel. This high phosphorus content is a result of the ancient "Direct Reduction" smelting process, where iron was extracted from ore using charcoal without the use of limestone, which would have otherwise removed the phosphorus as slag. upon initial exposure to the environment, the phosphorus acts as a catalyst to form a thin, dense, and adherent passive layer known as crystalline iron hydrogen phosphate hydrate or Misawite. This layer, only about 0.05 mm thick, effectively seals the iron surface from oxygen and moisture. Furthermore, the pillar's composition is notable for its extremely low levels of sulfur and in modern metallurgy, manganese is often added but can inadvertently promote corrosion, so its absence in the pillar further enhances its longevity.

In summary, the Iron Pillar of Delhi is a testament to ancient metallurgical brilliance, owing its rust-free existence to a high-phosphorus, low-manganese chemical makeup. By forming a dense, protective Misawite layer on its surface, the pillar effectively shields itself from the elements. It remains a rare example of how ancient techniques created a durable, self-healing material that continues to fascinate modern scientists and historians alike

# ASTRONOMY WONDERS

## The Aurora: The Dancing Light of the Sky

The Aurora is one of the most dazzling and remarkable natural wonders, appearing as colourful lights that shimmer and dance across the night sky near Earth's Polar regions. These lights are commonly known as **Northern Lights *(Aurora Borealis)*** in the Northern Hemisphere and the **Southern Lights *(Aurora Australis)*** in the Southern Hemisphere.

**What causes the Aurora?**

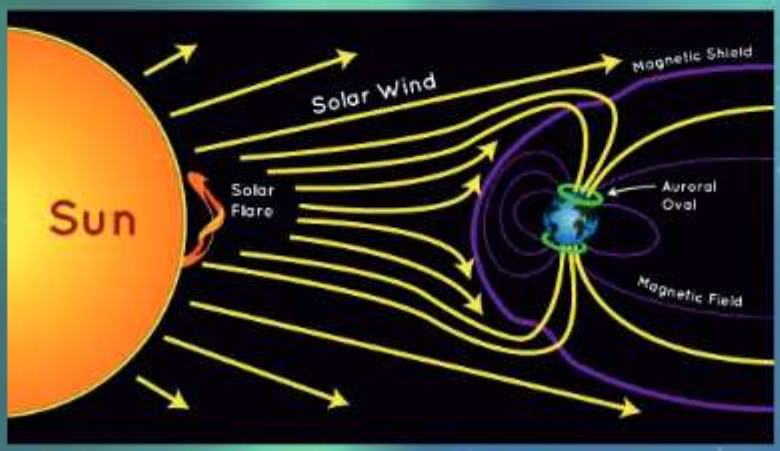
The aurora is formed due to the interaction between the Sun and the Earth. When the sun releases the charged particles called **solar wind**, when these particles reach the earth atmosphere, they are guided by the planet's magnetic field towards the poles. These particles collide with gases like oxygen and nitrogen and the energy is released in the form of light. This creates the glowing curtains, arcs and waves seen in the sky.

**Why do Auroras Occur Near the poles?**

The magnetic fields are strongest on North Pole & South Pole as the earth's magnetic field pulls charged particles towards the Polar Regions; creating the graceful Auroras. The best time to view the auroras is during winter nights, when the skies are dark and clear.

**Are Aurora Lights important?**

The Aurora plays an important role in scientific research, education and our understanding of Earth-Sun interaction. Auroras are closely linked with solar storms. Observing auroral activity allows scientists to monitor space weather conditions that can influence satellite operations, GPS and communication systems, Power grid and Navigation systems. Beyond science, the auroras carry deep cultural meaning for many northern communities by inspiring in their stories, myths and cultural heritage for centuries.




*The aurora is not just a breathtaking natural light show but also a powerful reminder of the connection between our planet and the sun. It blends the beauty, science and mystery, inspiring wonders and curiosity.*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# Rooted in the Campus

## Coconut Tree
## Botanical Name: *Cocos nucifera*

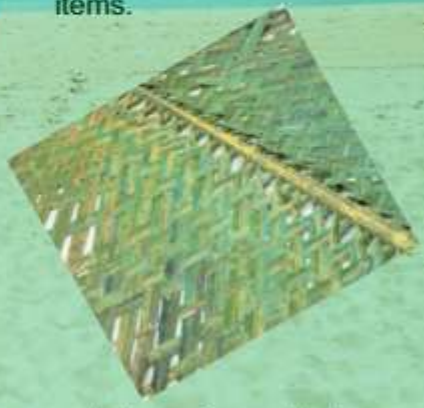
The coconut tree is a member of the palm family and the only living species of the genus cocos. Its botanical name is cocos nucifera and its historical name is Kalpavriksha. The term coconut can refer to the whole coconut palm, or to its fruit (seed), which botanically is a drupe not a nut. The coconut tree originated from Central Indo-Pacific region and is now ubiquitous in coastal tropical areas where it is considered a cultural icon of the tropics. The campus of Goa Science Centre roots 20 coconut trees.

Coconuts were first domesticated by the Austronesian people in Island Southeast Asia and were spread during the Neolithic period via their sea routes. They served as portable source of food and water during a long sea voyage of Austronesians. In historic times, sailors further spread the coconuts along the coasts of the Indian and Atlantic oceans.

The coconut tree can grow up to 30 meters tall and can yield up to 75 fruits per year. Coconut palms are intolerant to cold climates and prefer heavy rainfall, ample water supply and full sunlight. With proper care, coconut palms begin producing fruits in six to ten years and reach peak production between 15 to 20 years.

The coconut tree provides food, fuel, cosmetics, and material for folk medicine. The inner flesh of the mature seed and the coconut milk extracted from it form a regular part of the diet of many people in the tropic and subtropical region. Mature coconuts can be consumed directly or processed to produce oil and plant milk from the flesh, charcoal from the hard shell and coir from the fibrous husk.

Dried coconut flesh is known as copra, and the oil and milk derived from it are widely used in cooking as well as in soaps and cosmetics. The coconut shell can be crafted into beautiful items.



Coconut leaves are used for traditional thatch roofing, mats, baskets, and brooms, as well as food wrapping

In conclusion, The coconut tree is called Kalpavriksha (wish-fulfilling tree) as every part of it is useful, providing food oil, fiber (coir for ropes, mats), wood for construction, and leaves for thatch and crafts, making it a symbol of abundance and self-sufficiency in tropical regions

Source: https://en.wikipedia.org/wiki/coconut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# Indian Vaigyanic

**Homi J Bhabha: *Father of the Indian Nuclear Programme***

Homi J. Bhabha (1909-1966) was a famous Indian Scientist and was born on October 30,1909 in Bombay in a rich parsi family. After graduating from Elephistone college and the Royal Institute of Science in Bombay he went to Cambrige university. He received his doctorate in 1934. Homi J. Bhabha worked with Walter Heitler on the cascade theory of electron showers, which was of great importance for the understanding of cosmic radiation. He did significant work in identifying the meson. He is reffered to as the "Father of the Indian Nuclear Programme."

Homi J. Bhabha was a theoretical physicist whose work laid foundations for both modern particle physics and India's nuclear program. His key research are Bhabha scattering, Cosmic – Ray showers, meson prediction, relativistic time-dilation effects, early Quantum Calculations.

Beyond his theoretical insights, Bhabha's vision guided the establishment of major Indian Scientific institutions including the Tata Institute of Fundamental Research (TIFR) and the atomic energy commission. His work on cosmic rays and nuclear reactions helped in the design of India's first research reactor Apsara (1956).

These contribution earned him the Admas prize(Cambridge university) in 1942. He was awarded with Padma Bhushan, Conferred by the Government of India in 1954 and a Fellowship of the Royal society. Elected in 1941.

Homi J Bhabha's blend of deep theoretical work and practical scientific leadership left an indelible mark on both global particle physicist and Indian scientific infrastructure. His contributions continue to inspire researchers worldwide.

Reference-
-https://www.britannica.com
-https://hjbhabhaiti.delhi.gov.in

# Sci-Word Mix

**Find the mixed Chemical Name of Vitamins**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| L | E | T | H | I | A | M | I | N | E | A |
| O | S | E | R | B | F | L | A | V | I | S |
| R | E | T | I | N | O | L | J | O | M | C |
| E | C | O | B | A | L | A | M | I | N | O |
| F | B | I | O | T | I | N | Y | M | L | R |
| I | H | O | F | E | C | I | H | U | W | B |
| C | V | Q | L | P | A | A | G | U | J | I |
| L | T | H | A | I | C | C | S | M | U | C |
| A | B | I | V | X | I | I | X | I | N | A |
| C | J | H | I | O | D | N | O | L | P | C |
| A | N | I | N | U | P | Y | R | I | D | I |
| P | Y | R | I | D | O | X | I | N | T | D |

**Vitamin List**

**CALCIFEROL**
**RETINOL**
**RIBOFLAVIN**
**BIOTIN**
**FOLIC ACID**
**THIAMINE**
**NIACIN**
**PYRIDOXIN**
**ASCORBIC ACID**
**COBALAMIN**

# IN THE LAST QUARTER

October

Drop you Swachhata slogan for visitors as a part of Special Campaign 5.0

Activity on redefining waste for students as a part of Special Campaign 5.0

Street Play by Education team as a part of Special Campaign 5.0

Exploring Physics workshop as a part of CSW

Art from Waste Planter fabricatedusing old garden pots

Skill development in Electronics workshop as part of CSW

Curiosity Buzz workshop as a part of CSW

Kaavi Art Workshop organised for women on the occasion of World Tourism Day in collaboration with Goa Tourism Department

Mobile Science Exhibition to Salcete Taluka



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# IN THE LAST QUARTER

November

Sunday Science Workshop

Launching of 3D Film

Popular Science Lecture on 3 D printing on the occasion of ISCSMD

State Level Drama Competition in collaboration with GSCERT

Science Demonstration at MSE site in Belgum District

Outreach Activity: Young Scientist exhibition at Shiroda Higher Secondary School, Shiroda

Hands on activity for Pediatric cancer survivors on the occasion of Children'


Sci Birthday Celebration

Vigilance Awareness quiz for visitors



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# IN THE LAST QUARTER

December

Sunday Science Workshop

Science film festival in collaboration with Goethe Institute

24th Anniversary Day Celebration

Celebration of inscription of Diwali in the UNESCO Representative list

Launching of Demonstration Fire Fiesta

Mathemagic workshop as a part of CSW

Amazing Astronomy Workshop as a part of CSW

Junior Sky Explorers workshop as a part of CSW

Sky Observation Programme


Sci Birthday Celebration



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# Science Wonderland

Goa Science Centre is a constituent unit of National Council of Science Museums functioning under Ministry of Culture, Government of India. It is a place of edu-tainment in Science & Technology. Its Main objective is to inculcate a scientific temper & bring the excitement of science to the common public. It provides a perfect environment for exploring science through sci-fi exhibit.

## Galleries

- Fun Science ▲
- Science of Ocean ▶
- Mirror Magic ▼

## Science Park

## Pre-histrorik Animal Park

## Digital Planetarium

## 3D Show

## Science Show


## Sky Observation Program

## Upcoming Events

**January 2026**
- National Youth Day
- Science Demonstration Lecture series
- Republic Day Celebration

**February 2026**
- International Day for Women and Girls in Science
- Teachers Training Program
- Science Fiesta

**March 2026**
- International Women's Day
- World Water Day



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# General Information

## Entry Fee Per Visitor to Science Centre

| Particulars | Amount |
|---|---|
| **Entry Ticket to Science Centre Only** | |
| ◊ General Visitors | Rs.30/- |
| ◊ Group of Visitors (15 or more) | Rs.20/- |
| ◊ Students in Organized Group with Authority Letter | Rs.10/- |
| ◊ Students from Govt./Municipal School with Authority Letter | Rs.5/- |
| **Planetarium/Taramandal Shows** | |
| ◊ General Visitors | Rs.50/- |
| ◊ Group Visitors (15 or more) | Rs.30/- |
| ◊ Students in Organized Group with Authority Letter | Rs.20/- |
| ◊ Students from Govt./Municipal School with Authority Letter | Rs.10/- |
| **3D Science Show** | |
| ◊ General Visitors | Rs.30/- |
| ◊ Group Visitors (15 or more) | Rs.20/- |
| ◊ Students in Organized Group with Authority Letter | Rs.10/- |
| ◊ Students from Govt./Municipal School with Authority Letter | Rs.5/- |
| **Science Film Show** | **Rs.20/-** |
| **Science show** | **Rs.10/-** |
| **Special Packages** | |
| **Package Ticket to Science Centre, Planetarium & 3D Show** | |
| ◊ General Visitors | Rs.100/- |
| ◊ Group of Visitors (15 or more) | Rs.70/- |
| ◊ Students in Organized Group with Authority Letter | Rs.30/- |
| ◊ Students from Govt./Municipal School with Authority Letter | Rs.20/- |
| **Package Ticket to Science Centre & Planetarium** | |
| ◊ General Visitors | Rs.70/- |
| ◊ Group of Visitors (15 or more) | Rs.45/- |
| ◊ Students in Organized Group with Authority Letter | Rs.25/- |
| ◊ Students from Govt./Municipal School with Authority Letter | Rs.15/- |
| **Package Ticket to Science Centre & 3D Show** | |
| ◊ General Visitors | Rs.50/- |
| ◊ Group of Visitors (15 or more) | Rs.35/- |
| ◊ Students in Organized Group with Authority Letter | Rs.20/- |
| ◊ Students from Govt./Municipal School with Authority Letter | Rs.10/- |
| **Family Packages** | |
| Science Centre, Plantenarium, 3D Show | |
| ◊ Family of 4 Members | Rs.250/- |
| ◊ Family of 6 Members | Rs.350/- |

## Membership Program

### Innovation Hub Membership

- Eligibility: Students of class 5th & above
- Benefits: Access to the innovation hub for one year, can work on own innovative projects under the guidance of experts, free entry to the galleries, invitation to education programmes and activities.
- Annual Membership Fee: Rs.1000/-

### Science Centre Membership

- Eligibility: Individuals above 3 years of age
- Benefits: Free entry to the galleries, invitation to education programmes and activities.
- Annual Membership Fee:
  Rs.200/- for students
  Rs.400/- for Teachers
  Rs.500/- for other individuals

To avail membership please contact Education section GSCP.

## Sci-Birthday

- Celebrate your birthday at Goa Science Centre in a sci-fun way!!
- Package includes guided gallery tour, 3D show, planetarium show and hand-on activities with full-on edutainment.
- The contents is designed as per the age group.
- Air-conditioned activity room.
- Prior booking necessary

Package Rates:( Children & adult included)
up to 25 people -Rs.5000/-
up-to 50 people- Rs.7500/-

To booking please contact Education section GSCP.

Goa Science Centre is open to public every day including Sundays & public Holidays throughout the year except on Holi & Diwali

Opening Hours
9.30am to 6.00pm
Ticket Counter Timing
9.30am to 5.30pm


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# 25 years of Science Edutainment

## Celebrating Silver Jubilee year

**(19-12-2001 to 19-12-2026)**

As we complete 25 years of wonder, we want to hear your stories. Whether it was your first school trip in 2001, a family afternoon in the Science Park, or the moment you first gazed at the stars in our Planetarium—your memories are our history.Please share your photos, stories, and messages with us at *gscsilverjubilee@gmail.com*

Designed & Developed by

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