



# CURIOSITY



VASANT VALLEY SCHOOL SCIENCE NEWSLETTER

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## Greetings from Curiosity's Editorial Board!

This issue of *Curiosity* brings you the latest in science news, from the Vera Rubin telescope images to Shubhanshu Shukla's voyage into space. Science often finds its way into unlikely situations, as you will find in our article on how it's being used in the football world - and to decode what kind of music plants like!

Bid adieu to the monsoon by investigating one of its little-appreciated wonders in *Of Monsoons and Moss*, learn about the science of paralysis and, of course, attempt the crossword puzzle. Answers to the puzzle in the LC 1 edition are published here. This edition, we're also introducing a new *DEBUNKED* column, where we scientifically take-apart common myths and beliefs that - we love to break it to you - just aren't true.

We will be accepting articles, comics, posters, quizzes, and any other work for future issues year-round. Interested students should submit their contribution to the following Google Folder: [https://drive.google.com/drive/folders/1f3c1yHU0sqbOqxDcdBkrv\\_ZBBYmpz8IU?usp=drive\\_link](https://drive.google.com/drive/folders/1f3c1yHU0sqbOqxDcdBkrv_ZBBYmpz8IU?usp=drive_link), or email [meeras@vasantvalley.edu.in](mailto:meeras@vasantvalley.edu.in) or [khushiseth@vasantvalley.edu.in](mailto:khushiseth@vasantvalley.edu.in) with their contribution.

We look forward to reading them, just as we did the excellent contributions without which this issue would not have been possible.

## Editors

### Meera Shukla and Khushi Seth

Curiosity Editorial Team: Anahita Ganeshan, Nirvan Garg, Zoya Trehan Sahni, Aarna Gupta, Myrah Madhok

# THE VERA RUBIN TELESCOPE IMAGES



Perched on top of the dry, dark, and isolated heights of Cerro Pachón in the Chilean Andes, the Vera C. Rubin observatory is making history. Home to the world's largest digital camera and the powerful Simonyi Survey Telescope, the observatory recently captured its first ever images, marking a major milestone in what is poised to be one of the most ambitious astronomical projects till now.

The telescope's distinctive and one of a kind three-mirror design allows it to survey vast portions of the sky with unprecedented clarity and speed. Named in honor of U.S. astronomer Vera Rubin, whose exemplary work on dark matter reshaped our understanding of the cosmos, the observatory now stands as a tribute to her legacy.

A gateway to discoveries once thought impossible. And the revelations have already begun.

According to the National Science Foundation–Department of Energy (NSF–DOE) Vera C. Rubin Observatory, in just about 10 hours of initial observation, the telescope identified 2,104 previously unknown asteroids in our Solar System, including seven near-Earth asteroids. (Current observatories worldwide discover roughly 20,000 asteroids annually.)

Rubin Observatory's incredible power is ready to transform space science.

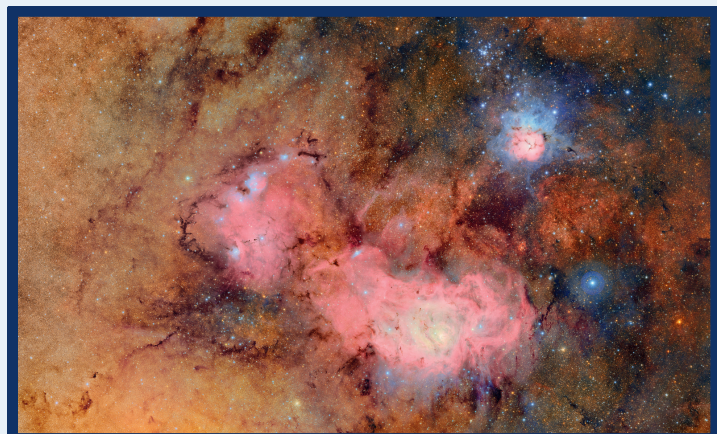
Over the next decade, the observatory will undertake the Legacy Survey of Space and Time (LSST), capturing the night sky every three days. Its 3.2-gigapixel camera will take images every 40 seconds for up to 12 hours each night, rapidly repositioning thanks to a brilliant moving dome and telescope mount. The observatory can detect millions of new asteroids within its first two years alone. But this mission goes deeper than cataloging space rocks.

The LSST will generate about 10 million data alerts each night, supporting global efforts across four key research areas: mapping transient objects and changes in the sky, understanding the formation of the Milky Way, surveying the Solar System, and probing the fundamental nature of dark matter and the universe's origins.

"It's transformative. It's going to be the largest dataset we've ever had to look at our galaxy with," says Professor Alis Deason of Durham University. "It will fuel what we do for many, many years." Deason notes that current data reaches as far as 163,000 light-years from Earth, but with Vera Rubin's capabilities, astronomers could peer as far as 1.2 million light-years—nearly eight times further, unlocking entire new regions of the cosmos.

Excitement is brimming across the globe as scientists speculate that the observatory might help resolve one of astronomy's most tantalizing and hotly debated mysteries, the possible existence of a ninth planet lurking in our Solar System. From the distant edges of our galaxy to the elusive invisible particles that shape its very structure, the Vera Rubin Observatory is ready to answer questions that have harangued humanity for centuries and kept people up at night, staring at the sky.

***-Anahita Rene Ganeshan, 10***





# SUBHANSHU SHUKLA'S JOURNEY TO SPACE



*June 25, 2025, will be remembered in Indian space history.*

Group Captain Shubhanshu Shukla of the Indian Air Force, engineer, and ISRO astronaut, has become the first Indian astronaut to visit the International Space Station (ISS). He is part of the Axiom Mission 4 (Ax-4) which marks India's return to human spaceflight after nearly 41 years, following Wing Commander Rakesh Sharma's historic journey in 1984.

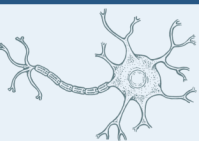
The Axiom 4 mission, a collaborative initiative between NASA and Axiom Space (a commercial space company), is the fourth private astronaut mission to the ISS. The diverse crew consists of Peggy Whitson (USA), Shubhanshu Shukla (India), and mission specialists from Poland and Hungary. For India, Poland, and Hungary, this mission represents a triumphant return to human spaceflight after decades long intervals.

SpaceX served as the launch provider, successfully launching the mission aboard a Falcon 9 rocket from Launch Complex 39A at NASA's Kennedy Space Center. The spacecraft docked with the ISS around 16 hours later, initiating a planned 14-day mission focused on scientific research and international cooperation.

Hailing from Lucknow, Uttar Pradesh, Shubhanshu Shukla's journey to space began in 2019, when he was selected as a candidate by the Institute of Aerospace Medicine (IAM). After being shortlisted as one of four astronaut trainees by ISRO and IAM, he underwent basic training at Russia's Yuri Gagarin Cosmonaut Training Center from 2020 to 2021. Returning to India, Shukla continued his advanced training at ISRO's Astronaut Training Facility in Bengaluru while simultaneously earning a Master's degree in Aerospace Engineering from the Indian Institute of Science. His official inclusion in India's human spaceflight program was publicly announced on February 27, 2024, at ISRO's Vikram Sarabhai Space Centre in Thiruvananthapuram.

As India strengthens its footprint in the space sector, Shubhanshu Shukla's mission becomes more than just a personal triumph, it's a national milestone. His journey is a beacon for the next generation of Indian scientists, engineers, and dreamers, signaling that space is no longer a distant frontier, but an emerging arena for India to showcase its excellence in. India is not merely participating in the cosmic future, it is actively charting its course as a leading spacefaring nation, committed to exploring the universe and advancing humanity's understanding of its place within it.

***-Anahita Rene Ganeshan, 10***



## REVERSING PARALYSIS



Researchers have made a massive breakthrough that could change the future for people with spinal cord injuries. By using gentle electrical stimulation along with physical therapy scientists have helped paralyzed rats regain the ability to walk. This new approach could one day help humans recover movement after spinal damage.

When the spinal cord is injured, the brain can no longer send signals to the muscles often leading to paralysis. In this study the electrical stimulation helped "wake up" the nerve circuits in the spinal cord. Combined with physical therapy this helped the nerves start to reconnect and adapt - a concept known as neuroplasticity, where the nervous system forms new connections despite damage. The results in rats were impressive. Even with severe injuries they were able to stand and walk again with support. Early trials in humans are also showing promise. Some patients have regained leg movement and a few have also been able to start walking.

Even though the treatment is still very new this discovery is a major step forward. This could one day lead to therapies that help people with paralysis regain movement and independence. If successful this approach could bring real hope to millions of people living with paralysis around the world.

***-Veer Ramchandani, 8***





# THE THREE LIONS AND SCIENCE



The English Football team turns to science to break the Nelson Rodrigues curse.

Sources say that as part of their training for the World Cup next summer, the English football players have been swallowing capsules containing digital technology before doing strenuous workouts to measure the internal temperature of each individual and how quickly they will cool down.

How it works:

Each pill has a sensor made out of Magnesium, Silicone and Copper, which is contained in a capsule. It works by sticking a patch on your stomach which communicates with the sensor inside the pill. Once you swallow the pill, the fluids in your stomach interact with the sensor to create a small electrical signal. After a few minutes the patch detects the signal and sends data to a tablet or smartphone.

The pills were originally designed to monitor regular medication use for patients suffering from mental illnesses, such as Schizophrenia and Bipolar I disorder. The developers are also working towards treatment of cardiac disorders, diabetes and Hepatitis C. However, now the pill seems to be of interest beyond its conventional medical use.

The 2026 World Cup will be held in Canada, Mexico and the United States. Many of the host cities can be very hot in the summer. To prepare for this, the English Football team has been holding its training camps in Barcelona and exercising in heated tents. In this heated environment, the players swallowed digital pills and undertook a strenuous bike workout. The data collected from this exercise is designed to help the coach, Thomas Tuchel plan his team based on how each player is reacting to the heat.

It's a good idea, but I don't know if deploying the power of science will be enough to break the curse of 1966.

**-Zubin Sahni, 8**



## THE GREEN RHYTHM

### HOW MUSIC SHAPES PLANT GROWTH



Plants don't have ears, so they're not exactly vibing to marimba rhythms or belting out "I got that sunshine in my pocket..." , but studies suggest they might respond to music more than we thought.

Scientists have found that sound waves can influence plant growth, especially when the music is soft, slow, and melodic. Classical and jazz compositions can enhance nutrient uptake, water absorption, and even overall health. Roses, for example, seem to love the violin. Some plants might be more Sabrina Carpenter-coded; others, full Adele mode. (Who knows?)

Devendra Vanol, a researcher in India, discovered that plants may even distinguish between different genres and environmental sounds. Meanwhile, Reda Hassanien in China found that sound waves increased the yield of several crops and reduced pest infestations—without any chemicals involved.

But it's not all good moves. Heavy metal and loud, aggressive sounds can actually stress plants, damaging their cells and slowing their growth. Some plants, like cress, even produce defensive chemicals when exposed to certain noises (maybe the sound of munching caterpillars?)

Could music be the next green tool in agriculture? The science is still growing, but your playlist might just help your plants thrive.

**-Anahita Rene Ganeshan, 10**



# OF MONSOONS AND MOSS

During the monsoon season, you don't normally do anything but sip some hot tea and snuggle up in a blanket as the rain pelts down outside your window. Though, have you ever wondered what natural marvels damp climates can bring? Well, in this article, we will be diving into one of the most common, yet unexplored marvels of the monsoon - moss. Perhaps it's how they always grow on wood in our homes in the rainy season, or maybe it's because they appear to resemble mould at first glance - but there is something about mosses that causes us to think they are nothing but a wet patch of grass. Actually, moss plays one of the most important roles in our ecosystem. Without moss, plants, trees and shrubs wouldn't be able to live. It helps keep soil healthy, helps distribute nutrients to help plants grow, provides a home for many microscopic organisms and stores large amounts of carbon. Therefore, it plays a crucial role in protecting trees, without which we wouldn't have enough oxygen to survive.

You can't find moss just in the monsoons, although it is more common after it has recently rained. The most common place to find them is a rainforest, where the humidity and dampness are very high. Of course, if you want to find moss, you don't have to go all the way to Cameron highlands or Bali! Think about places around you that might be constantly damp. A wooden plank beneath a clothesline, a windowpane below some water seepage or even a rock in your backyard next to a sprinkler - moss can be absolutely anywhere! You are most likely to find moss growing on wood or leaf litter, as it decays easily, but you can still find it on damp rocks and soil too.

Now, you must be wondering what is so special about moss. You've just learnt how vital it is for our ecosystem and where all you can find it, but the truth is there's much more to moss than it appears at first glance. The first time I looked at moss, I'm not going to lie, I thought it was a patch of bright green freshly trimmed grass. When I leaned closer, though, I realised it was something completely different. A bunch of really tiny ferns maybe? I wasn't entirely wrong! When I went back home and researched it, I found out it was moss. By dictionary definition - "moss, (division Bryophyta), any of at least 12,000 species of small nonvascular spore-bearing land plants. Mosses are distributed throughout the world except in salt water and are commonly found in moist shady locations. They are best known for those species that carpet woodland and forest floors. Ecologically, mosses break down exposed substrata, releasing nutrients for the use of more-complex plants that succeed them. They also aid in soil erosion control by providing surface cover and absorbing water, and they are important in the nutrient and water economy of some vegetation types." - credit: Britannica. Confusing, right? Don't worry, I'll simplify it for you. Moss, or mosses, are a species of plants which completely lack roots. Although they are normally found in damp areas, you will not find them anywhere near saltwater. They help prevent soil erosion, which occurs when there are very few or no tree roots to support the soil.

Oh, and let me tell you one last thing - why it is important to preserve moss. Although mosses may not be 'endangered' as such, it is very important to protect them, as they play a vital role in our ecosystem and provide habitats for microorganisms, store large amounts of carbon, prevent soil erosion and circulate nutrients for plants in the soil. Technically speaking - believe it or not - we can't survive without moss.



**-Lila Kapur Gandhi, 6**

# DEBUNKED

## HOMEOPATHY

Homeopathy was developed by Samuel Hahnemann, a German physician, in 1796. It believes in the principle of fighting fire with fire, or in the fancy language Hahnemann wrote it in, *similia similibus curentur* (like cures like).

Such homeopathic *remedies* take a sample of something believed to cause a disease, and then significantly dilute said sample in ethanol or water. Here start the significant issues in this still widely practiced pseudoscience.

The end result of *homeopathic dilution* is a concentration of solute so small, that it is chemically and physically indistinguishable from the solvent/diluent itself. This means that eventually when you consume a homeopathic remedy, all you are actually consuming is ethanol and/or water. What a sham!

Homeopathy maintains that this method of dilution retains the “essence” of the substance, but really? Any self-respecting logical person knows that if something is so dilute there’s no chance it’s going to have any effect. Another issue is homeopathy can frequently use toxic substances such as lead, mercury, cadmium, etc. Once confronted with this, some homeopaths either deny the toxic effects, voiding all of toxicology in a single sentence, or they claim that the concentration is too low to cause any harm. But hang on - if the concentration is too low to have any effect, doesn’t that mean your remedy is useless?

One might think that it’s alright, at least the concentration is too low to actually have any ill-effects. Yet when the solvent is ethanol - (which is usually at very high concentration) which is often the case - there are significant detriments.

The metabolism of ethanol in the liver is initially into ethanal, a Class 1B carcinogen. This can cause liver cancer and cirrhosis.

In conclusion, if the solvent in a homeopathic remedy is ethanol, you risk permanent liver damage if you regularly use homeopathy. If it’s something else like water, then all it is, is a placebo. But now if you’ve read this article, the placebo isn’t really going to work anymore. So you’re welcome: you never have to take homeopathy again.





# THE EXPERIMENT COLUMN

## MICROSCOPIC EXAMINATION OF MOSS

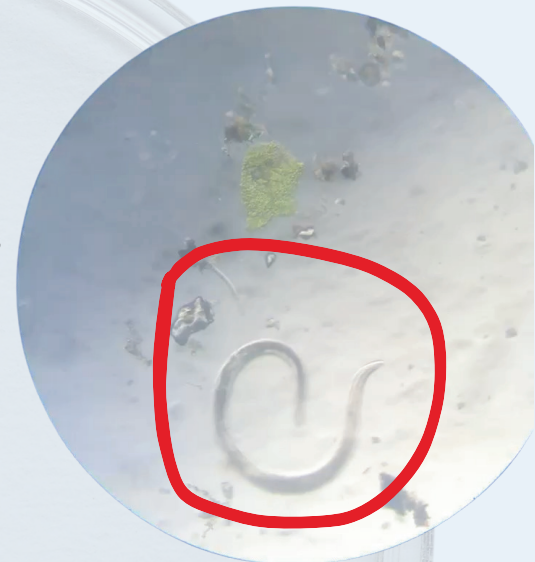
Mosses provide a habitat to many microscopic species, including tardigrades (water bears) - famous for being incredibly resilient, such that they can survive space. Other such residents include Nematodes, *Daphnia*, Algae, etc. With the current weather being remarkably rainy, moss has become quite abundant, and this is the perfect opportunity to observe some of these creatures under a microscope.

### APPARATUS

- Spatula
- Petri dish
- Optical microscope
- Glass slide
- Coverslip
- Dropper
- Purified water (NOT DEIONISED OR DISTILLED)
- Gloves
- Hand sanitiser (for sterilisation of work environment afterwards)
- A coin or small opaque circular object (to place on the illuminator, to enable dark field illumination)

*Bright field image of a nematode from a moss sample. Image quality is poor as it is an extract from a video, where the nematode can clearly be seen swimming in the FOV.*

IMAGE CREDIT: AUTHOR



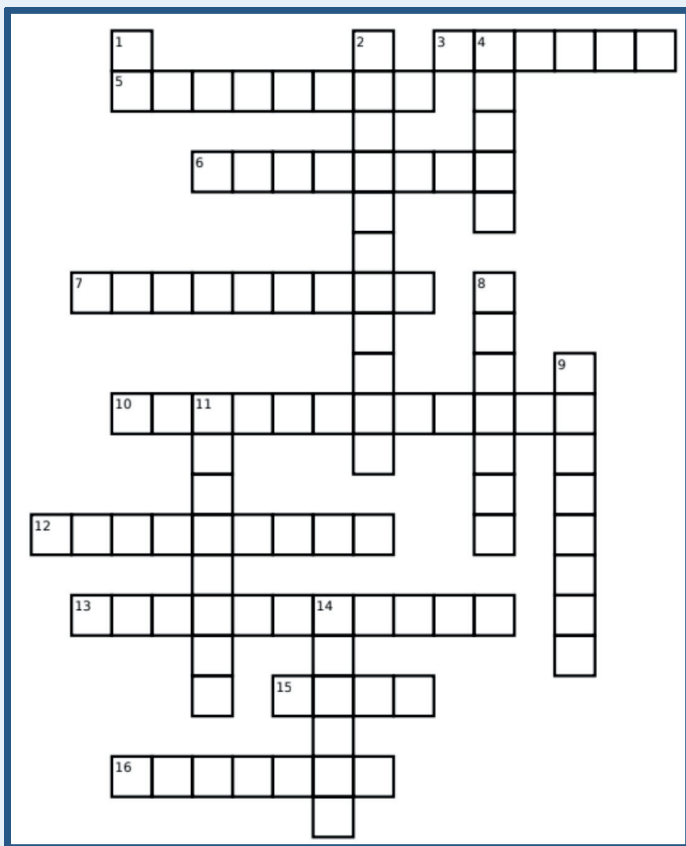
### PROCEDURE

- Locate a growth of moss. Use the spatula to scrape some moss into the Petri dish. Ensure there is a substantial amount of sample.
- Use the dropper to add a small volume of purified water to the Petri dish. It is important not to use deionised or distilled water, as we do not want to give any of the microanimals osmotic shock. It is also important that the amount of water added is not enough to submerge the moss sample.
- Swirl the contents of the Petri dish lightly or mix by pumping the liquid in the dropper. Leave to rest and hydrate for 24hrs.
- After 24hrs, take some liquid from the Petri dish in the dropper and place one drop on a glass slide. Carefully add a coverslip and view the slide under the microscope.
- **GOING FURTHER:** Place the coin (or small opaque circular object) in the centre of the illuminator of the microscope. This blocks the light coming from the center of the illuminator, and as a result only highly scattered light enters the objective lens, as most light does not pass straight through the sample into the lens. This means that the background is dark. The advantage of this is that because tardigrades (etc.) are almost translucent, they can be hard to see under brightfield illumination. With a dark background and dark field illumination, the outlines of the creatures show up bright white. However, this is an additional step and most creatures are usually visible using bright field illumination as well.

This procedure can be utilised for most liquid samples containing living specimens that need to be examined. For example, the same process can be repeated with pond water.



# CROSSWORD



## ACROSS

3. SMALLEST DISCRETE PACKET OF ELECTROMAGNETIC ENERGY.
5. GAS PRODUCED AT THE CATHODE DURING WATER ELECTROLYSIS.
6. SIMPLEST TYPE OF CHEMICAL BOND FORMED BY ELECTRON SHARING.
7. LAW STATING PRESSURE AND VOLUME OF A GAS ARE INVERSELY RELATED.
10. MEMBRANE-BOUND ORGANELLE RESPONSIBLE FOR CELLULAR RESPIRATION.
12. FORCE THAT RESISTS RELATIVE MOTION BETWEEN FLUID LAYERS.
13. GREEN PIGMENT IN CHLOROPLASTS ESSENTIAL FOR PHOTOSYNTHESIS.
15. SCIENTIST WHO PROPOSED THE PLANETARY MODEL OF THE ATOM.

## DOWN

1. SCALE USED TO MEASURE ACIDITY OR ALKALINITY.
2. PROCESS BY WHICH DNA MAKES AN IDENTICAL COPY OF ITSELF.
4. POSITIVELY CHARGED PARTICLE IN AN ATOM'S NUCLEUS.
8. MEASURE OF DISORDER OR RANDOMNESS IN A SYSTEM.
9. SUBSTANCE THAT SPEEDS UP A REACTION WITHOUT BEING CONSUMED.
11. SCIENCE OF CLASSIFYING ORGANISMS BASED ON SHARED TRAITS.
14. UNIT OF FREQUENCY EQUAL TO ONE CYCLE PER SECOND.

## ANSWERS TO LC 1 EDITION

### Across

3. Fungi
5. Troposphere
7. Proton
8. Friction
10. Domain

### Down

1. Dropper
2. Vector
4. Graphite
6. Panthera
9. Gold