



NUCLEUS



LETTER FROM THE PRINCIPAL'S DESK

DEAR READERS,

OUR INSTITUTION, FOUNDED ON THE PRINCIPLES OF EXCELLENCE AND A COMMITMENT OF NURTURING YOUNG MINDS, HAS A RICH LEGACY IN THE FIELD OF EDUCATION. THE SCINDIA SCHOOL HAS ALWAYS STRIVED TO BE AT THE FOREFRONT OF ACADEMIC INNOVATION AND HOLISTIC DEVELOPMENT.



THE NUCLEUS MAGAZINE SERVES AS A TESTAMENT TO OUR SCHOOL'S DEDICATION TO THE PURSUIT OF KNOWLEDGE AND THE ADVANCEMENT OF SCIENCE. IT SHOWCASES THE INQUISITIVENESS AND INTELLECT OF OUR YOUNG SCHOLARS WHO CONTINUE TO EXCEL IN VARIOUS SCIENTIFIC DISCIPLINES. FROM INSIGHTFUL RESEARCH ARTICLES TO THOUGHT-PROVOKING ESSAYS, THIS MAGAZINE REFLECTS THE DEPTH OF TALENT AND ENTHUSIASM WITHIN OUR SCHOOL COMMUNITY.

AS WE NAVIGATE AN ERA OF RAPID SCIENTIFIC AND TECHNOLOGICAL ADVANCEMENTS, IT BECOMES IMPERATIVE FOR US TO EQUIP OUR STUDENTS WITH NOT ONLY KNOWLEDGE BUT ALSO THE ABILITY TO THINK CRITICALLY AND CREATIVELY. THE CONTENTS OF NUCLEUS SCIENCE MAGAZINE RESONATE WITH THIS PHILOSOPHY, PROMOTING A SCIENTIFIC TEMPER AND A THIRST FOR EXPLORATION.

TO THE READERS, I ENCOURAGE YOU TO DELVE INTO THE PAGES OF NUCLEUS SCIENCE MAGAZINE WITH AN OPEN MIND AND A CURIOUS SPIRIT. ENGAGE WITH THE IDEAS PRESENTED HERE, AND LET THEM INSPIRE YOU TO EXPLORE THE WONDERS OF SCIENCE FURTHER.

I AM CONFIDENT THAT THE SCINDIA SCHOOL COMMUNITY WILL CONTINUE TO SHINE BRIGHTLY IN THE WORLD OF SCIENCE AND EDUCATION, MAKING US ALL IMMENSELY PROUD. TOGETHER, WE WILL CONTINUE OUR JOURNEY OF NURTURING YOUNG MINDS AND EMPOWERING THEM TO BE LEADERS AND INNOVATORS IN THE FIELD OF SCIENCE.

LETTER FROM THE VICE PRINCIPAL'S DESK

DEAR READERS,

IT IS MY PRIVILEGE AND DELIGHT TO ADDRESS YOU AS THE VICE PRINCIPAL OF SCINDIA SCHOOL IN THIS EDITION OF NUCLEUS SCIENCE MAGAZINE.

I AM FILLED WITH IMMENSE PRIDE AT THE ACCOMPLISHMENTS OF OUR YOUNG SCHOLARS AND THE DEDICATED FACULTY WHO HAVE NURTURED THEIR TALENTS.



NUCLEUS SCIENCE MAGAZINE IS A TESTAMENT TO THE UNYIELDING SPIRIT OF INQUIRY AND INNOVATION THAT THRIVES WITHIN THE WALLS OF OUR ESTEEMED INSTITUTION. OUR COMMITMENT OF FOSTERING A CULTURE OF SCIENTIFIC CURIOSITY AND EXPLORATION IS EMBODIED IN THE PAGES OF THIS PUBLICATION.

I AM HEARTENED TO SEE THE DIVERSE ARRAY OF ARTICLES AND REFLECTIONS THAT MAKE UP THIS MAGAZINE. IT REFLECTS THE RICH TAPESTRY OF KNOWLEDGE THAT IS CULTIVATED HERE AT SCINDIA SCHOOL, WHERE STUDENTS ARE NOT ONLY IMPARTED WITH SCIENTIFIC FACTS BUT ARE ALSO ENCOURAGED TO THINK CRITICALLY, QUESTION ASSUMPTIONS, AND SEEK OUT ANSWERS.

THE ROLE OF EDUCATORS IS NOT JUST TO TEACH, BUT TO INSPIRE. IN THIS MAGAZINE, YOU WILL FIND THE FRUITS OF THAT INSPIRATION. OUR STUDENTS HAVE EMBRACED THE CHALLENGES AND WONDERS OF SCIENCE, AND THEY ARE EAGER TO SHARE THEIR FINDINGS AND INSIGHTS WITH YOU, OUR ESTEEMED READERS.

TO THE READERS, I URGE YOU TO IMMERSE YOURSELVES IN THE PAGES OF NUCLEUS SCIENCE MAGAZINE. ENGAGE WITH THE IDEAS PRESENTED HERE, QUESTION THEM, AND LET THEM IGNITE YOUR OWN CURIOSITY. IT IS THROUGH THE EXCHANGE OF KNOWLEDGE AND IDEAS THAT WE ADVANCE AS A SOCIETY, AND I BELIEVE THIS MAGAZINE PLAYS A CRUCIAL ROLE IN THAT PROCESS.

IN CLOSING, I WANT TO EXPRESS MY FIRM BELIEF THAT SCINDIA SCHOOL WILL CONTINUE TO BE A BEACON OF EXCELLENCE IN THE REALM OF SCIENCE EDUCATION. OUR STUDENTS ARE THE FUTURE SCIENTISTS, INNOVATORS, AND LEADERS, AND THEIR POTENTIAL KNOWS NO BOUNDS. I AM EXCITED TO WITNESS THE HEIGHTS THEY WILL REACH IN THEIR SCIENTIFIC PURSUITS.



Letter From the Science Department



WE ARE THRILLED TO PRESENT THIS COLLECTION OF ARTICLES, RESEARCH PAPERS, AND INSIGHTS THAT SHOWCASE THE PASSION FOR SCIENCE THAT RUNS DEEP WITHIN OUR INSTITUTION. AS EDUCATORS, IT FILLS US WITH IMMENSE PRIDE TO WITNESS THE INQUISITIVENESS, DEDICATION, AND INTELLECTUAL RIGOR DISPLAYED BY OUR STUDENTS.

THE PURSUIT OF KNOWLEDGE IS AT THE HEART OF WHAT WE DO IN THE SCIENCE DEPARTMENT. WE BELIEVE THAT TRUE EDUCATION GOES BEYOND TEXTBOOKS, ENCOURAGING OUR STUDENTS TO EXPLORE, QUESTION, AND EXPERIMENT. NUCLEUS SCIENCE MAGAZINE IS A TANGIBLE REPRESENTATION OF THIS ETHOS, A PLATFORM WHERE OUR BUDDING SCIENTISTS CAN SHARE THEIR DISCOVERIES AND IDEAS WITH A WIDER AUDIENCE.

IN THIS ISSUE, YOU WILL FIND A DIVERSE RANGE OF TOPICS, FROM CUTTING-EDGE RESEARCH TO REFLECTIONS ON THE WONDERS OF THE NATURAL WORLD. EACH ARTICLE IS A TESTAMENT TO THE CURIOSITY AND INNOVATION THAT THRIVE WITHIN THE WALLS OF SCINDIA SCHOOL. WE HOPE THAT THESE PAGES INSPIRE YOU TO LOOK AT THE WORLD THROUGH THE LENS OF SCIENCE, FOSTERING A DEEPER APPRECIATION FOR THE COMPLEXITIES AND BEAUTY OF OUR UNIVERSE.

WE EXTEND OUR HEARTFELT GRATITUDE TO THE DEDICATED STUDENTS WHO HAVE AUTHORED THESE PIECES, THE TIRELESS EFFORTS OF OUR FACULTY ADVISORS, AND THE COMMITTED EDITORIAL TEAM WHO HAVE WORKED DILIGENTLY TO BRING THIS MAGAZINE TO LIFE. IT IS THEIR COLLECTIVE DEDICATION THAT MAKES NUCLEUS SCIENCE MAGAZINE A REALITY.

TO OUR READERS, WE ENCOURAGE YOU TO DIVE INTO THE ARTICLES WITHIN THESE PAGES WITH AN OPEN MIND AND A THIRST FOR KNOWLEDGE. LET THE STORIES AND DISCOVERIES SHARED HERE IGNITE YOUR OWN PASSION FOR SCIENCE, SPARKING DISCUSSIONS AND INSPIRING FURTHER EXPLORATION.

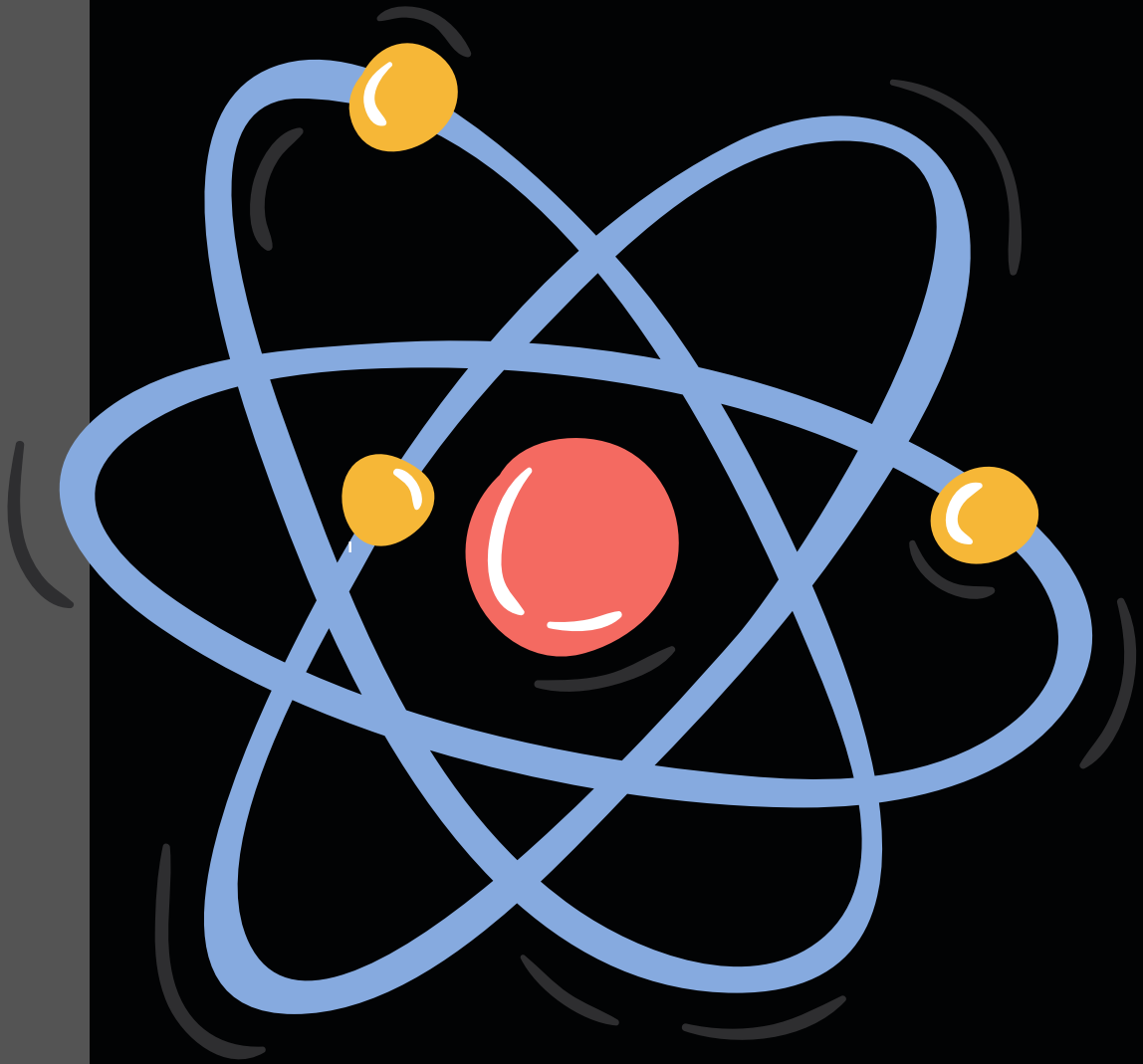
AS WE CONTINUE ON OUR EDUCATIONAL JOURNEY, WE REMAIN COMMITTED TO NURTURING THE NEXT GENERATION OF SCIENTISTS, THINKERS, AND INNOVATORS. THE SCIENCE DEPARTMENT AT SCINDIA SCHOOL IS PROUD TO BE A PART OF THIS ENDEAVOR, AND WE LOOK FORWARD TO WITNESSING THE REMARKABLE CONTRIBUTIONS OUR STUDENTS WILL MAKE TO THE WORLD OF SCIENCE IN THE YEARS TO COME.

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PHYSICS



THE EXISTENCE OF TIME



Time, an intangible and omnipresent force, governs the rhythm of our lives. It is a fundamental concept that underpins our understanding of the universe. It shapes our experiences, gives order to events, and influences our perception of reality. While we often take its existence for granted, the nature of time is far from simple. One intriguing characteristic of time is its unidirectional flow, consistently progressing forward without ever turning back.

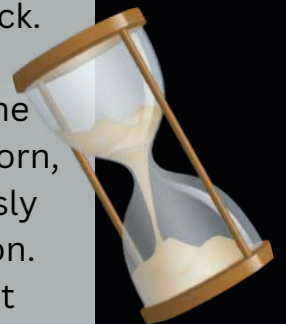
From our daily routines to the grandest cosmic phenomena, the unidirectional nature of time is a universal experience. We are born, we grow, we age, and eventually, we pass away. Time relentlessly moves forward, marching ahead with unwavering determination.


Despite our longing to relive cherished moments or undo past mistakes, time refuses to grant us the ability to reverse its course.

This unidirectional flow of time is evident in various aspects of our lives. Consider the aging process. As the years pass, we witness the irreversible effects of time on our bodies. Wrinkles deepen, hair grey, and vitality wanes. We can never reclaim the youthful vigour of our earlier years, no matter how much we may yearn for it. The hands of the clock only tick in one direction, propelling us relentlessly into the future.

Furthermore, the arrow of time is embedded in the laws of physics.

The second law of thermodynamics, for instance, states that the entropy of an isolated system tends to increase over time. Entropy can be understood as a measure of disorder or randomness within a system. In simpler terms, it illustrates the tendency of things to move from a state of order to a state of disorder. This concept is commonly known as the “arrow of time,” and it aligns perfectly with our daily experiences.





Consider a glass of water that falls and shatters into countless pieces. The shattered glass represents a state of increased disorder or higher entropy compared to the intact glass. If we were to witness the shattered pieces reassembling themselves and leaping back onto the table, we would undoubtedly consider it a miraculous event. However, such an event defies the natural flow of time, as it violates the principle of increasing entropy.

In the realm of cosmology, the expansion of the universe provides another compelling example of time's unidirectional nature. The Big Bang theory suggests that the universe began in a highly ordered and dense state, and it has been expanding ever since. The universe's expansion implies that galaxies, stars, and other celestial objects are moving away from one another. This expansion corresponds to an increase in entropy, as the universe becomes progressively more dispersed and chaotic. It reaffirms the notion that time moves forward, leaving behind an irreversible wake.

The unidirectional flow of time aligns with our intuitions and experiences, and it shapes the narrative of our lives. We often speak of time as "passing" or "running out," emphasizing its linear progression. While time's unyielding march can sometimes evoke a sense of loss or regret, it also offers the opportunity for growth, learning, and the creation of meaningful experiences.

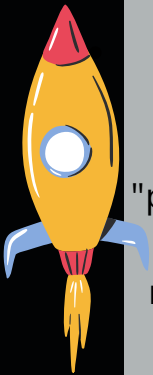
In conclusion, the existence of time manifests as an unbroken, unidirectional flow that carries us forward from the past into the future. Its irreversible nature is apparent in our personal lives, the laws of physics, and even the grand scale of the universe. Time refuses to bend to our desires to revisit the past or alter its course. Embracing the inevitability of time's unidirectional flow can inspire us to make the most of the present, to cherish each passing moment, and to appreciate the beauty of life's transient nature.

-Aadi Dev Goel

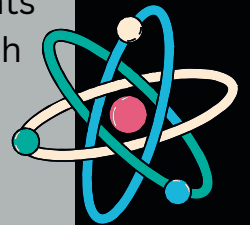


The Celestial Swallower

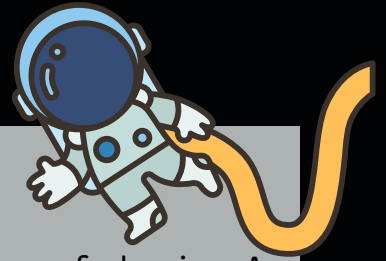
The Celestial Swallower is the nickname given to the most intriguing and destructive force in the cosmos – Black hole. They are a region of space where essentially everything breaks down - be it matter, light or even the laws of physics. They are formed when huge stars collapse on themselves creating a region of infinite gravity and their mass ranging from few times that of sun to billions of times larger. Their study is also considered crucial to the understandings of the origins and fate of the universe.



Black holes come in different sizes, depending on their mass and the amount of matter they contain. The smallest black holes are called "primordial black holes" and are thought to have formed soon after the Big Bang. Stellar black holes, on the other hand, are formed when massive stars exhaust their fuel and collapse under their own weight. These black holes can have masses up to 20 times that of the sun. Supermassive black holes are said to present at the centre of every galaxy, with millions to billions times larger mass. These cosmic giants warp the space-time fabric around them with their huge mass which forces any matter to bend.



One of the most fascinating properties of black holes is the event horizon which is also dubbed as the 'Point of no return' which is self-explanatory, any matter which traverses beyond this line gets trapped in so high gravity that it can't go back. This size of the event horizon is directly linked to its mass. The greater the black hole, the larger the event horizon. Another magnificent characteristic of black holes is the accretion disk which is formed as the matter rotates around the black holes by the pull of gravity. These emit all sorts of radiation including X-rays which can be detected by telescopes and be used to study black holes.

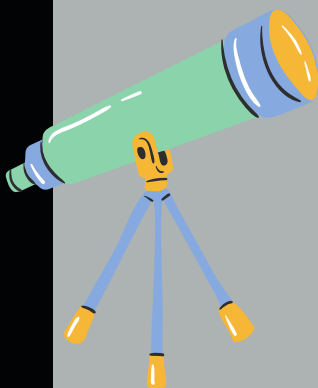


They directly challenge our understanding of the laws of physics. A study by Stephen Hawking proved that black holes despite swallowing everything do evaporate themselves. This is now known as Hawking radiation which means that due to quantum interactions taking place near the event horizon, the black holes slowly radiate out energy, eventually causing them to lose mass and evaporate completely.

Recent advancements in technology have enabled astronomer to study black in greater detail than ever before possible. The Event Horizon Telescope (A global network of synchronized radio observatories) in 2019 released the first image of a black hole at the centre of galaxy M87. This unprecedented image confirmed many long-held theories while at the same time raising many questions about its structure and working.

The research of black holes is still in its infancy, and there is much more to learn about this truly awe-inspiring object, which stands testimony to gravity and the mysteries of the universe itself. Studying this enigmatic object is bound to deepen our knowledge about the cosmos and unlock the various mysteries revolving around it.

- Keshav Jhunjunwala



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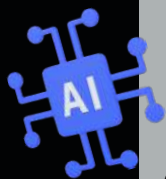


GLORIFICATION OF CHEMISTRY



AI has made significant contributions to the field of chemistry, revolutionizing various aspects of research, drug discovery, and chemical analysis. Here are some ways in which AI has helped advance chemistry:

AI and machine learning algorithms have accelerated drug discovery by predicting the biological activity of molecules and identifying potential drug candidates more efficiently. AI-powered virtual screening methods can quickly analyse and prioritize large databases of chemical compounds, identifying those most likely to interact with a target protein or receptor. This enables researchers to focus on the most promising candidates, streamlining the drug discovery process.



AI models can predict the outcomes of chemical reactions, helping chemists design more efficient and selective reactions. This can lead to the development of new synthetic routes and improve the overall efficiency of chemical synthesis.



AI techniques have been applied to quantum chemistry, enabling more accurate calculations of molecular properties and interactions. AI-based approaches can efficiently handle complex quantum mechanical calculations, leading to a better understanding of chemical phenomena.

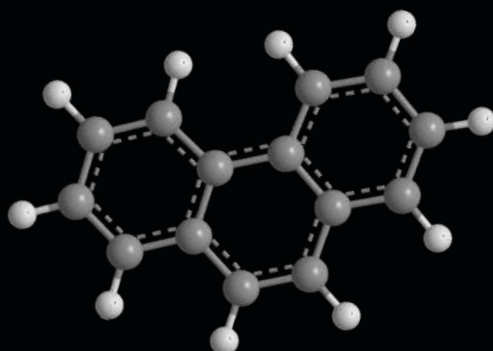
AI helps chemists handle large volumes of data generated in modern research. Machine learning algorithms can analyse and extract patterns from experimental data, leading to new insights and discoveries. AI-driven automation and robotics have improved the efficiency of laboratory processes. Robots equipped with AI algorithms can perform repetitive tasks, such as high-throughput screening and sample preparation, freeing up researchers' time for more complex tasks.

As AI technologies continue to advance, they are likely to play an even more significant role in shaping the future of chemistry research and applications.

-Simarjot Singh Malhi



CHEMISTRY



WATER: FROM THE FORT TO THE CITY

Apart from being an emblem of educational excellence, the Scindia school, one of the most noteworthy achievements of the school is the endeavour of the school to supply water to the Gwalior city from the taals in the school's 160 acre campus.

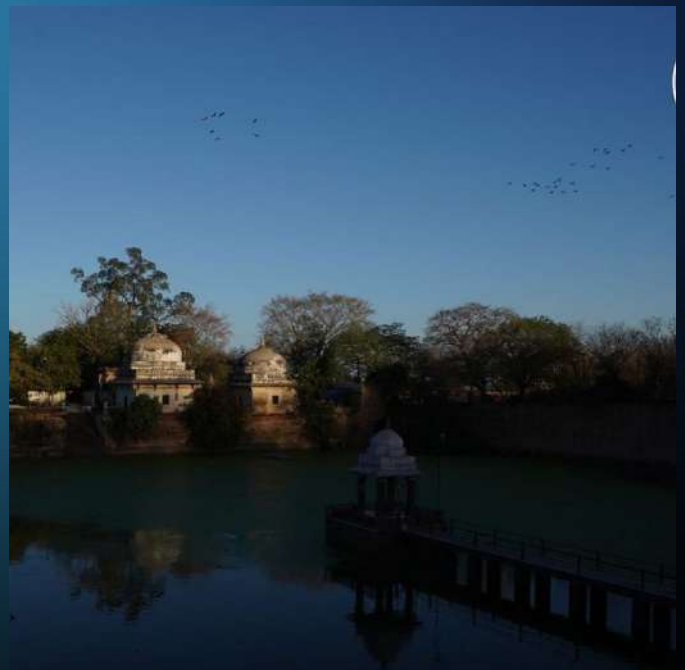
These taals which continuously renew with the rainwater have been already tested for the quality of the water which is of exceptional quality and represents a unique solution to the city's water needs while imparting invaluable lessons in water conservation and ecology to the students.

The school has also taken steps to ensure that the taals do not get contaminated by not disposing any kind of solid or liquid waste in the taals.

The Scindia School's initiative to supply Gwalior with quality water from its Taals serves as a shining example of how educational institutions can play a pivotal role in environmental conservation. By intertwining ecological education with practical initiatives, the school equips its students with not just academic knowledge but also the skills and mindset to address the pressing environmental challenges of the future.

-Sameep Mody

PHOTO GALLERY



CHEMISTRY

BIOLOGY



NEUROSCIENCE AND BRAIN RESEARCH

Introduction to Neuroscience and Brain Research

Neuroscience is a multidisciplinary field that seeks to understand the structure and function of the brain, as well as its role in cognition, behaviour, emotions, and pathology. This scientific discipline encompasses various research areas that involve studying different aspects of the brain. This article will provide an overview of recent advances in neuroscience research by discussing topics such as brain anatomy and function, perception and cognition, neuro-imaging techniques, brain disorders, and mental health treatments.

Brain Development and Ageing

The brain undergoes significant changes throughout the lifespan, from early development to ageing. In infancy and childhood, the brain rapidly develops as neurons form connections through synapses. This process is influenced by genetic factors as well as environmental experiences such as learning and social interactions.

As we age, the brain gradually loses some of its cognitive abilities due to natural processes like neuronal death, degeneration and decreased plasticity. However, research shows that certain lifestyle choices can help maintain healthy brain function in later years. Regular exercise, a balanced diet, and engaging in mentally stimulating activities can all support cognitive health. Understanding how the brain develops over time and how it ages is crucial for developing interventions that promote healthy ageing and prevent or treat neurological conditions associated with ageing.



Brain-Machine Interfaces: Future Directions

The development of complex brain-machine interfaces (BMIs) is a fascinating new area of neuroscience. These devices can decode neural signals and translate them into commands for controlling external devices, such as prosthetic limbs or communication aids for paralysed patients. Recent progress in artificial intelligence and machine learning has significantly improved the accuracy and speed of BMIs, opening up new possibilities for their use in rehabilitation or enhancing human cognitive abilities. For example, Stephen Hawking, even after losing all his motor functions to Amyotrophic Lateral Sclerosis (ALS), discovered, proposed and shared with the world many ground-breaking theories like Hawking Radiation, Singularity Theorems, Theoretical Cosmology, etc. with the help of these kind of machines.

Conclusion

In conclusion, neuroscience research continues to provide fascinating insights into the functioning of our brains at multiple levels, from basic molecular mechanisms to complex cognitive processes that underlie our thoughts. Non-invasive imaging stimulation techniques are allowing us to not only gain a deeper understanding but also devise innovative strategies to diagnose and treat a wide range of disorders impacting mental health and well-being. Future advancements will undoubtedly unveil even greater mysteries surrounding this remarkable organ and may lead to transformative interventions that improve the quality of life for millions of people affected by neurological conditions worldwide.

-Kumar Abhikshit Narayan



BIOLOGY



CLIMATE CHANGE AND ECOSYSTEMS



Climate change is an issue that demands very immediate human attention. The Earth's climate is rapidly changing due to our activities, particularly the burning of fossil fuels and deforestation. One of the most concerning consequences of climate change is its impact on the ecosystem.

Global warming, driven by the increase in greenhouse gas emissions, has led to a rise in average global temperatures. This temperature rise has a profound effect on ecosystems and the species that inhabit them. Ecosystems are intricate networks of plants, animals, and microorganisms that depend on each other for survival. When the equilibrium within these ecosystems is disrupted, the consequences can be severe.



One of the primary impacts of global warming on ecosystems is the change of habitats of various species. Many species are adapted to specific climate conditions and have specific temperature and moisture requirements. As the climate changes, their habitats are transformed, and they struggle to survive in unfamiliar environments. Some species may be able to migrate or adapt, but many others face the risk of extinction.

For instance, polar bears, highly specialized for life in the Arctic, rely on sea ice for hunting seals which is their primary food source. However, with the melting of Arctic ice due to rising temperatures, polar bears are losing their hunting grounds, and their survival is increasingly threatened. This is just one example of how climate change directly impacts biodiversity and alters ecosystems.

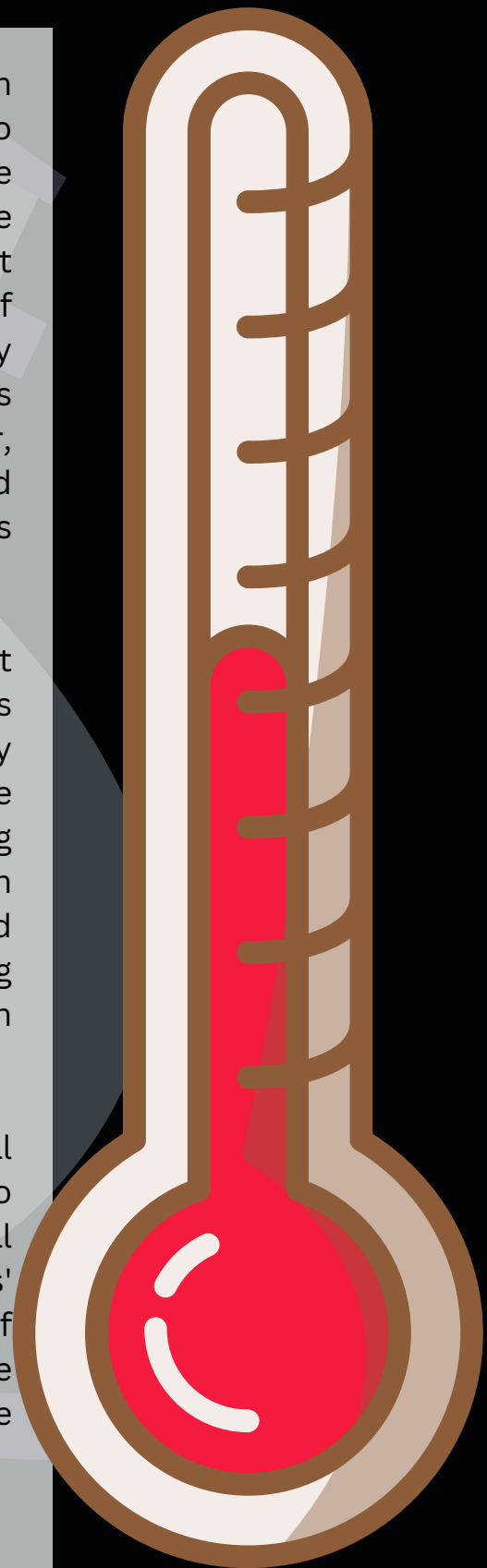


The consequences of climate change on ecosystems and biodiversity are not confined to specific regions or individual species. They have global implications and can disrupt the intricate web of life on our planet. Biodiversity loss not only diminishes the beauty and complexity of our natural world but also threatens the stability and functioning of ecosystems that provide us with essential services, such as clean air, water, and food. Addressing climate change and mitigating its impact on ecosystems requires collective action.

Governments, businesses, and individuals must work together to reduce greenhouse gas emissions, transition to renewable energy sources, and promote sustainable land-use practices. Additionally, protecting and restoring natural habitats, implementing conservation measures, and supporting research and monitoring efforts are vital for preserving biodiversity and building resilience in ecosystems.

In conclusion, climate change is a pressing global issue that poses significant threats to ecosystems and biodiversity. The rise in global temperatures disrupts habitats, alters species' life cycles, and increases the frequency of extreme weather events, all of which have profound consequences for the delicate balance of life on Earth.

-Kumar Abhikshit Narayan



DAISUGI (TRADITIONAL JAPANESE FORESTRY TECHNIQUE)

Daisugi is a traditional Japanese forestry technique that involves growing trees for lumber (wood that has been processed into uniform and useful sizes) in a unique and sustainable way. In this technique, saplings are carefully selected and planted in a way that allows them to grow straight and tall without the need for external support.

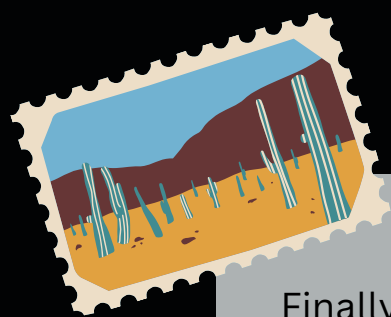
The process begins with selecting a mature, healthy tree with a straight trunk. The top is then cut off, leaving only the branches at the base. This stimulates new growth, and multiple saplings soon emerge from the cut branches. These saplings are carefully pruned (trim by cutting away dead or overgrown branches or stems, especially to encourage growth) and thinned out so that only the strongest ones remain.

As the saplings grow, they are trained to grow straight up, with the branches carefully pruned to create a narrow, vertical channel. This channel allows the trees to grow tall and straight without the need for additional support structures such as poles or wires.

The Daisugi technique has several advantages over traditional forestry methods. First, it allows for an increased yield of high-quality lumber from a single tree. By growing multiple saplings from a single tree, the Daisugi technique allows for more efficient use of resources.

Second, the technique promotes sustainable forestry by reducing the need to cut down mature trees. Instead, the technique allows for the creation of new, straight trees that can be harvested for lumber while the original tree continues to grow and produce new saplings.





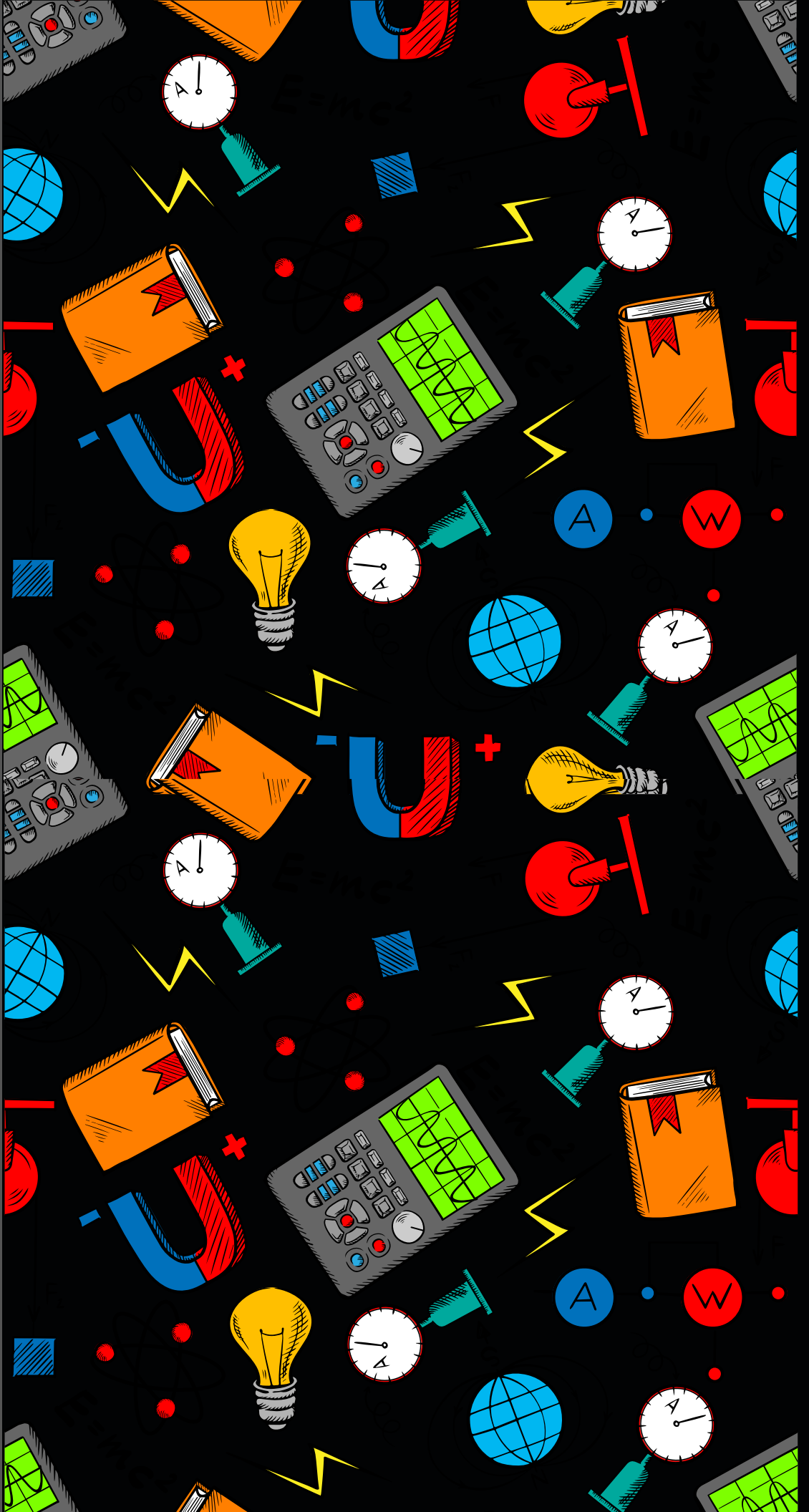
Finally, the Daisugi technique creates a beautiful and unique forest environment. The tall, straight trees with their narrow channels create a visually stunning landscape that is both functional and aesthetically pleasing.

In conclusion, the Daisugi technique is a unique and sustainable way to grow trees for lumber. By carefully selecting and training saplings, this technique allows for increased yields of high-quality lumber while promoting sustainable forestry practices. Additionally, the technique creates a visually stunning forest environment that is both functional and beautiful.

Ms. Mrinal S Bhat

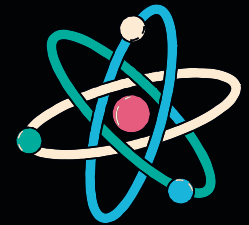


MISCELLANEOUS





MY ARYABHAT ADVENTURE



In the giving month of August 2022, I (Aadi Dev Goel) participated in the first round of Aryabhat Astronomy quiz 2022-23 and bagged the 6th position among the 5350 students who had participated in the same. With 72 points in this round, I stood first in the school and was selected to go to the 2nd round to be held in Bhopal on the 24th of December the same year. In the meantime, I had a lot of time on my hands to practice and that time was used in the best way possible thanks to Mr. Rahul Bhardwaj and Ms. Sangeeta Jain. Finally, the day arrived when I had to participate in the final round. The whole day was spent in the different rounds of this and in the end, we were so tired but excited that we couldn't even sleep. The next morning, the awards were to be given, and when my name was announced on the stage, I was amazed, when I went up on the stage to receive it, I could not help but think about all the people who had helped me achieve 11th position in the state and my award to visit the Kodaikanal Solar Observatory.



My journey to the observatory began at the Bhopal junction where I boarded the train at 3 a.m. in the morning of 29th April 2023, where I met the people accompanying me and enjoyed the 2-day train journey. We reached the Kodaikanal road railway station in the evening of the 30th and arrived at the observatory in the night. The observatory was more than 100 years old and I could see that in its architecture. We saw all the different telescopes there. We saw the KTT (Kodaikanal tunnel telescope), WARM Telescope (White light Active Region Monitor), H-Alpha telescope and the spectroscope. After this, we left for Bengaluru. We arrived at Bengaluru on the morning of 4th May. Here, we visited the Raman Research Institute, Indian Institute of Astrophysics, Nehru Planetarium and VITM (Visvesvaraya Industrial Technology Museum). For this, I would like to thank Rahul Sir, Sangeeta Ma'am, Mrinal Ma'am from our school for their support and guidance and Alok Sir, Pranshu Sir from Aryabhat for helping us out on the trip. I would also like to thank Sanjay sir from Aryabhat for arranging this trip for me.

- Aadi Dev Goyal



5 UNSUNG SCIENTISTS OF INDIA

Names like Newton Einstein and Charles Darwin frequently spring to mind when we think of eminent scientists who have fundamentally changed how we see the universe. But it's important to acknowledge the countless underappreciated experts who have made important contributions to both science and society. In this article, I have highlight five outstanding Indian scientists whose discoveries and developments have had a long-lasting influence on a number of scientific domains.

1. Gopalswamy Doraiswamy Naidu

GD Naidu, known as the "Edison of India," is credited with influencing the Indian Industrial Revolution with inventions such as the first electric motor, mechanical calculator, ticket vending machine, electric razor, fruit juice extractor, kerosene-run fan, and projection TV.

Born in 1893, Naidu left school in Class 3 due to his abhorrence of school's curriculum. At 16, he encountered technology when he saw a 1912 model Rudge motorbike and saved money to buy the motorcycle. He founded Universal Motor Service (UMS) and later owned a fleet of 280 buses. India's first electric motor was created at his electric enterprise, New Electric Works. Naidu formed an indigenous firm for most of his new inventions and devoted most of his later years to philanthropy. On January 4, 1974, GD Naidu passed away.

2. Rajagopala Chidambaram

Nuclear science and energy studies have benefited greatly from the work of famous physicist Rajagopala Chidambaram. He was involved in India's underground nuclear tests in 1974 and 1998 and played a crucial part in the country's nuclear programme.

The policies and regulations governing India's nuclear power plants have been greatly influenced by Chidambaram's knowledge of nuclear security and safety.

3. Narinder Singh Kapany

Kapany, a Punjab-born scientist, is considered the 'Father of Fibre Optics' for his discovery of communication through optical fibres. His work paved the way for the internet and medical marvels like laser surgeries and endoscopic imaging. Kapany studied at the University of Agra and later joined Imperial College, London.

He successfully transmitted images over optical fibres during his PhD and coined the term 'fibre optics' in 1955. Kapany later joined the University of Rochester and became a successful entrepreneur in Silicon Valley, USA. He is credited with over 100 patents and runs a philanthropic organization called the Sikh Foundation.

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4. Anna Mani

Anna Modayil Mani, a brilliant meteorologist and physicist from Travancore, Kerala, revolutionized the scientific field by creating groundbreaking achievements. Born in 1918, she embraced reading and education, pursuing an honors degree in physics at Presidency College in Madras. She conducted research at Sir CV Raman's lab, which won the Nobel Prize, and wrote a thesis on diamond luminescence. Despite facing discrimination at Madras University, Mani continued her studies at Imperial College in London and later focused on meteorological instruments. In 1948, she returned to India and worked at the Indian Meteorological Department in Pune, designing radiation instrumentation and constructing an instrumentation tower and a meteorological observatory. Her studies primarily examined the relationship between clouds, atmospheric aerosols, and climate change. Guidelines for air quality monitoring and pollution control in India were developed in large part because to Mani. Her work continues to have an impact on laws that are intended to lessen the damaging impacts of air pollution on the environment and human health. Mani passed away on August 16, 2001, after suffering a paralyzing stroke in 1994.

5. Prafulla Chandra Ray

Prafulla Chandra Ray, a well-known scientist and professor, is frequently referred to be the "founder of modern chemistry in India. He conducted extensive research in a variety of fields, including organic chemistry, chemical technology, and pharmaceuticals.

India's first pharmaceutical enterprise, the Bengal Chemical and Pharmaceutical Works, was established by Ray. His initiatives to encourage domestic chemical and pharmaceutical production set the groundwork for these industries to become self-sufficient.

Conclusion:

The achievements of these unsung Indian scientists are a testament to their intellectual prowess and enthusiasm. Although they might not have gotten as much credit as some of their peers, their influence on science and society is undeniable. It is essential to highlight their accomplishments in order to motivate younger generations to push the boundaries of knowledge and develop research in India and abroad.

-Vikas Soni, IP

MISCELLANEOUS

An Interview of Dr. Ebenezer Chellasamy -

Dr Ebenezer is a Radio Astronomer, a scientist, and the current director of the Kodaikanal solar Dr. Ebenezer Chellasamy is a dedicated resident scientist at the Kodaikanal Observatory, specializing in Solar Radio Astronomy. With a profound passion for understanding our sun's intricate phenomena, Dr. Chellasamy contributes significantly to the field, using advanced radio telescopes to unveil the mysteries of solar activity and its impact on our planet.

Question- What ignited your passion for the field of radio astronomy?

Ans- When I was young, I used to enjoy playing around with electric objects and circuits, whenever someone gave me money I used to go out and buy nuts, bolts, wires, batteries, and basically, everything used by electricians. This led me to start breaking and putting things apart and making them back, slowly, I started doing the same With radios, antennas, and so on. This got me interested in radio astronomy.

Question- What are your career goals in this field of research?

Ans- As you know two of the biggest discoveries in the observatory have been the discovery of the Evershed effect by John Evershed, and the the discovery of the Wilson Bappu effect by Olin J. Wilson and Professor M. K. Vainu Bappu. My goal is to have such a notable discovery and publish it in the very same journal in which Evershed published his discovery.

Question- What is the scope of your research in this field?

Ans-To create a path towards achieving a complete understanding of the universe, some great people cut trees in the forest to create that path, and some remove the branches, but a person like me, I am just cutting a few leaves in my research. But someday, I will cut another tree in that forest.

Question- How do you think that the Kodaikanal solar observatory is helping in these fields of research?

Ans-This observatory has existed for a hundred years and has had two of the greatest discoveries. This building has existed for so long and has seen many aspiring scientists in these times, it was India's center of astronomy for more than half a century. I think of it as the start of real astronomy in this country.

Question- Our final question to you is what is your advice you all the students to pursue cosmology, and how it will help them in the future?

Ans-I believe that if you have an interest in the field of astronomy keep it burning, always be curious to learn more and if you don't like or enjoy it, No one is forcing you.

Adi Dev Goyal



Competitions held in – 2022-23

1. PM KHAR – MAYANK CHOUDHARY

2. ASTRONOMY QUIZ – AADI DEV GOEL (CLASS 7TH)

3. INNOVENTURE, PUNE 2022-23 –

A. ARNAV JOSHI – BEST SPOT LIGHT NATIONAL LEVEL WINNER (1ST PRIZE) – CLASS 9TH

B. LAKSHYA TULSIYAN – NATIONAL LEVEL 2ND RUNNER UP – CLASS 7TH

C. KUSHAGR ARORA - NATIONAL LEVEL 2ND RUNNER UP – CLASS 7TH

4. JUNIOR INTER - HOUSE SCIENCE QUIZ COMPETITION, 2022.

WINNER – KD HOUSE

PARTICIPANTS NAME –


1. AADI DEV GOEL (CLASS 7TH)

2. RISHIT SHARMA (CLASS 7TH)

3. DEV CHAKROBARTY (CLASS 7TH)

4. AYUSH AGNIHOTRI (CLASS 6TH)

5. RUDRAKSH BANSAL (CLASS 6TH)



5. CLIMATE CHANGE OLYMPIAD COMPETITION, 2022 – SAMEEP MODY AND KESHAV JHUNJHUNWALA GOT 62ND RANK OVERALL IN THE FINAL QUIZ COMPETITION IN WHICH 100000 PARTICIPANTS PARTICIPATED ALL OVER THE WOLRD.

6. SAM PITRODA AWARD – MEDHANSH TRIVEDI (CLASS 10TH)

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