The Manik Public School Maniknagar

MAGAZINE

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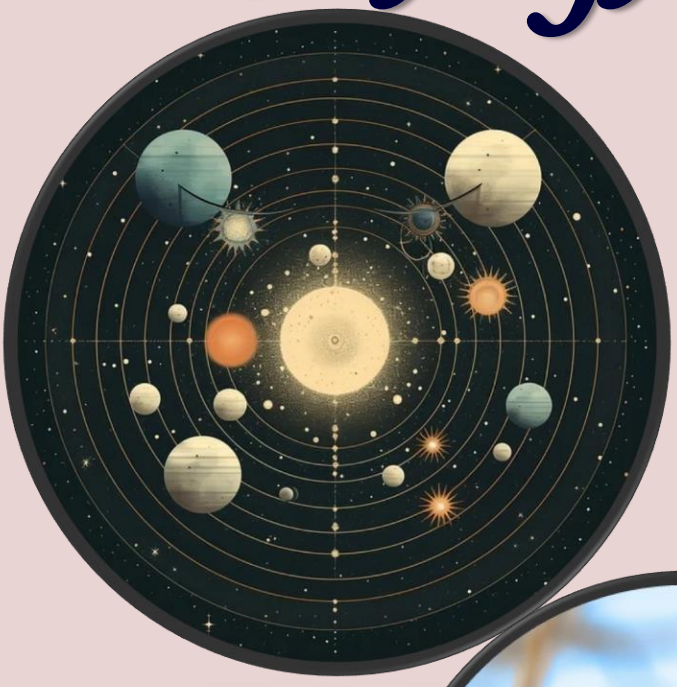


"Vigyan Echoes"

Unleash your curiosity of Science

Department of Science

Dear Students, Teachers, and Parents,

As we step into a new year, I am thrilled to reflect on the incredible achievements of our Science Department. Our students have consistently demonstrated a passion for discovery, a thirst for knowledge, and a dedication to excellence.

Throughout the year, our students have participated in various science competitions, fairs, and exhibitions, showcasing their innovative projects and experiments. Their hard work and creativity have earned them accolades and recognition, making us proud. From designing sustainable solutions to environmental problems to developing cutting-edge technologies, our students have demonstrated a remarkable ability to think creatively and critically.

Our department has also organized several workshops, seminars, and guest lectures, providing our students with opportunities to engage with renowned scientists, experts, and industry professionals. These interactions have not only broadened their horizons but also inspired them to pursue careers in science, technology, engineering, and mathematics (STEM).

As we move forward, we will continue to strive for excellence, pushing the boundaries of scientific inquiry and exploration. We will encourage our students to think critically, solve problems creatively, and collaborate effectively. We will also continue to provide opportunities for our students to engage in hands-on learning experiences, such as science fairs, robotics competitions, and environmental projects.

I would like to extend my gratitude to our students, teachers, and parents for their unwavering support and enthusiasm. Your encouragement and motivation have played a significant role in our department's success, and we are grateful for your partnership.

I also want to thanks our worthy President Sir and our dearest Principal Sir , to encourage and provide the suitable platform for the students to showcase their talent in different field of science education.

As we embark on a new year, we are filled with excitement and anticipation. We look forward to exploring new frontiers, discovering new ideas, and making new breakthroughs. We are confident that our students will continue to excel, and we are committed to providing them with the support and resources they need to succeed.

Happy New Year!

Dr. Sangeet Bhardwaj
Director of Educational Program & Head of Science Department

Birds in Our Campus This Winter

As winter settles in, our campus becomes a vibrant haven for a variety of birds, each contributing to the natural beauty and ecological balance of the environment. Among the many species gracing our surroundings, the Yellow-footed Green Pigeon (*Treron phoenicoptera*), the Lesser Golden-backed Woodpecker (*Dinopium benghalense*), and the Indian Golden Oriole (*Oriolus kundoo*) stand out for their vivid colors and fascinating behaviors.

In this second edition of *Science Magazine*, we continue to explore the diverse aspects of science that shape our world. As Chief Editor, I am excited to share this edition, hoping it encourages a deeper appreciation for our natural world and inspires efforts to protect it for future generations.

Yellow-footed Green Pigeon (*Treron phoenicoptera*)

1. Yellow-footed Green Pigeon (*Treron phoenicoptera*)

The Yellow-footed Green Pigeon, or Hariyal, is a medium-sized bird known for its striking green and yellow plumage. Commonly found in wooded areas, this frugivorous bird plays a vital role in seed dispersal, helping to maintain the health of our campus greenery. Its soft cooing calls can often be heard from the treetops, adding a soothing ambiance to the winter air.

Lesser Golden-backed Woodpecker (*Dinopium benghalense*)

2. Lesser Golden-backed Woodpecker (*Dinopium benghalense*)

The Lesser Golden-backed Woodpecker is an eye-catching bird with its black-and-white plumage and golden back. Known for its rhythmic drumming on tree trunks, it uses its powerful beak to search for insects in the bark. By controlling insect populations, this woodpecker helps maintain the balance of the local ecosystem, and its presence is an important sign of a healthy environment.

3. Indian Golden Oriole (*Oriolus kundoo*)

The Indian Golden Oriole, with its brilliant yellow feathers and contrasting black wings, is a striking bird that brightens up our campus. Often seen flitting through the trees, the oriole feeds on fruits, nectar, and insects. Its melodious song adds to the symphony of nature that fills the air during the winter months, making it a delightful sight and sound for birdwatchers.

Together, these birds—the Yellow-footed Green Pigeon (Treron phoenicoptera), the Lesser Golden-backed Woodpecker (Dinopium benghalense), and the Indian Golden Oriole (Oriolus kundoo)—bring a splash of color and life to our campus this winter.

Indian Golden Oriole (*Oriolus kundoo*)

SriRam Shastri
Chief Editor, Science Department
PGT Biology

Welcome to this edition of *Vigyan Echoes*! As the student editor, I am delighted to present a curated selection of articles that highlight the latest advancements and intriguing discoveries in science. This issue brings together the fresh perspectives of our talented student contributors, each exploring a unique facet of the scientific landscape. Our goal is to make complex ideas accessible and engaging, and I hope these stories spark your curiosity and inspire a deeper appreciation for the ever-evolving world of science. Thank you for joining us on this exciting journey of exploration and discovery.

Shivaraj Naik
XII Science & Student Editor

Cech's Pioneering Discoveries The Dawn of the RNA World: Sidney Altman and Thomas

The concept of the RNA world hypothesis revolutionized our understanding of molecular biology by suggesting that early life forms may have relied on RNA both to store genetic information and to catalyze biochemical reactions. This paradigm shift was largely fueled by the groundbreaking research of Sidney Altman and Thomas Cech, whose discoveries in the 1980s provided compelling evidence for RNA's catalytic capabilities and self-replicating potential.

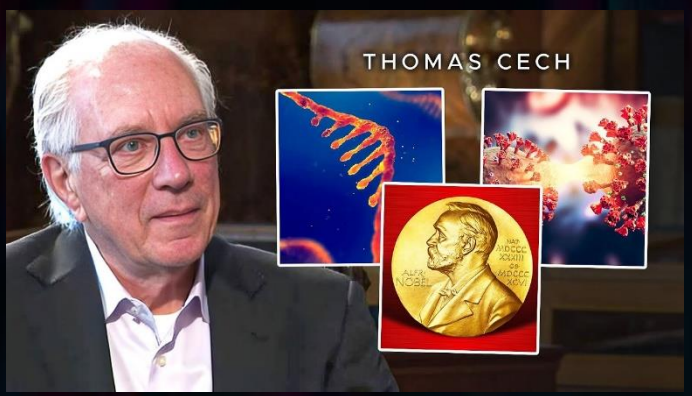
Thomas Cech's Pioneering Research

Around the same time, Thomas Cech made another pivotal discovery that further advanced the RNA world hypothesis. In 1982, Cech published a landmark paper in *Science* titled "The Self-Splicing of Tetrahymena rRNA: Evidence for an Intramolecular Catalytic Reaction." Cech's research focused on the rRNA of the single-celled organism *Tetrahymena*, revealing that certain RNA molecules could catalyze their own splicing without the need for proteins.

Sidney Altman's Contributions

Sidney Altman's research primarily focused on ribozymes, RNA molecules with enzymatic properties. In 1983, Altman and his colleagues published a seminal paper in *Science* titled "Ribonuclease P: An Enzyme with a Novel Structure." This paper demonstrated that ribonuclease P, an enzyme involved in the processing of precursor tRNA, was actually composed of RNA and protein components. Altman's work showed that RNA could act as a catalyst, challenging the prevailing notion that only proteins could perform such functions.

Altman's findings were groundbreaking because they highlighted RNA's dual role as both genetic material and a catalytic agent. This discovery provided crucial support for the RNA world hypothesis, which posits that early life forms may have used RNA for both information storage and biochemical catalysis before the evolution of DNA and proteins.



Cech's discovery of self-splicing introns was a major breakthrough. It demonstrated that RNA could not only act as a genetic repository but also possess enzymatic activity. This finding provided strong evidence that RNA could function both as a genetic material and as a catalyst, supporting the idea that early life forms could have relied on RNA alone for their biological process.

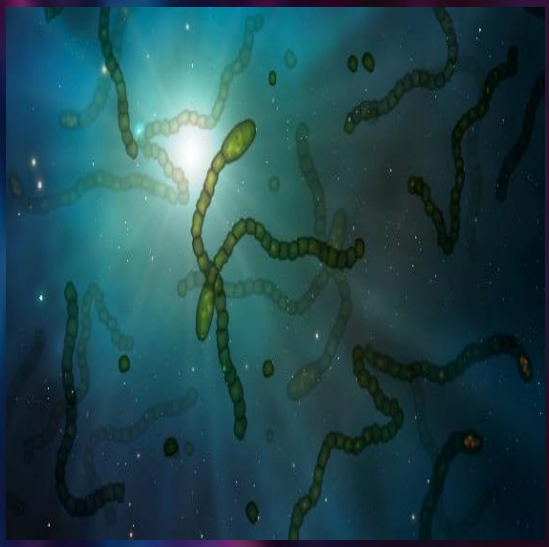
The Impact of Their Discoveries

The combined work of Altman and Cech fundamentally altered the scientific understanding of RNA and its role in the early evolution of life. Their discoveries paved the way for the RNA world hypothesis, which suggests that RNA molecules could have been the precursors to the more complex systems of DNA and proteins seen in modern organisms.

The implications of their research extend beyond the origins of life. Understanding RNA's catalytic functions has led to advancements in various fields, including:

1.Molecular Biology : The discovery of ribozymes has expanded the toolkit available to molecular biologists, allowing for the development of RNA-based tools and techniques.

2.Genetic Engineering: RNA-based technologies, such as RNA interference (RNAi), have become critical tools for gene regulation and therapeutic interventions.



3.Astrobiology: The RNA world hypothesis provides insights into the potential for life elsewhere in the universe, suggesting that RNA-based life forms could have arisen in extraterrestrial environments.

Sidney Altman and Thomas Cech's pioneering work on self-replicating RNA molecules has had a profound impact on the field of molecular biology. By demonstrating that RNA can act both as a genetic material and a catalyst, their research provided compelling support for the RNA world hypothesis and reshaped our understanding of the origins of life. Their discoveries continue to influence research in genetics, biotechnology, and astrobiology, underscoring the significance of RNA in the story of life's evolution.

Shivaraj Naik
XII Science

Scientific Insights into the Psychological and Social Benefits of Compassionate Behavior

To foster a more compassionate and fulfilling life, it's essential to integrate acts of kindness and understanding into daily interactions. Forgiveness, tolerance, and kindness are not just moral virtues but also contribute to psychological and social well-being. Research in psychology and neuroscience suggests that acts of kindness can enhance both personal happiness and social bonds.

Forgiveness is particularly beneficial, reducing stress and improving mental health. Studies indicate that forgiving others can decrease feelings of anger and resentment, leading to better emotional regulation and overall well-being.

Kindness and empathy towards others, including both strangers and loved ones, also play a crucial role in enhancing our own happiness. Engaging in compassionate behaviors, such as offering a seat to someone on public transport or giving a thoughtful gift, fosters positive social interactions and contributes to a supportive community.

Respect and consideration for family members, such as showing deference to a father or making a mother proud through one's conduct, are critical for nurturing strong familial relationships. Such interactions not only support family cohesion but also promote individual self-esteem and personal growth.

The key is to perform these acts of kindness without anticipating rewards. When we focus on the well-being of others, we naturally enhance our own satisfaction and happiness. Engaging in daily acts of kindness and consideration is not only a moral choice but also a scientifically supported method for improving both personal happiness and social harmony.

By incorporating these practices into our daily lives, we not only contribute to the well-being of others but also enrich our own lives, creating a positive feedback loop of compassion and happiness.

Lavanya Manjunath Pitgond
VII C

THE LITTLE-KNOWN WORLD OF FLIES!

What makes flies different from a dragonfly or a butterfly? How do the lovely iridescent bluebottle and greenbottle flies help solve murders? What do insect bites, galls and chocolate have in common? Do flies have taste-buds? How do we introduce flies in science classrooms? This article explores the fascinating world of true flies, their incredible variety, and the diversity of services they provide us with, ending with an activity that teachers can use to unravel one aspect of the life of flies to students.

Introduction

"To know the fly is to share a bit in the sublimity of Knowledge." - Prof Vincent G Dethier Flies generally conjure a vision of dirt, disease and disgust.

Our introduction to this image of flies is in school. A student is introduced to the humble housefly in a conclusive manner, leaving one with the impression that all flies are repulsive creatures. Limited scientific information about houseflies is accompanied by a vivid description of the mouth parts being used to drink from muck, thereby leaving an indelible image of a fly only as a vermin. A student's next encounter with the fly is during a lesson on health, as the carrier of diseases, thereby nailing the coffin on the possibility of flies being anything but loathsome creatures.

No doubt there are many flies that bite and spread disease. But do all flies deserve such an image?

Sidhani
[Class X B]

Brown Muscid Fly

The Formation of Auroras: Nature's Light Show

Auroras, commonly known as the Northern Lights (aurora borealis) in the Northern Hemisphere and the Southern Lights (aurora australis) in the Southern Hemisphere, are stunning natural light displays that have fascinated humans for centuries. These mesmerising phenomena occur when charged particles from the Sun interact with Earth's magnetic field and atmosphere, creating vibrant, dancing lights in the sky.

How Auroras Form

The formation of auroras begins with the Sun. The Sun constantly emits a stream of charged particles known as the solar wind, which travels across space and occasionally reaches Earth. When these charged particles encounter Earth's magnetosphere, the magnetic field that surrounds and protects our planet, they are guided towards the polar regions where the magnetic field lines converge.

As the charged particles—primarily electrons—travel along these magnetic field lines, they collide with atoms and molecules in Earth's upper atmosphere, primarily oxygen and nitrogen. These collisions transfer energy to the atoms and molecules, exciting them to higher energy states. When these excited atoms and molecules return to their normal state, they release this energy in the form of light, creating the colourful displays we see as auroras.

The Colours of Auroras

The specific colours of auroras depend on the type of gas being excited and the altitude at which the interactions occur. Oxygen atoms at higher altitudes (around 200-300 kilometres) typically emit a red light, while at lower altitudes (around 100 kilometres), they produce a green light, which is the most common colour seen in auroras. Nitrogen molecules can produce blue or purplish-red light, depending on the energy of the collision.

Auroras and Space Weather

The intensity and frequency of auroras are influenced by solar activity. During periods of high solar activity, such as solar flares or coronal mass ejections (CMEs), the solar wind becomes more intense, sending a greater number of charged particles towards Earth. This can lead to more frequent and brighter auroras, sometimes visible much farther from the poles than usual.

Conclusion

Auroras are a breathtaking reminder of the dynamic interactions between the Sun and Earth. These natural light displays not only provide a visual spectacle but also serve as a visible sign of the complex processes occurring in our planet's magnetosphere and atmosphere. Whether seen from the Arctic Circle or the Antarctic, auroras continue to captivate and inspire those lucky enough to witness them.

Paveen Sikhinam
XII Science

MEDICAL PHYSICS

The Silent Revolution: How Medical Physics is Transforming Healthcare

In the bustling corridors of hospitals and clinics worldwide, there's a silent revolution underway—one that is transforming how we diagnose, treat, and ultimately understand diseases. This revolution is driven by medical physics, an interdisciplinary field that merges the precision of physics with the intricacies of medicine.

The Role of Medical Physics

Medical physics stands at the intersection of technology and healthcare. It's a field that involves applying physics principles to develop new medical devices, improve diagnostic techniques, and enhance the efficacy of treatments. From the x-ray machines that allow us to peer inside the human body to the sophisticated radiation therapies that target cancer cells with pinpoint accuracy, medical physics is foundational to modern medicine.

Imaging: Seeing the Unseen

One of the most visible contributions of medical physics is in the realm of medical imaging. Techniques such as Magnetic Resonance Imaging (MRI), Computed Tomography (CT), and Positron Emission Tomography (PET) scans have revolutionized diagnostics. These technologies allow physicians to visualize the inside of a patient's body without invasive procedures, offering unprecedented detail that can lead to early diagnosis and better treatment outcomes. MRI, for example, utilizes powerful magnets and radio waves to create detailed images of organs and tissues. The underlying physics—nuclear magnetic resonance—was a concept initially explored for fundamental scientific research, yet it has found a life-saving application in medical diagnostics. Similarly, CT scans combine x-ray images taken from different angles to create cross-sectional views of bones, blood vessels, and soft tissues, providing more information than traditional x-rays.

Radiation Therapy: Precision in Treatment

Beyond diagnostics, medical physics plays a critical role in treatment, particularly in radiation therapy for cancer. Here, physics is used to direct high-energy radiation beams at tumours, damaging the DNA of cancer cells and inhibiting their ability to reproduce. Advances in medical physics have led to the development of techniques such as Intensity-Modulated Radiation Therapy (IMRT) and Image-Guided Radiation Therapy (IGRT), which allow oncologists to target tumours with millimetre precision, sparing surrounding healthy tissues.

Innovation on the Horizon

The future of medical physics promises even more groundbreaking innovations. Researchers are exploring the potential of proton therapy, a type of radiation treatment that uses protons rather than x-rays, allowing for even more precise targeting of tumours with less damage to surrounding tissue. Additionally, advancements in artificial intelligence (AI) are being integrated with medical imaging and treatment planning, enhancing accuracy and opening new possibilities in personalized medicine.

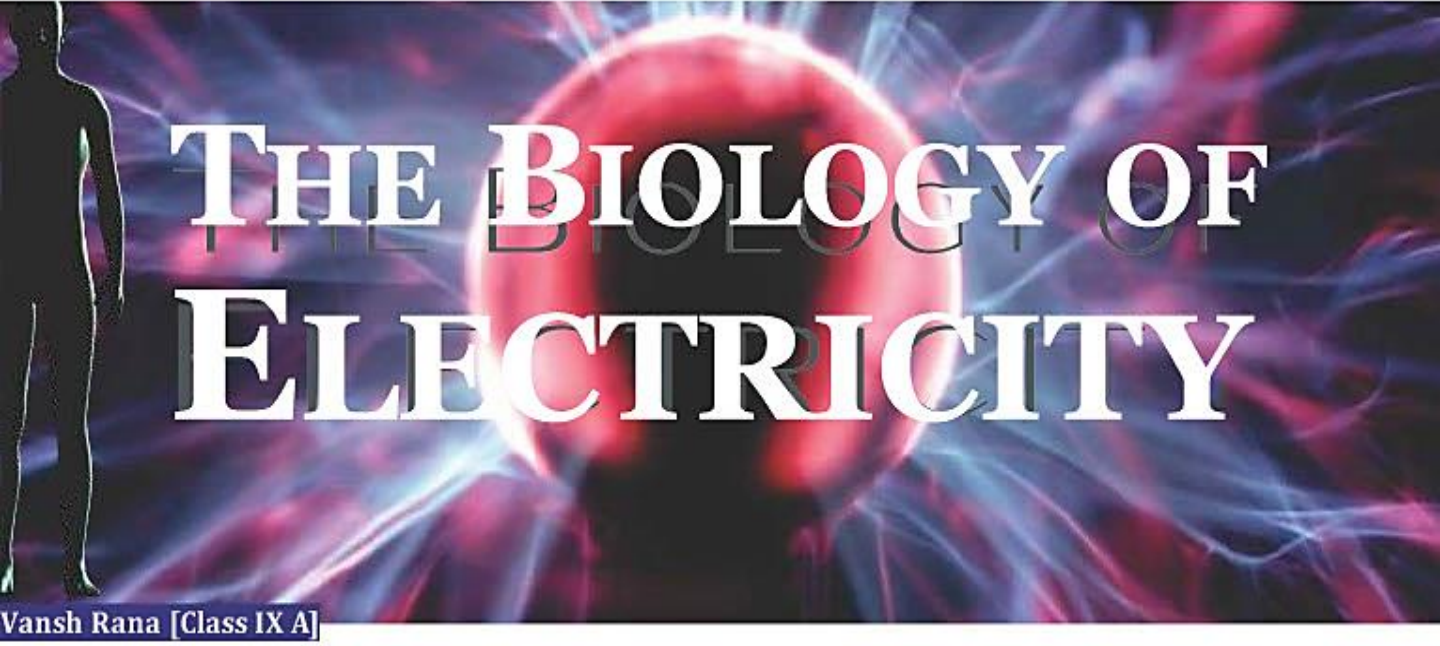
The Challenges Ahead

However, with these advancements come challenges. Medical physicists must constantly adapt to new technologies and ensure that these innovations are implemented safely and effectively. The rapid evolution of medical devices also necessitates ongoing education and training for healthcare professionals to keep pace with the latest developments. Moreover, there is a growing need for collaboration between physicists, engineers, clinicians, and policymakers to navigate the ethical and regulatory landscapes surrounding new technologies. This interdisciplinary approach is essential to ensure that the benefits of medical physics are accessible to all patients, regardless of geographic or economic barriers.

Conclusion

Medical physics is a vital yet often overlooked field that continues to push the boundaries of what is possible in healthcare. As technology advances, the role of medical physicists will only become more critical, ensuring that the innovations of tomorrow become the life-saving treatments of today. In the grand tapestry of modern medicine, medical physics is the thread that weaves science into the fabric of patient care, making the invisible visible and turning what was once thought impossible into reality.

Devilal Kainwal
PGT Physics



The Biology of Electricity

Vansh Rana [Class IX A]

What role does electricity play in the functioning of the human body? While electricity is mainly explored as a topic in Physics in school science, and touched upon in Chemistry, is it also important to touch upon the importance of electricity in Biology, and specifically in sustaining life? This article examines the criticality of electricity in the functioning of various processes in the human body.

Electricity is defined by the Wikipedia, as 'a form of energy resulting from the existence of charged particles (such as electrons or protons), either statically, as an accumulation of charge, or dynamically, as a current'.

In the last century, Electricity and its applications have transformed society. Today, every second of every day, unconsciously, without even realizing it, we use some gadget, or tool, or machine, powered by electricity. If we were to ask children,or even adults, to name something which is powered by this awesome force, it would be verysimple for them to reel off everything from computers, to light bulbs, to machineries, to refrigerators, to mobile phones. But, I suspect, none of them would name the most complex electrically powered machine in the world. In fact, we all use this machine every single moment of our lives. Yes, I am talking about the human body.

The human body, or the body of any living organism for that matter, would count under the most complex of machineries powered by the force of electricity.

Of course, I am sure that at a fundamental level, most people know that every activity in the body – from the beating of the heart, to sensing of our surroundings; from the complex cognitive functioning of the brain, to the love one feels – is powered by chemical reactions. And every chemical reaction occurs due to the complete or partial exchange of electric charges. Thus, even though most children, and even many adults, do not consciously think about it, it is apparent that electric charges play an important role in the formation of life, as it does in determining the very structure of all matter.

However, what is not as apparent is all the different ways in which electricity sustains life. In this article, I will explore some examples of this.

Proteins – cellular workhorses

One of the roles played by electricity in the bodyis in the functioning of one of the key building blocks of life – proteins, the workhorses in cells. There are tens of thousands of proteins in our body that perform a mindboggling number of functions at the cellular level, every second. These include...

Scientists Found A Way To Turn Cancer Cells Back Into Normal Cells

Researchers in Korea have made a groundbreaking discovery in cancer treatment, potentially revolutionizing how we approach this complex disease. Instead of focusing on killing cancer cells, which often leads to harmful side effects, they have found a way to revert them back to a healthy state. Using a digital model of the gene network in normal cells, they identified key molecules that control cell differentiation, the process by which cells become specialized. By suppressing these molecules in colon cancer cells, they successfully transformed them back to a normal-like state, effectively eliminating the cancer threat without destroying any cellular material. This innovative approach was tested digitally, through molecular experiments, and in mice, with promising results. The researchers believe that this discovery opens up new possibilities for cancer therapy, where the goal is not just to kill cancer cells but to restore them to their original healthy function. This could lead to treatments with fewer side effects and improved outcomes for patients.

The team also used their digital modeling program to identify similar molecules in mouse brains, suggesting that this technique could be applied to other types of cancer as well. This breakthrough not only offers a new perspective on cancer treatment but also provides a powerful tool for understanding the complex processes involved in cell development and differentiation. The ability to manipulate these processes could have far-reaching implications for regenerative medicine and other fields. While the research is still in its early stages, it represents a significant step forward in the fight against cancer, offering hope for more effective and less harmful treatments in the future. The researchers are optimistic that their findings will pave the way for a new era of cancer therapy, where the focus is on restoring health rather than simply destroying disease. This approach could potentially transform the way we treat cancer, leading to better outcomes and improved quality of life for patients worldwide.

Compiled By
Ms. Sheena Dhiman
PGT Chemistry

From Kerosene Lamps to Electric Lights: The Journey of Electricity

Electricity is an integral part of modern life and the most widely used form of energy. Humans have learned about electricity from nature, as it is a fundamental aspect of the natural world. In the past, many cities and towns were built alongside waterfalls, which were primary sources of mechanical energy that powered water wheels for various tasks. Before the advent of electricity over 100 years ago, homes were lit with kerosene lamps, food was preserved in iceboxes, and rooms were heated by wood-burning or coal-burning stoves.

The understanding of electricity began with Benjamin Franklin's famous experiment involving a kite during a stormy night in Philadelphia. Gradually, the principles of electricity became clearer. Thomas Edison profoundly impacted daily life by perfecting the electric light bulb in 1879. Prior to this, direct current (DC) electricity was used for outdoor lighting. In the late 1800s, Nikola Tesla pioneered the generation, transmission, and use of alternating current (AC) electricity, which can be transmitted over much greater distances than direct current. Tesla's innovations brought indoor lighting to homes and powered industrial machines.

Despite its critical role in our daily lives, most of us rarely pause to consider what life would be like without electricity. Like air and water, we tend to take electricity for granted. Every day, we rely on electricity to perform many tasks, from lighting and heating or cooling our homes to powering our televisions and computers.

Dhaneswari
VIII C

Prashanti's Ode to the Animal Kingdom

In the vast expanse where life's stories blend,
Prashanti explores where the wild dreams wend.
From oceans deep to mountains high,
The animal kingdom stretches wide, reaching the sky.

From single-celled wonders that drift in the sea,
To majestic elephants roaming wild and free.
A symphony of life in diverse display,
Where creatures thrive in their unique ballet.

Invertebrates crawl with a silent grace,
Spiders spin webs in a delicate embrace.
Molluscs glide in their oceanic spheres,
With shells and mantles, their form endears.

Vertebrates stand with a backbone so true,
From fish in the water to birds that fly through.
Amphibians leap from land to the stream,
In a world where their dual lives seamlessly dream.

Reptiles, with scales and a stealthy glide,
Snakes and lizards in shadows reside.
Mammals, with warmth and a caring touch,
From tiny shrews to the giants as such.

Prashanti marvels at this grand parade,
The myriad forms that evolution made.
Adaptations thrive in every nook and cranny,
From the Arctic's chill to the jungle's uncanny.

In the kingdom where survival writes its lore,
Predators, prey, and ecosystems galore.
Each creature plays a part in the grand design,
In nature's vast theatre, both humble and fine.

So here's to the animal kingdom, wild and grand,
A testament to life's intricate hand.
Prashanti's ode to this wondrous array,
Where every creature finds its own way.

Prashanti,
XI Science, School Captain

ABOUT MY PRIORITY SUBJECT: SCIENCE

I hope that by reading this, you can gain some interesting insights into science and feel motivated about the subject.

My Thoughts on Science

Imagine a future where your daily life is transformed by scientific advancements that we can't fully grasp yet. Even though we can't dive into all the innovations that are shaping today's science fiction and tomorrow's reality, the excitement is palpable. From thrilling space exploration to the precision of gene editing, science is at the heart of many phenomena that are changing our lives. In the world of science, there are many unsolved mysteries. For me, science is not just a subject but a gateway to understanding the universe. It's suspenseful and fascinating to learn about. Science is a vast and multifaceted field that encompasses a wide range of disciplines. Although I am familiar with subjects like Chemistry, Physics, Zoology, Botany, and Cosmology, there are many more areas to explore.

Major Fields of Science

Biology: The study of living organisms, including their structure, function, growth, origin, evolution, and distribution.

Physics: The branch of science that studies the fundamental principles governing matter and energy. It helps us understand how things move and interact, from everyday objects to the universe itself.

Chemistry: The study of the composition, properties, and reactions of substances. It focuses on how materials interact and transform into new substances.

Personal Reflection

Reading definitions of different scientific fields can sometimes be dry and unengaging. Instead of just learning about these topics, I want to share my personal journey with science.

At the age of 15, I am still exploring various subjects within science. My curiosity and affinity for the subject drive me to learn more. I hope to invent or discover something new in the future—something no one has thought of before.

Initially, I didn't know much about science, but over time I developed a deep interest in it. Biology, in particular, fascinated me because it deals with the functions of living beings. Understanding the human body and natural phenomena has been a rewarding experience.

Why Science is Important to Me

Although people often discuss subjects like Chemistry, Biology, and Physics, I find biology particularly intriguing. My curiosity drives me to learn about topics like blood circulation, reproduction, the nervous system, and microorganisms.

Science provides a way to understand the world, solve complex problems, and drive technological innovation. Fields like Neuroscience and Astronomy are especially fascinating to me because of their exploration of the universe and fundamental forces.

Mathematics vs. Science

I have learned that Mathematics is a popular subject worldwide. Despite this, I remain passionate about science. While many people choose Mathematics, I believe that science aligns better with my interests and goals.

In conclusion, I want to focus on science because it fascinates me and aligns with my future aspirations. Although Mathematics is important, I find science more compelling and relevant to my goals.

Final Thoughts

Science has been a significant part of my life and learning journey. I hope to continue exploring and discovering new aspects of this field.

Shlok D.
VIII B

WATER

A Surprising Molecule

Why is our search for extra-terrestrial life forms linked to a search for water? Why does ice float in a glass of water? What makes water different from other liquids? In this article, the author uses many everyday observations of water to explore it as a topic that can be studied across classes and disciplines.

Water is the most common liquid we know and we use it without thinking too much about it, except to grumblewhen it spills, overflows, rain gets in... or to long for when we are thirsty, the tank runs dry or it doesn't rain.

Water plays many roles in our lives, the lives of all organisms, and the planet in general. It is studied by chemists, physicists, biologists and engineers, and research is still being done on it. This is surprising, because it is such a small molecule, such a simple formula - H2O, probably the first that any science student learns.

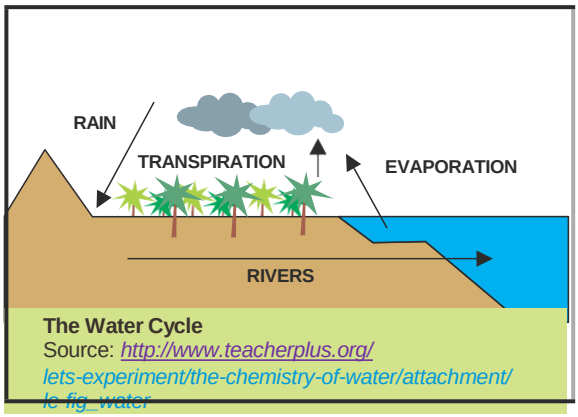
Felix Franks is a British scientist whose work is mainly on the structure and properties of water. He narrates the following anecdote: he was travelling by train to present a lecture on water at a university. He shared his compartment with another scientist who was travelling to the same place for a job interview. On hearing the title of Frank's lecture, he is supposed to have said 'I thought everybody knew the structure of water is H2O'. Franks says 'needless to say, he did not get the job.

What are all the roles that water plays?

1. *It provides an environment for living.*
2. *It acts as a structural material.*
3. *It is a very good solvent.*
4. *It is a transport medium, at large and small scales, for both material and energy.*
5. *It acts as an insulator.*
6. *It is a climate moderator.*
7. *It acts as a coolant.*
8. *It is a reagent.*

There are probably many more uses of water; and many of the roles listed above are linked to each other. We can find numerous examples for all of the above functions of water as we observe life around us.

Let us start with looking at some functions of water that operate at larger scales: we all have some idea of the water cycle, but the sheer volume of water moved around during this process may surprise us.



The Water Cycle
Source: http://www.teacherplus.org/lets-experiment/the-chemistry-of-water/attachment/le_fig_water

The seas, rivers, lakes, ponds, little puddles in rocks, and trees, all provide an environment for creatures to live, all over the world, and in all climates. Many small ponds and puddles are teeming with life, very quickly after they form - itis easy to see where the mosquito larvae come from, but what about the fish and the plants - howdo they get there? The eggs and the seeds lie there, dry and dehydrated till the rains come, allowing them to germinate and new organisms to grow, providing them with a space to live in- water inside and out.

Why is water essential for life? It provides a medium, in which chemicals dissolve and react; and, also, acts as a reagent to make chemical reactions happen. Can any other compound support life in the same way, not just on Earth, but elsewhere? Xenobiologists (scientists who think about extra-terrestrial life) don't seem to think so. All search for alien life seems to centre on whether water is present elsewhere in the Universe or not. On earth, water is available, and all life has evolved to use it.

When those of us who are terrestrial, moved from the water to land, we had to evolve ways of getting water, keeping the water in, and making sure that our offspring had water to grow. All groups of organisms solved the problem in different ways, all very marvellous to study as a biologist.

Water falls on to the Earth as rain/snow, dissolving carbon dioxide from the air, and running ovlimestone - $CaCO_3$ through a chemical reaction);

er land dissolving minerals (notably

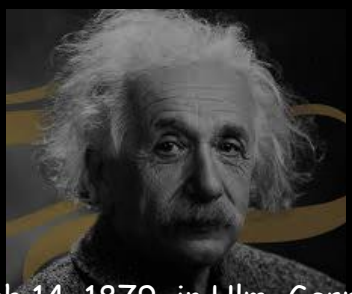
finally, either going underground, or into the seas.In the sea, marine creatures use the calcium and carbonate ions, to make shells for themselves.

As water runs over land, it erodes it - both by chemical action, and by physical weathering - shaping landscapes into valleys and gorges. Wateris used for large-scale transport through canals, rivers and seas. People sail on seas, using not only seasonal winds, but also seasonal currents. Even big liners, nowadays, use ocean currents to save fuel. These water currents (Gulf stream, El Nino and others) also have important effects on climate

Camels are supposed to carry water in their humps to help them go long distances without drinking. What they do have in their humps is fats. The fats act both as an insulator and as a source of water. Metabolism of food gives out water and that provides part of the water that all organisms require. Metabolising 1 gram of fat gives out more than 1 gram of water. So, the camel gets both energy and water from its hump, and can go many days without eating or drinking. Some scientists have, however, argued that the hump cannot be a source of water to the camel, since taking in oxygen to metabolise the fats in the hump will cause a loss of body water through breathing.

Advait Pandey
IX A

"EARLY INFLUENCES: THE CHILDHOODS OF EINSTEIN AND HAWKING"

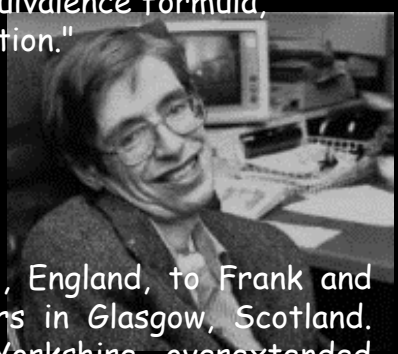


Albert Einstein

Albert Einstein was born on March 14, 1879, in Ulm, Germany. He spent part of his childhood in Italy before his family moved to Switzerland. At the age of 17, he enrolled at the Polytechnic Institute in Zurich, where he studied mathematics and physics for five years, graduating in 1900. During this period, he also acquired Swiss citizenship. In 1905, often referred to as Einstein's "Annus Mirabilis" or "Miracle Year," he published five groundbreaking papers that laid the foundation for quantum physics and introduced revolutionary concepts, including the theory of relativity and his famous equation, ($E=mc^2$). These contributions significantly advanced our understanding of the speed of light and the relationship between mass and energy.

In recognition of his contributions to physics, Einstein was awarded the Nobel Prize in Physics in 1921. Following this honor, he moved to Princeton, New Jersey, where he became a professor at the Institute for Advanced Study. He held this position until his death on April 18, 1955.

Albert Einstein was a theoretical physicist who is considered one of the most influential scientists of the 20th century. His development of the theory of relativity, one of the two pillars of modern physics, has had a profound impact on both science and the philosophy of science. He is best known for his mass-energy equivalence formula, ($E=mc^2$), which is often dubbed "The world's most famous equation."



Stephen Hawking

Stephen Hawking was born on January 8, 1942, in Oxford, England, to Frank and Isobel Hawking. His mother came from a family of doctors in Glasgow, Scotland. Hawking's great-grandfather, who was wealthy and from Yorkshire, overextended himself by purchasing a farm and went bankrupt during the Great Agricultural Depression of the early 20th century. His great-grandmother salvaged the family's financial situation by opening a school in their home.

At the age of eight, Hawking attended St. Albans High School for Girls in St. Albans for a few months, as young boys could join one of the school's houses at that time. In 1950, when Hawking's father became head of the Division of Parasitology at the National Institute for Medical Research, the family moved to St. Albans, Hertfordshire. There, the family was known for their intelligence and somewhat eccentric lifestyle. Meals were often spent in silence, each person engrossed in a book. They lived a frugal existence in a large, cluttered, and poorly maintained house, and they traveled in a converted London taxi cab.

Priya S. A.
VIII C

Science

Everything works,
because of science.
Every your old ,
kitchen appliance.

What about your
mom's car?
Without science,
it wouldn't go for.

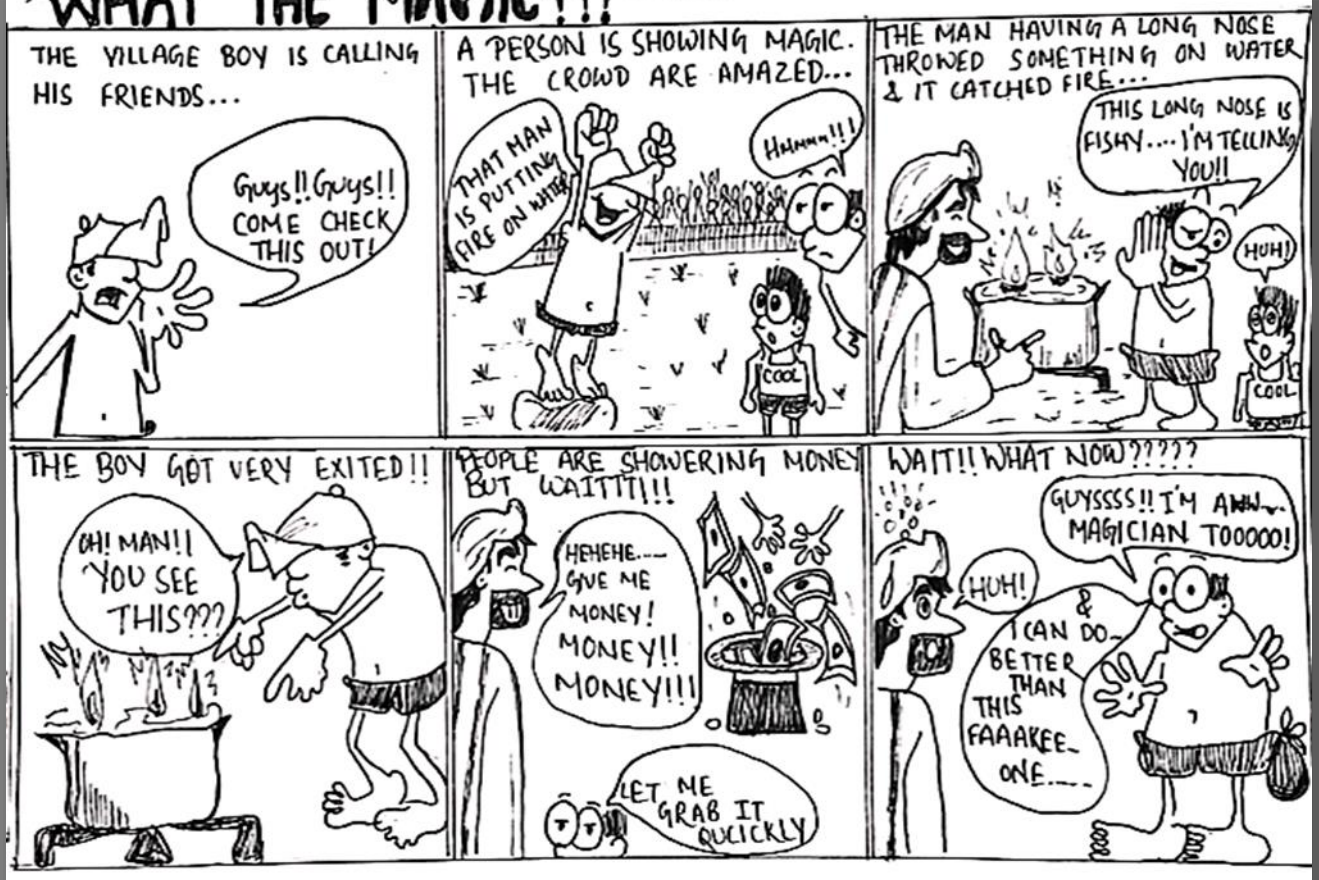
With science we could make,
a computer or phone,
If you want a twin,
just ask for a clone.

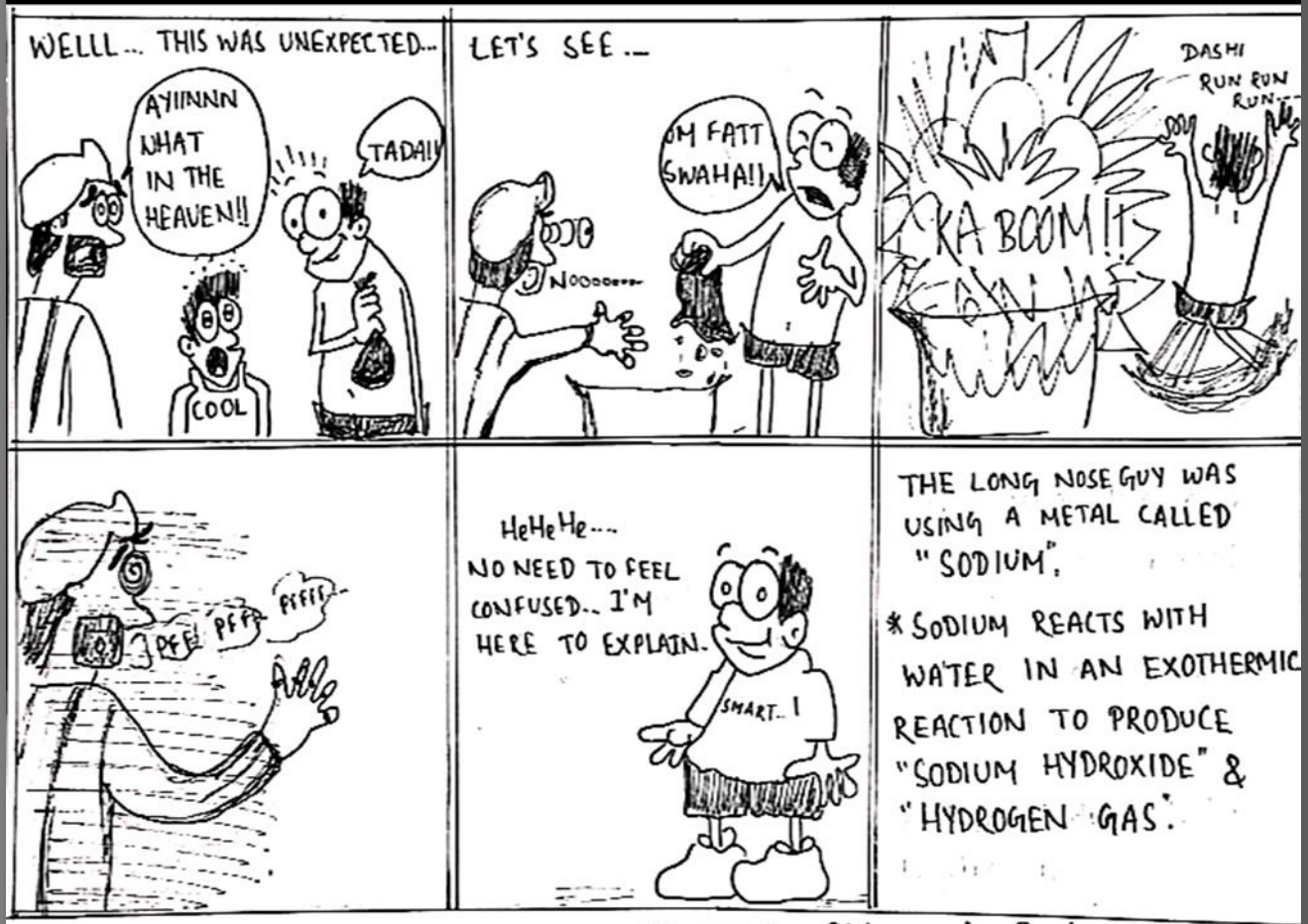
Science will explain,
nature and trees,
It's also used,
to find cures for disease.

Science is clear,
It's so much fun,
Enjoy it my dear.

Avani. Kulkarni
VII A

WHAT THE MAGIC!!!





CREATED BY... A_Saileja_Dora

Conservation of Forests and Wildlife

- ✓ Trees and plants in the forest are an integral part of the ecosystem.
- ✓ It sustains life on the planet.
- ✓ Forest provides clean air and shelter.
- ✓ Also, forest help to conserve biodiversity.
- ✓ Forest provides many resources such as food, medicines, fabric and raw material.
- ✓ Wildlife conservation is very important to maintain the food chain and ecosystem balance.
- ✓ Wildlife conservation is the practice of protecting wild species and their habitats to prevent extinction and future generation.
- ✓ It's essential to maintain the balance of the ecosystem and protect rare and extinct species of animals.
- ✓ Wildlife is important because it helps to keep our surroundings safe, and is essential for medicinal benefits.

Nishita Pande
VIII

THE IMPACT OF ARTIFICIAL INTELLIGENCE ON SCIENTIFIC RESEARCH: TRANSFORMING DISCOVERY AND INNOVATION

As we stand at the threshold of 2024, the world of scientific research is on the cusp of a revolution. Artificial Intelligence (AI) is transforming the way scientists conduct research, analyze data, and make groundbreaking discoveries. This essay will delve into the profound impact of AI on scientific research, exploring how it is accelerating discovery, innovation, and progress in various fields.

AI is revolutionizing the data collection and analysis process. Traditionally, scientists spent an inordinate amount of time sifting through vast amounts of data, often manually, to identify patterns and trends. AI algorithms can now process this data at an unprecedented scale and speed, freeing up researchers to focus on higher-level thinking and interpretation. For instance, in the field of astronomy, AI-powered telescopes can analyze vast amounts of celestial data to identify new celestial bodies and patterns, leading to significant breakthroughs in our understanding of the universe.

AI is facilitating collaboration and knowledge-sharing across disciplines and borders. This has led to the emergence of new fields such as bioinformatics, where AI is being used to analyze genomic data and develop personalized medicine. Moreover, AI-powered Chabot's and virtual assistants are enabling researchers to communicate more effectively, transcending language and cultural barriers.

It allows scientists to model and predict phenomena that were previously impossible to study. For example, in the field of materials science, AI-powered simulations are being used to design new materials with unique properties, such as superconductors and nanomaterials. Similarly, AI-powered robots are being used to conduct experiments and gather data in environments that are hostile or inaccessible to humans, such as deep-sea exploration.

Furthermore, AI-powered simulations can test hypotheses rapidly and efficiently, allowing scientists to iterate and refine their theories at an unprecedented pace.

AI is posing significant challenges to the traditional publishing and peer-review models. With the rise of pre-print servers and open-access journals, AI-powered algorithms can help to accelerate the publication process, reduce publication bias, and increase the transparency and reproducibility of research findings.

In conclusion, the impact of AI on scientific research is nothing short of transformative. By accelerating discovery, innovation, & progress, AI is enabling scientists to tackle complex problems, explore new frontiers, and push the boundaries of human knowledge. As we look to the future, it is clear that AI will continue to play an increasingly important role in shaping the course of scientific research, and it is our responsibility to ensure that this powerful technology is harnessed for the betterment of humanity.

Uthara Prasad

TGT Science

The Journey of Life on Earth: From Simple Cells to Complex Creatures

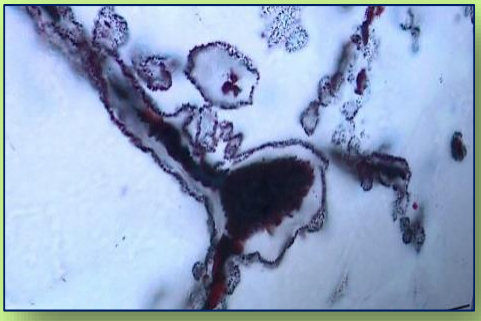
The story of life on Earth is like an epic adventure that began about 4.6 billion years ago. It's a tale of how simple cells evolved into the incredible diversity of life we see today. Let's explore this journey, from the birth of life to the complex organisms that now share our planet.

The Birth of Earth

Around 4.6 billion years ago, Earth formed from a cloud of gas and dust in space. At first, it was a hot, molten ball of rock. Over millions of years, it cooled down, creating a solid crust and forming oceans and an atmosphere. This new environment set the stage for life to begin.

The First Signs of Life

Life probably started in Earth's early oceans, where simple organic molecules began to form. These molecules combined to create the first living cells. The earliest life forms were tiny, single-celled organisms called prokaryotes. These simple cells had no nucleus and were the first to appear about 3.5 billion years ago.



The Rise of Photosynthesis

Around 3 billion years ago, some of these early cells developed the ability to perform photosynthesis. This process allowed them to use sunlight to make their own food and released oxygen into the atmosphere as a byproduct. This was a crucial development because the oxygen built up in the atmosphere, eventually creating the conditions necessary for more complex life forms.

The Appearance of Complex Cells

About 2 billion years ago, a major leap in complexity occurred with the emergence of eukaryotic cells. Unlike prokaryotes, eukaryotic cells have a nucleus and other specialized structures. This new type of cell could perform more complex functions and led to the evolution of multicellular organisms.

The Cambrian Explosion

Around 540 million years ago, there was a rapid increase in the number and variety of life forms, known as the Cambrian Explosion. During this period, many major groups of animals appeared, including early ancestors of modern marine creatures. This explosion of life created the first complex ecosystems in the oceans.

Plants and Fungi Move to Land

The first plants and fungi began to colonize land around 450 million years ago. Plants evolved from green algae and started to grow in terrestrial environments, creating the first land-based ecosystems. Fungi also adapted to land life and formed important relationships with plants, helping them absorb nutrients from the soil.

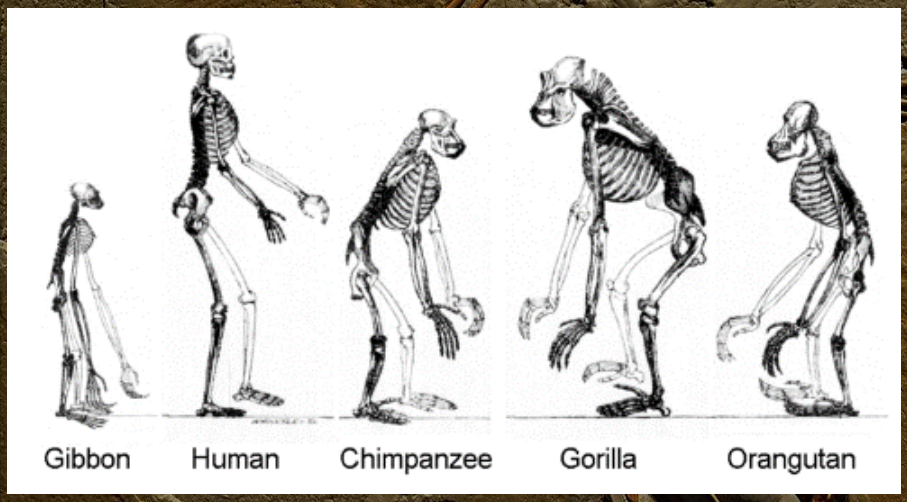
The Evolution of Vertebrates

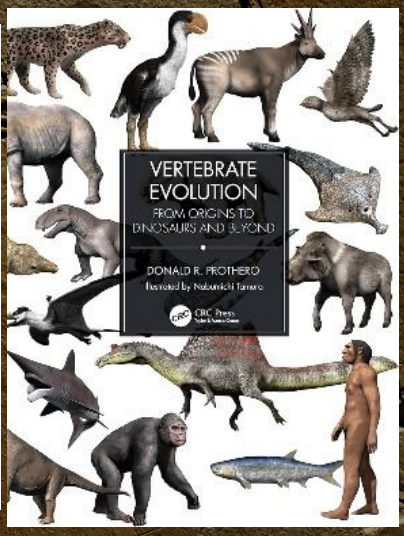
Vertebrates, animals with a backbone, first appeared about 500 million years ago. These early vertebrates were jawless fish. Over time, vertebrates evolved into jawed fish, amphibians, reptiles, birds, and mammals. This evolution allowed animals to adapt to a wide range of environments, from the oceans to land.

The Age of Dinosaurs

Dinosaurs became the dominant land animals during the Mesozoic Era, which lasted from about 250 to 65 million years ago. They evolved into a diverse range of forms, from towering sauropods to agile theropods. The end of the Mesozoic Era, marked by a mass extinction event, led to the decline of dinosaurs.

The Rise of Mammals and Humans





After the extinction of the dinosaurs, mammals became the dominant land animals. Over the past 65 million years, mammals evolved into various forms, including primates. Our own species, Homo sapiens, emerged around 300,000 years ago, and humans have since developed complex societies and technologies.

The Ongoing Evolution

Life on Earth continues to evolve. New species are constantly emerging, and existing species are adapting to changing environments. Evolution is an ongoing process that shapes the diversity of life on our planet.

The journey of life on Earth is a story of continuous change and adaptation. From the earliest single-celled organisms to the diverse array of plants, animals, and microbes we see today, life has evolved through countless stages. Understanding this journey helps us appreciate the complexity and interconnectedness of all living things and reminds us of the incredible history that has shaped the world we live in.

Hanvathe Narsingh Rao
XII Science

NATIONAL SPACE DAY CELEBRATION

On National Space Day,23rd August, 2024, an engaging and informative session was conducted for Class 6th and 7th students at The Manik Public School, led by Dr. Sangeet Bhardwaj, Director of Educational Programs. The event was designed to celebrate advancements in space exploration and to educate young minds about India's remarkable Chandrayaan-3 mission.

Dr. Bhardwaj's session began with an introduction to National Space Day, emphasizing its role in recognizing the achievements and potential of space science. The focus of the day's discussion was Chandrayaan-3, India's latest lunar mission, which aims to enhance our understanding of the Moon's surface and potential for future exploration.

The presentation provided a comprehensive overview of Chandrayaan-3, highlighting its mission objectives, the technology behind the spacecraft, and its journey to the Moon. Dr. Bhardwaj used a variety of multimedia tools, including dynamic animations and detailed visuals, to illustrate the spacecraft's design and its landing strategy.

The Q&A segment of the session was particularly lively, with students eager to learn more about space exploration. They asked questions about the challenges of landing on the Moon, the scientific goals of Chandrayaan-3, and the future of lunar exploration.

Feedback from both students and teachers was overwhelmingly positive. Many students expressed excitement about space exploration and were inspired by the real-world application of their studies.

The event not only celebrated India's advancements in space technology but also motivated the next generation of scientists and engineers. It underscored the importance of science education and provided students with a deeper understanding of the exciting possibilities that space exploration offers.

Earth Rotation Day Quiz

Earth Rotation Day is celebrated on January 8 to mark the discovery of Earth's rotation by Léon Foucault in 1851. To observe this day, our school conducted a quiz highlighting interesting facts about Earth's rotation, such as how it causes day and night, affects time zones, and influences weather patterns.

The quiz aimed to encourage students to learn about the science behind Earth's movements and their impact on our daily lives. It was an exciting and educational event that inspired curiosity and a deeper appreciation for our planet.

Junior Science Quiz: A Celebration of Knowledge and Curiosity

On 13th September, 2024, The Manik Public School held its much-anticipated Junior Science Quiz, an event that brought together some of the brightest young minds in the school. This year's quiz saw an enthusiastic turnout, with students from various grades participating, either as contestants or eager audience members. The quiz not only tested the participants' knowledge of science but also ignited their curiosity about the world around them.

The event commenced with an introduction by Shweta of Grade X A, who emphasized the importance of scientific literacy in today's world. She encouraged students to approach science not just as a subject, but as a way of thinking, urging them to remain inquisitive and never stop questioning. This set the tone for an exciting and intellectually stimulating competition.

The quiz was divided into multiple rounds, each designed to challenge the participants in different areas of science. The rounds included topics ranging from biology, physics, and chemistry, to earth science, space exploration, and current advancements in technology. Each team displayed impressive knowledge and quick thinking, making for a closely contested competition.

The quizmaster, kept the atmosphere light yet competitive, ensuring that both the participants and the audience stayed engaged throughout. Some questions were real brain-teasers, but the students were up for the challenge, confidently answering with explanations and even engaging in some healthy debates over the trickier questions.

After several thrilling rounds, Lakshmibai House emerged victorious, clinching the top spot with their impressive score. Their performance was a perfect blend of knowledge, teamwork, and strategy. Siddharaj House followed closely behind, proving that the competition was fierce till the very end.

The event concluded with a vote of thanks by Vaishnavi , who acknowledged the hard work of the organizing committee, the teachers, and the enthusiastic participation of the students. The quiz was not just a competition but a celebration of learning and scientific inquiry.

The success of the Science Quiz this year has already set high expectations for the Senior Science Quiz event. It served as a reminder that education goes beyond textbooks, and such events provide a platform for students to explore and express their knowledge and love for science.

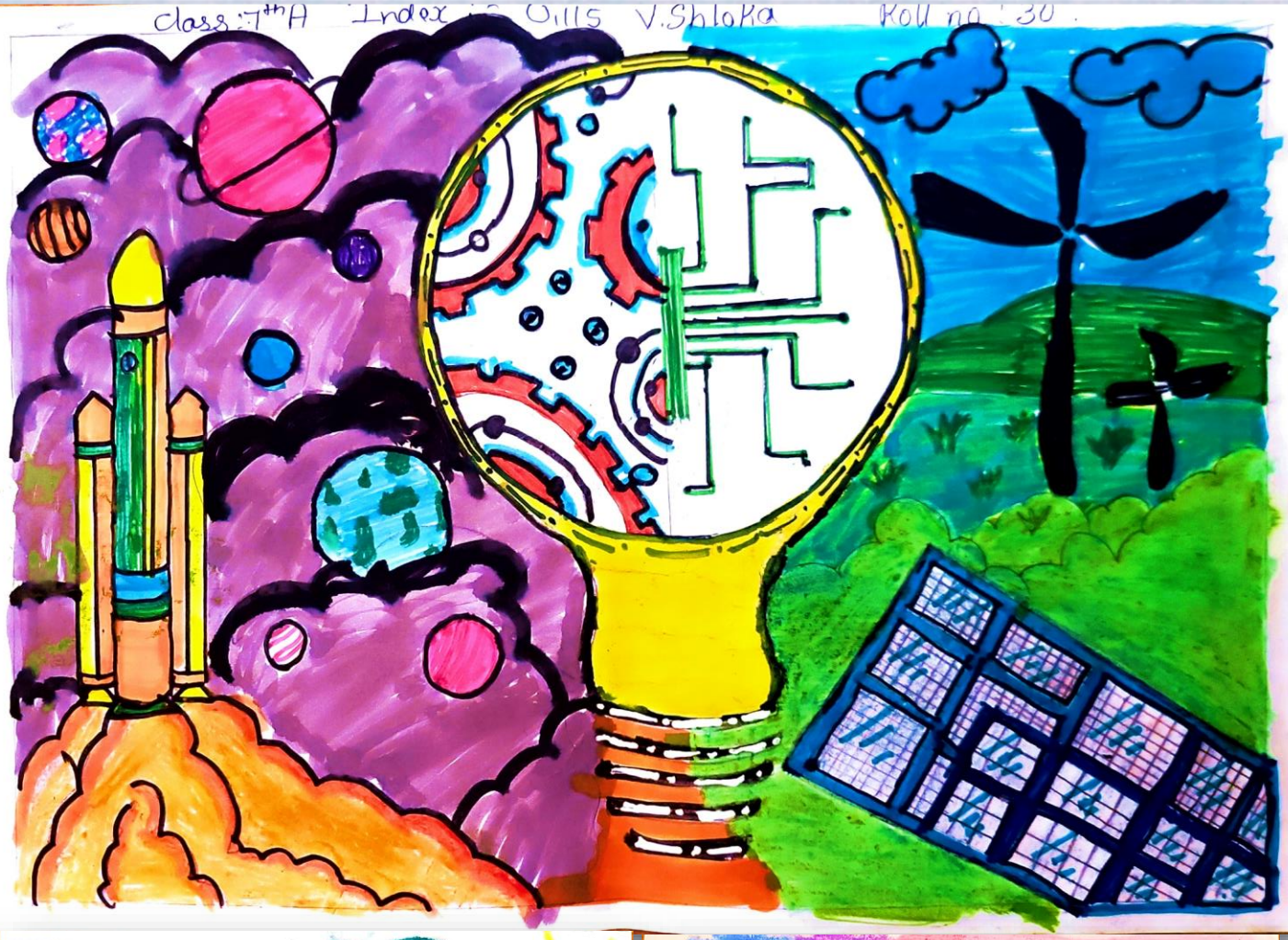
We look forward to even more participation and enthusiasm in the coming years as The Manik Public School continues to foster a spirit of inquiry and discovery among its students.

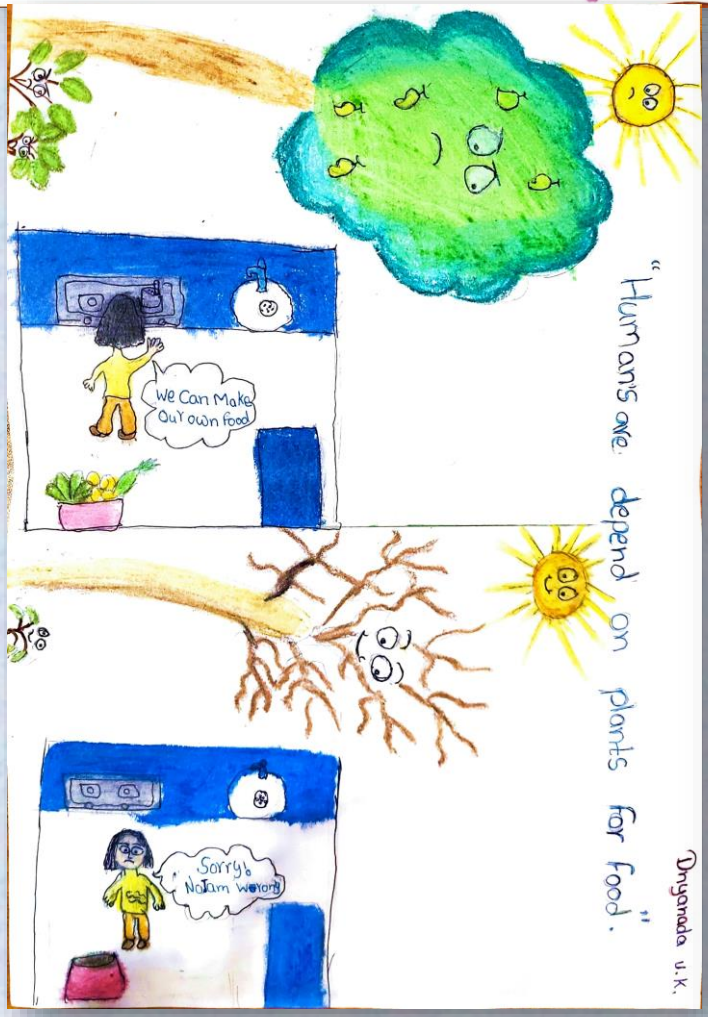
The supporting team also includes :

Nageshwar Rao, Aslam Pasha, Shweta Biradar , Vaishnavi Jyante & Arpita Agnihotri

We appreciate the Student Council for helping in organising the event. We extend a special thanks to Mr. Sanjay Makhija, Bursar MPS and Mrs Meenakshi Banga Pandey, VP Well Being for bestowing their blessings on us.

Class: 7th A Index No: Ills V. Shloka Roll no: 30.

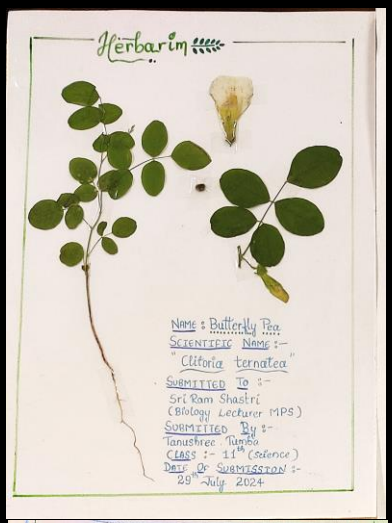


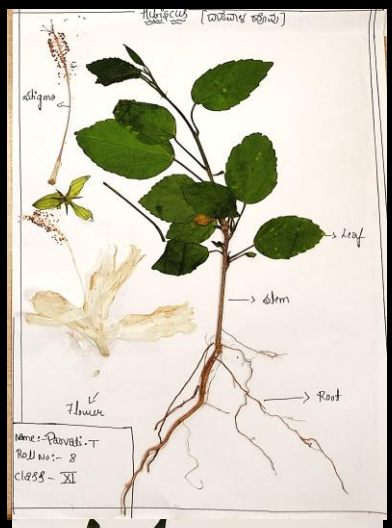


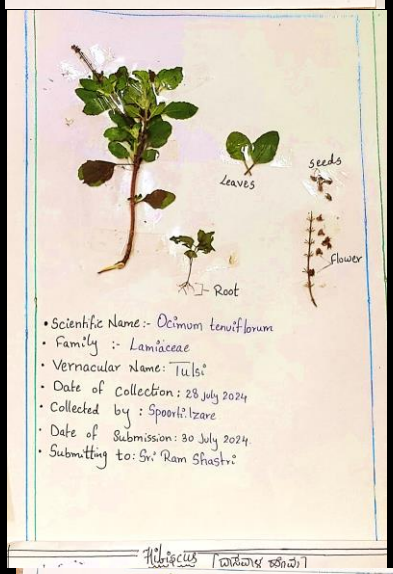
"Humans are depend on plants for food."

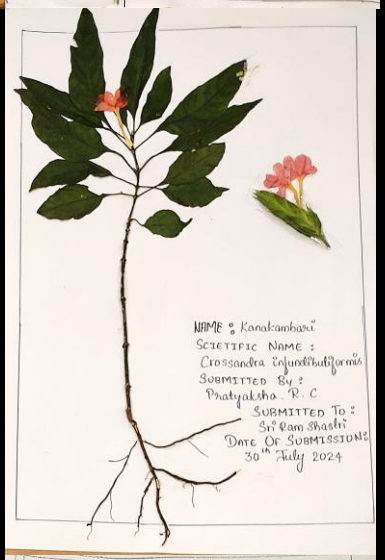
Dnyanada U.K.

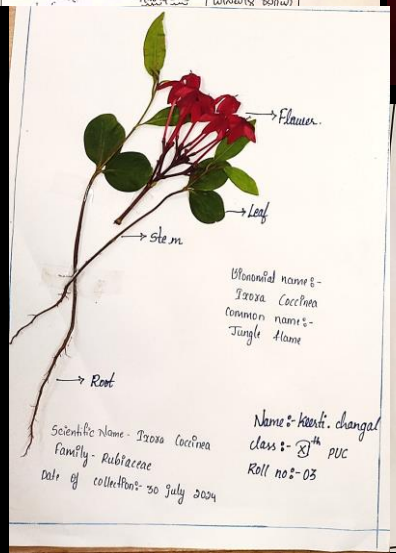
"VIGYAN AUR VIDYARTHI"

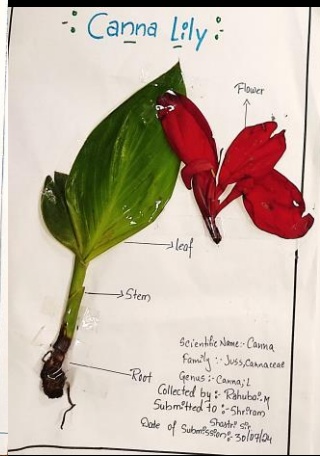


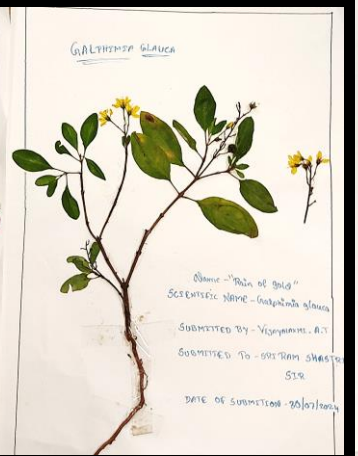


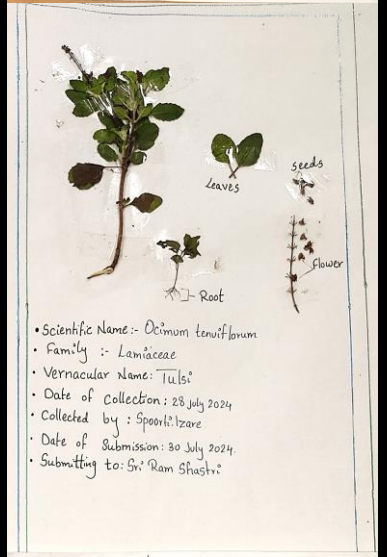












"VIGYAN AUR VIDYARTHI"

"VIGYAN PRASAAR"

"MANIK VIGYAN PARIWAAR"

Dr. Sangeet Bhardwaj – DOEP & HOD

SriRam Shastri – PGT Biology

Sheena Dhiman – PGT Chemistry

Devilal Kainwal – PGT Physics

Mustaque Ali – PGT Chemistry

Saileja Dora – TGT Biology

Uttara Prasad – TGT Science