MOD EXPLORERS

2025

SCIENCE SLAL

UNVEILING THE SEVEN WONDERS OF SCIENCE

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MESSAGE FROM THE PRINCIPAL

Science is at the heart of innovation, and at MSVV,our students are embracing this spirit every day.Through hands-on experiments, thoughtful inquiry, and creative problem-solving, they are learning to think critically and explore the world around them with curiosity and purpose.This newsletter is a celebration of their passion for discovery. From designing investigations and testing hypotheses to building models and presenting their findings, our students are developing the skills that will shape the future—resilience, collaboration, and an eagerness to keep asking “why” and “how”. What truly stands out is their ability to take on challenges with determination and creativity. They are not just learning about science—they are doing science. Whether it’s in the lab, the classroom, or beyond, they are showing us what it means to be innovative thinkers and lifelong learners. I am incredibly proud of their efforts and the enthusiasm they bring to every project. Their work reflects the kind of thinkers, problem-solvers, and leaders we strive to cultivate at Modern School,Vasant Vihar.I look forward to seeing how their ideas continue to grow and inspire others.

Vibha Khosla
Principal
Modern School Vasant Vihar

EVERYTHING IS THEORETICALLY IMPOSSIBLE UNTILL ITS DONE

TIME TRAVEL: MYTH OR REALITY?

Time travel isn’t just the stuff of movies—it’s real. Every astronaut aboard the International Space Station (ISS) is already traveling into the future, albeit by just a fraction of a second. But what if we could push this effect to the extreme? Could a person leave Earth and return centuries later, barely aged at all?

Einstein’s theory of relativity tells us that the faster you move, the slower time flows for you. Astronauts orbiting Earth at 28,000 km/h experience time slightly slower than those on the ground. The effect is minuscule, but if we could travel at 99% the speed of light, a few years for the traveler could mean centuries for those left behind.

However, speed isn’t the only way to warp time - gravity can also bend it. A clock placed near a massive gravitational field—like a black hole—ticks more slowly than one on Earth. The closer you get, the stronger the effect. In theory, an astronaut orbiting a black hole for a few years could return to find that thousands of years have passed on Earth.

This might be surprising to know, but “time travel” is not just a theory. In 1971, scientists flew atomic clocks around the world on jets, proving that time slows down at high speeds. And today, astronauts aboard the ISS age milliseconds slower than people on Earth. It’s real. It’s happening - we just don’t notice it. If we want to travel far into the future, we need near-light-speed travel or access to extreme gravitational fields. For now, that’s beyond our reach. But physics says it’s possible, and with each technological breakthrough, the future of time travel inches closer.

By Vedaansh Jain

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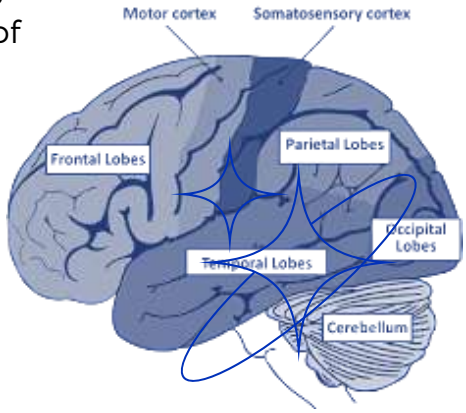
DO WE ONLY USE 10% OF OUR BRAIN?

The idea that we only use 10% of our brain has been around for over a century, but it's simply not true. It likely started from early misunderstandings and limited knowledge of the brain. In reality, almost every part of our brain has a purpose and is active at different times, even when we sleep. The brain is constantly processing information and adapting, and while not all areas are firing simultaneously, all regions contribute to our daily functions. This myth sticks around because it suggests untapped potential often reinforced in movies and books, but the truth is we use 100% of our brain.



By Ritvi Jain

METAL ORGANIC FRAMEWORKS AND COVALENT ORGANIC FRAMEWORKS

Many countries around the world have promised to not only reduce pollution, but also reach net zero carbon emissions by 2050. To make this joyful reality occur, scientists are creating new materials that can capture harmful gases and improve energy use. One of the most important materials are Metal Organic Frameworks, or MOFs. Basically, they are tiny structures made of metal and organic molecules, having an extremely large surface area, meaning they can capture gases like carbon dioxide, a major cause of global warming.

Various companies are working to produce MOFs on a large scale to help achieve this goal, i.e. pulling enough carbon dioxide out of the air before it causes irreversible harm. MOFs are also useful in households, as they improve our ACs. When placed inside AC units, they can remove humidity from the air, making cooling around 40% more efficient. This is important because air conditioning uses a lot of electricity, especially as temperatures rise worldwide.

Another promising material is the Covalent Organic Framework, or COFs. Unlike MOFs, COFs do not contain metal and are even more stable under heat and chemicals. COFs can separate gases, store energy and clean pollution up to an extent. Scientists have found that COFs can also remove some harmful chemicals from drinking water, such as perfluorinated compounds (PFCs), which are dangerous to human health. Materials science is becoming more important in the fight against climate change. As scientists create new materials, we can expect that our goals for cleaner air, better energy storage and safer water will be achieved in the future

By Ojas Panda

UNVEILING THE SEVEN WONDERS OF SCIENCE

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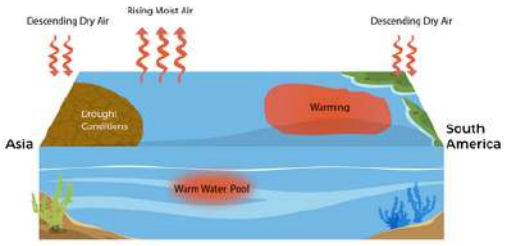
WHY A SCIENCE MAGAZINE?

This science magazine is more than just a publication; it serves as a window to discover the wonders of the scientific world all around us. In today's world, with the rapid development of science and technology, there has never been a greater demand for scientific awareness than today. My aim, as the editor, would be to provide an exclusive platform for readers not only to stay updated but also get inspired to venture into the wide range of discovery.

With this magazine, we seek to make complex scientific concepts come alive in engaging and easy-to-understand terms. By promoting collaboration among writers and researchers, we produce content that appeals to a broad audience, ranging from science fanatics to beginners.Driven by my passion for science,owing to exposure and the wonderful teachers at our school, I aspire to instill the same in students of our school

THE EDITORS COLUMN

Global warming is the most urgent and terrifying issue that human beings are facing nowadays. The harsh truth is that the reality er are witnessing today marks the onset of an emerging crisis, with implications that are so broadly connected and are already devastating much of the globe. India, in particular, has a bright future to look forward to, but with the implications of global warming increasing year by year the future tends to be frightening. And to add to all this, this year is an El Niño year is an El Niño — amplifying the already extreme weather conditions.

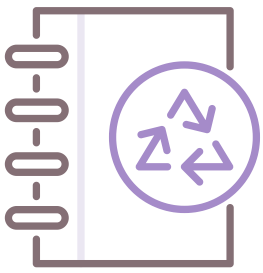


El Nino events profoundly influence extreme weather events around the world, with far-reaching consequences for food production , water availability, and the wellbeing of both people and ecosystems. Implications for India are significant , with the impact on agricultural production being one of the most pressing concerns.

El Nino events have been associated with amplifying temperature rise, heat extremes, and inducing more erratic rainfall patterns over the subcontinent. Historically, at least half of the instances of El Nino have been directly linked to droughts during the summer monsoon season.
The Atlantic Ocean, on the other hand, is experiencing a decline in hurricane activity, leading to alterations in weather patterns that undermine regional climates.
India's existence and progress are irretrievably linked to its monsoon patterns. With rains increasingly becoming more and more erratic, the prospects are bleak. It is not a question of the day but a generation crisis. The seriousness of the situation emphasises the call for global action on climate change since the very processes that have sustained civilisations for millennia are now under threat
By Devika Raj Batra

DID YOU KNOW THAT ?

Did you know that recycling one aluminum can will allow us to produce enough energy to power a TV for 3 hours? Recycling saves energy and minimizes the impact on the environment to a very large degree



Did you know recycling paper can power a light bulb for as long as 6 hours? Simple actions such as recycling save energy and decrease waste, making a huge difference to the environment.

Did you know that carrying a refillable water bottle instead of buying plastic bottles can save you up to 156 plastic bottles per year?

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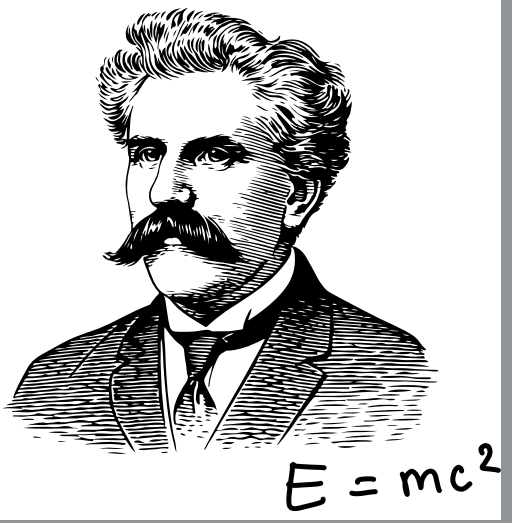

DNA : THE BLUEPRINT OF LIFE

DNA, or deoxyribonucleic acid, contains the genetic blueprint for all living things. Its double helix is made up of four chemical bases—Adenine (A), Thymine (T), Guanine (G), and Cytosine (C)—which always pair up (A with T, G with C) to create the genetic code. The code instructs the synthesis of proteins necessary for growth, repair, and cell function.

Human beings have 46 chromosomes, 23 pairs, one inherited from each parent. Characteristics pass down through alleles—dominant ones are expressed with a single copy, whereas recessive ones need two copies that are the same. Variation in genes results from mutations, crossing over, and independent assortment during meiosis, whichmakes everyone different.

By Ritvi Jain

THE MAGIC OF SCIENCE

Science is magic, but
better, you see;
It helps you unlock every mystery.
Why does the rainbow shine so bright?
How does the moon glow at night?
Raindrops fall, the rivers flow,
Seeds turn into trees and start to grow.
Lightning flashes, thunder roars—
Science explains it, opens new doors!
Up in space, the planets spin,
A universe vast, where stars begin.
With every question, big or small,
Science helps us understand it all!

By Alaina Pahwa

SCIENTIST OF THE MONTH

A**lbert Einstein** was a brilliant scientist who changed our understanding of the universe. Born in 1879 in Germany, he is best known for developing the theories of special and general relativity. His famous equation, E=mc², shows how energy and mass are related. These revolutionary ideas transformed the field of physics and how we think about space, time, and gravity. Einstein was also a strong advocate for peace and human rights. He believed that imagination was more important than knowledge, stating, "Imagination is more important than knowledge." His work continues to influence science today, inspiring generations of thinkers. Einstein's creativity and curiosity helped him make discoveries that reshaped the world. He was not just a scientist, but also a philosopher who questioned the nature of reality. His legacy remains a symbol of intellectual courage and the power of asking big questions.He postulated the formula E=mc^2

By Devyani Batra

A SCIENTIST IS NOT A PERSON WHO GIVES THE RIGHT ANSWERS, SHE'S THE ONE WHO ASKS THE RIGHT QUESTIONS

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PERIODIC TABLE TRENDS

Sometimes when we are really hungry, we put together a dish without an exact recipe. This might work but sometimes it can also backfire as we won't know if certain foods mesh together or not, which is why we need a precise recipe in order to get the best results consistently. In the chemical world, the Periodic table can be compared to a no fail recipe needed by chemists for accuracy in their work.

In the middle of the 19th Century, Dmitri Mendeleev proposed what is now known as the "periodic law" which states that "Element properties are a periodic function of their atomic weight." Mendeleev thus tabulated elements in the order of their rising atomic weights. This is what constitutes the Periodic Table of Mendeleev. This table divides the elements horizontally into 'periods' in such a way that those elements having similar properties are vertically in one 'group'.

The discovery of this logic backed table paved the way for future discovery of elements and their characteristics, hence marking a breakthrough in the field of chemistry. The periodic table also provided certain gaps to account for newly discovered elements like gallium, scandium and germanium which were discovered much later. To its credit, Mendeleev's periodic table was also able to accurately predict and correct the atomic masses of elements such as gold, indium and platinum.

However, as with everything, evolution comes along and changes the course of things. In 1913, Henry Mosely proposed the idea that chemical and physical properties displayed by elements are periodic functions of their atomic numbers and not their atomic masses as believed before.

This modification to the Periodic table has led to what we call the 'modern periodic table' based on the same structure but now the trend being a rising atomic number. The periodic table has thus undergone changes yet its core has remained the same making it easier for scientists to predict properties of elements, uncover new trends as well as understand reactivity and bonding patterns.

It is thus safe to say that just as recipes which are very old are tweaked in order to make them relevant in the present age, the periodic table has evolved over the years and yet remained the same in many ways.

By Amaira Kapoor

By Ayira Jain

UNVEILING THE SEVEN WONDERS OF SCIENCE

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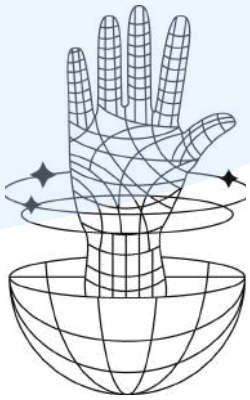
THE MULTIVERSE THEORY: IS OUR UNIVERSE JUST ONE OF MANY?

What if you had made a different choice this morning? What if, in another reality, you took a different career path, met different people, or never existed at all? The multiverse theory suggests that these alternate versions of reality may not just be imagination—they may be real. At the quantum level, particles exist in multiple states at once until observed. Some physicists believe that instead of choosing a single outcome, the universe splits—one where the event happens, and one where it doesn't. If true, every decision, every possibility, creates a new reality. Another theory suggests that during the Big Bang, rapid expansion created countless "bubble universes," each with different physical laws. In some, gravity may be stronger. In others, atoms may not even exist. If the multiverse is real, our universe is just a tiny drop in an infinite ocean. If reality splits with every decision, then in some universe, another version of you exists—but is it really *you*? Do these alternate selves share your thoughts, your memories, your identity? Or are they just strangers who happen to look like you? Right now, the multiverse is unproven. Some scientists argue it's untestable and therefore not real science. Others believe we might find indirect evidence through quantum experiments or cosmic background radiation. But if we do prove it, what then? Would it change how we see ourselves? Would it mean that every choice we make is both significant—and insignificant—at the same time? The multiverse, if real, could redefine everything we know about existence. But until we find proof, we are left with only one universe—this one. And maybe, just maybe, that makes it even more special.



By Samairra Malhotra

SYMBIOSIS IN NATURE

Planet Earth is inhabited by millions of species—at least! Because different species often inhabit the same spaces and share—or compete for—the same resources, they interact in a variety of ways, known collectively as symbiosis. There are four main symbiotic relationships: mutualism, commensalism, parasitism, and competition.

To explore these relationships, let's consider a natural ecosystem such as the ocean. Oceanic environments are known for their species diversity. Imagine you are on a diving expedition to explore the worlds beneath the waves. If we were in the warm waters of the Pacific or Indian Oceans, we'd likely spot an excellent example of mutualism: the relationship between clownfish and sea anemones. In a mutualistic relationship, both species benefit. Sea anemones live attached to the surface of coral reefs. They trap their prey with stinging cells called nematocysts, which are located on their tentacles. Nematocysts release toxins when a small animal contacts an anemone's tentacle. This paralyzes the stung animal, allowing the anemone to easily bring the animal into its mouth for ingestion.

BY SANAYA JAIN

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SCIENCE FICTION VS SCIENCE

We all know about science, a subject that breaks down and helps us to understand the mysteries of the universe, from gravity to genetics. And we've all heard of fiction, the world of imagination and the world where all dreams come true, which brings us thrilling stories in books and movies. But what happens when these two worlds collide? Science Fiction, a genre where reality meets possibility, blending scientific concepts with futuristic adventures. If you've never explored the fascinating link between Science and Science Fiction, this article will take you on a journey through their similarities and differences!

Now, let me introduce "science" to you. Science is a standard subject every student learns at school. It is divided into 3 parts, Chemistry, Physics and Biology. It is a definite mixture of fun and learning. It is like creating a realistic adventure story of your own, while learning from it at the same time! Science is the root of science fiction. Science Fiction on the other hand, also known as Sci-Fi, is a story in the form of a movie or book focusing on elements of science that may evolve or get introduced in the future! Writers take creative liberties to imagine what science can progress into in the future! They are mostly related to technological advancements like time travel, or alien life forms.

There are many factors that classify, individualise and differentiate Science Fiction from Science. First, in the realm of science, the primary and most important goal to achieve is to understand the natural world, that is, the processes and phenomena that take place. Scientists commit to investigating evident events that take place, forming theories and ideas. On the other hand, science fiction uses seeds of scientific facts to build from it and create 'what if' scenarios that reach beyond current world science. This is the reason why it is called Science fiction. While science revolves on certainty, science fiction focuses on imagination, taking a bit of inspiration from scientific laws.

Second, the outcomes of scientific endeavours have direct and measurable impacts on society - they lead to tangible advancements such as new technologies, medical breakthroughs, and a deeper understanding of our world. The progression of science results in practical applications that improve daily life and contribute to economic growth and societal development. In contrast, the impact of science fiction is more abstract and cultural. While it may not always result in immediate technological change, science fiction plays a vital role in inspiring innovation and prompting critical reflection about the future. Many real-world inventors and scientists have cited science fiction as the spark that ignited their curiosity and ambition. Additionally, science fiction often acts as a social commentary, using futuristic or alternate scenarios to explore ethical dilemmas, political issues, and the human condition, thereby influencing public discourse and inspiring creative solutions.

By Samairra Malhotra and Aahana Mulchandani

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EXPERIMENTS FOR PRESCHOOL

MAGIC PEPPER EXPERIMENT

Materials Required: A shallow bowl, Water, Ground black pepper, Dish soap

How to:
1. Pour water into the bowl until the bottom is covered.
2. Sprinkle black pepper on the water.
3. Dip your finger in the water.
OBSERVATION: Nothing happens!
4. Put a drop of dish soap on your fingertip.
5. Dip your soapy finger into the water.
OBSERVATION: The pepper will quickly move away from your finger.

Reasoning: The soap breaks the surface tension of the water, making the pepper scatter.

MAGIC MILK EXPERIMENT

Materials Required: A shallow plate, Milk (whole milk works best), Food colouring (multiple colours), Dish soap, A cotton swab

How to:
1. Pour milk into the plate so it covers the bottom.
2. Add a few drops of different food coloring in different spots.
3. Dip a cotton swab into dish soap.
4. Gently touch the soapy swab to the center of the milk.
OBSERVATION: The colors swirl and mix on their own.

Reasoning: The dish soap breaks the fat in the milk, causing the colors to move and mix.

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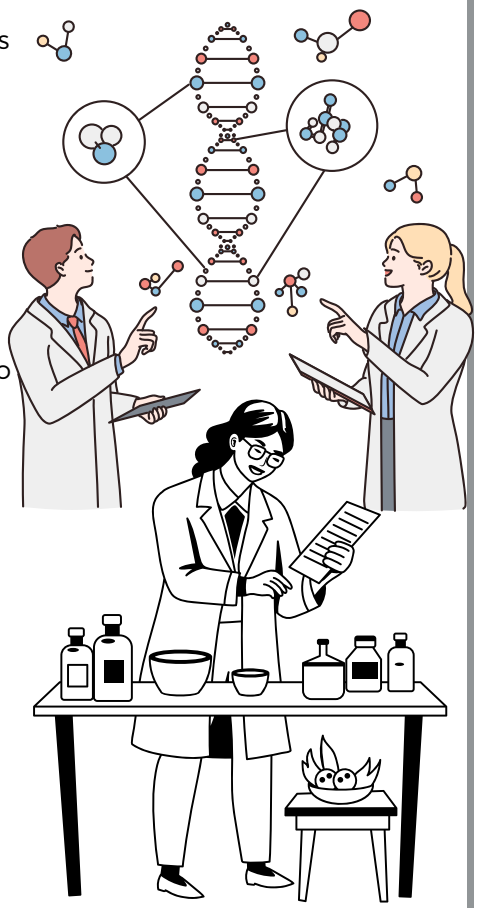
Interesting Careers In Science

Astrobiologist – Research the potential for life on other planets. Astrobiologists research extreme environments on Earth and examine how life could exist on other planets or moons within our solar system.

Environmental Scientist – Act to preserve the environment by researching pollution, climate change, and conservation. Environmental scientists usually work for government agencies or NGOs to create sustainable practices.

Genetic Counselor – Assist individuals and families in understanding genetic conditions and what genetic testing has to say. Genetic counselors apply science to make informed decisions about health, heredity, and family planning.



Neuroscientist – Investigate the nervous system and the brain to understand better how we think, learn, and perceive the world. Neuroscientists may work in research, clinic practice, or even technology, creating brain-computer interfaces.

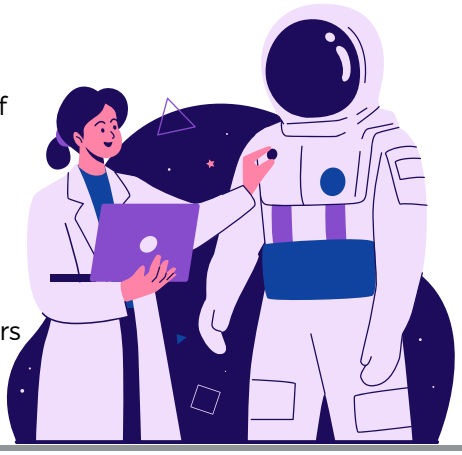
Biotechnology Researcher – Use living organisms or biological systems to create new products or technologies, including medicines, biofuels, or genetically modified plants. This discipline combines biology and technology to address real-world issues.

Forensic Scientist – Use scientific techniques to solve crimes. Forensic scientists examine evidence such as DNA, blood, and fingerprints to help law enforcement officials in criminal investigations.

Marine Biologist – Research ocean life, such as marine organisms, ecosystems, and the impact of human activity on aquatic ecosystems. Marine biologists may pursue careers in research, conservation, or policy development.

Pharmacologist – Research the actions of drugs and chemicals on the human system. Pharmacologists develop new medications or enhance existing therapies to cure diseases and enhance public health.

Climate Scientist – Study the effects of climate change on the systems of the Earth, such as weather, ecosystems, and populations. Climate scientists provide insights into policies and plans to reduce and adapt to climate change.



Space Engineer – Construct and develop technology to venture out into outer space. Space engineers design everything from spacecraft and rovers to satellite systems, leading to space missions and space exploration.

By Ananya Kumar

UNVEILING THE SEVEN WONDERS OF SCIENCE

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A GUIDE ON BINARY

The given binary code is:

01101000 01100101
01101100 01101100 01101111
00100000 01100101
01100001 01110010
01110100 01101100 01101001
01101110 01100111 01110011

Step 1: Break the code into 8-bit segments:

01101000 → h
01100101 → e
01101100 → l
01101100 → l
01101111 → o
00100000 → (space)
01100101 → e
01100001 → a
01110010 → r
01110100 → t
01101000 → h
01101100 → l
01101001 → i
01101110 → n
01100111 → g
01110011 → s

Decoded message: "hello earthlings"

CROSS WORD HINTS

1) Blood vessel that carries blood with oxygen from heart to all body parts.
5) Continuous change or progress.
6) Any object that allows less light to pass and its difficult to see through.
8) Something that is operated by machines.
9) Coming up with a new idea or theory to make something artificial .

2) A quantity that does not vary.
3) The smallest particle of an element.
4) Emission of light by a hot object.
7) Beam of light.

By Muskaan Sachdeva

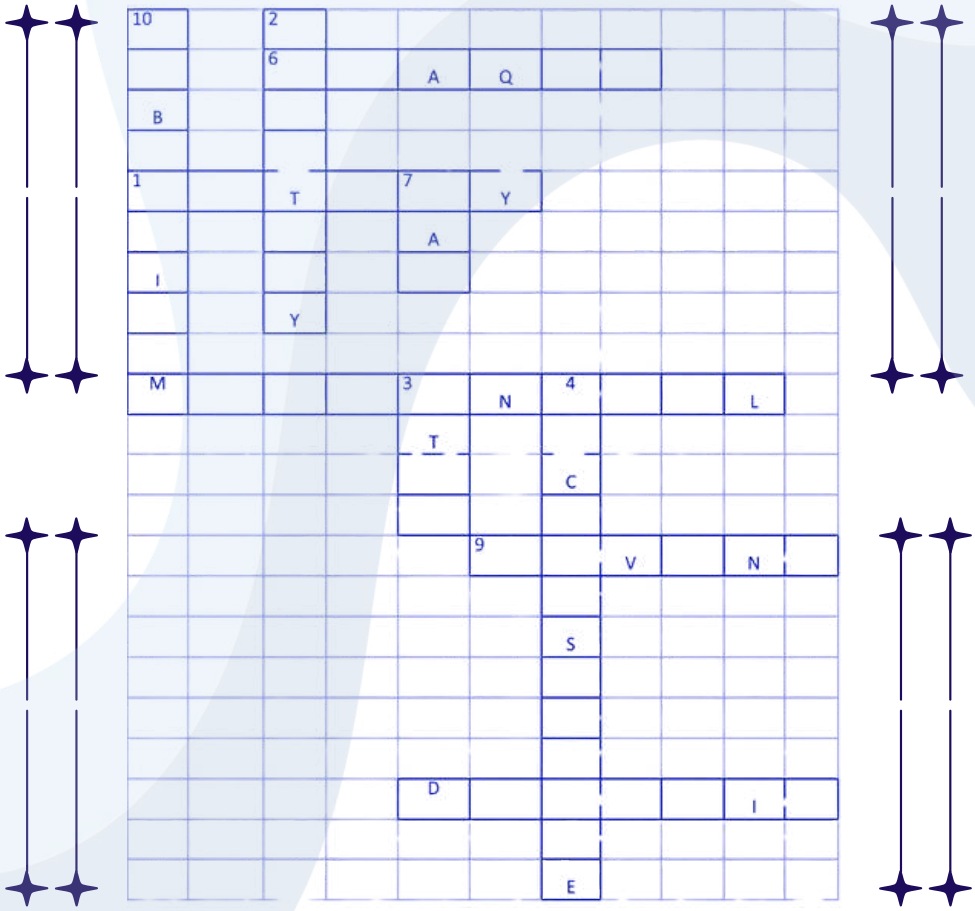
STORM YOUR MIND

Puzzle #1: An advanced civilization has sent us a mathematical sequence as a test of intelligence. Can you crack it?
2, 6, 12, 20, 30, ?
What is the next number in the sequence?

Puzzle #2: Galactic Cipher
Aliens don't use our alphabet, but they do send encoded messages. Can you decipher this one?
"Uifsf jt b tfdsfu dpef ijeefo jo uif hbmbyz!"
(Hint: Each letter has been shifted forward in the alphabet.)

Puzzle #3:
If every coin flip creates a new universe, how many universes exist after flipping a coin 5 times?
A) 5
B) 10
C) 16
D) 32

Ans 3: D) 32
Ans 2: "There is a secret code hidden in the galaxy!"
Ans 1: 42



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THE DOUBLE SLIT EXPERIMENT

A Window into Quantum Mechanics

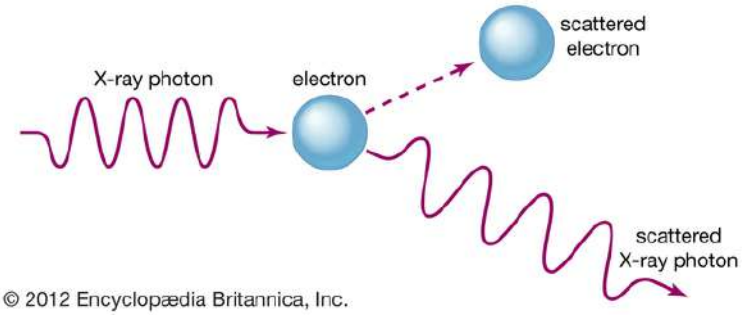
Originally done in the early 19th century by Thomas Young with light waves, the double-slit experiment was further developed in the 20th century when quantum mechanics came along. The process is straightforward: a light beam or isolated particles like electrons or photons are aimed at a two-slit barrier. Behind the barrier, a screen records the pattern created by the particles.

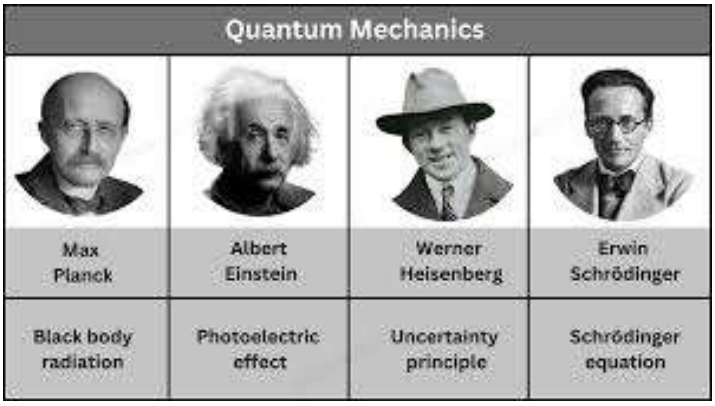
When the light is passed through the slits without observation, an interference pattern forms on the screen—alternating bright and dark regions, typical of waves interfering with each other. This indicates that every photon or electron acts like a wave, going through both slits at the same time and interfering with itself. But once a measuring device is brought into the system to see through which slit the particle will pass, the interference pattern is lost and the photons act as distinct particles passing through only one slit. Measuring causes their wave-like behavior to collapse into particle-like behavior, leading to deep philosophical questions regarding the nature of observation and reality.

The double-slit experiment is not only a demonstration of quantum mechanics; it is an open invitation to venture into the very essence of reality. While scientists continue to explore the frontiers of quantum mechanics, one thing is for sure—our perspective of the universe is still incomplete, and the secrets of quantum physics keep challenging the frontiers of human understanding.

As physicist Richard Feynman once said, 'I think I can safely say that nobody understands quantum mechanics.' However, it is this quest for understanding that makes science so alluring. The double-slit experiment reminds us that reality is stranger than we ever thought it could be, and perhaps that is exactly the mystery that makes the universe so magnificent.

By Samairra Malhotra





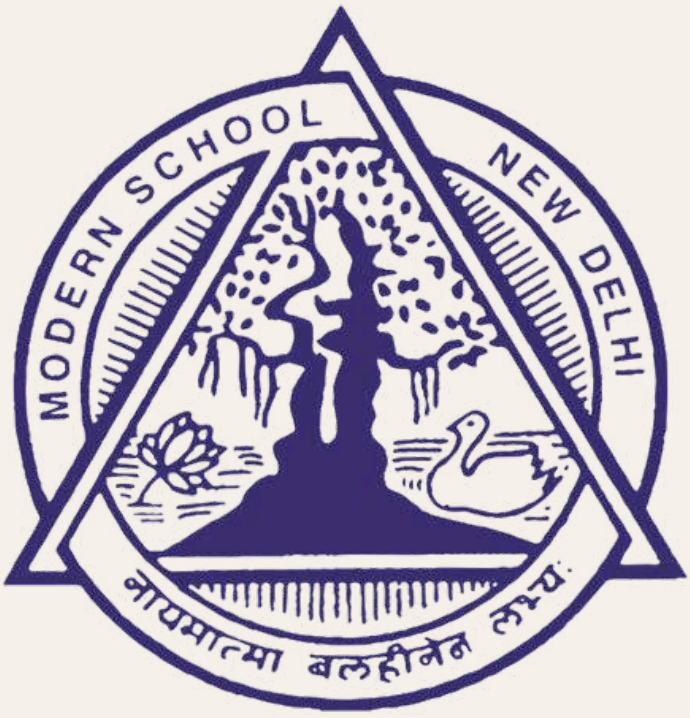
Pioneers of Quantum Mechanics

Max Planck (1858–1947): Father of quantum theory, introduced the idea of energy quantization, foundational for understanding atomic phenomena.

Albert Einstein (1879–1955): Explained the photoelectric effect, showing light behaves as particles (photons), earning him the Nobel Prize.

Werner Heisenberg (1901–1976): Formulated the Uncertainty Principle, highlighting the limits of measuring particles' position and momentum.

Erwin Schrödinger (1887–1961): Developed wave mechanics and the Schrödinger equation, crucial for describing quantum states.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