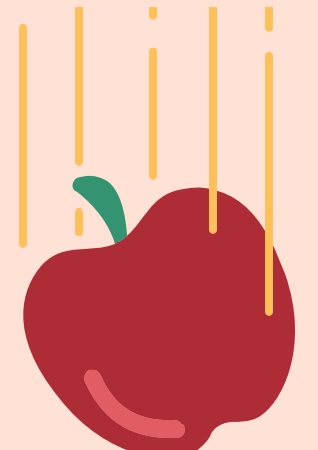
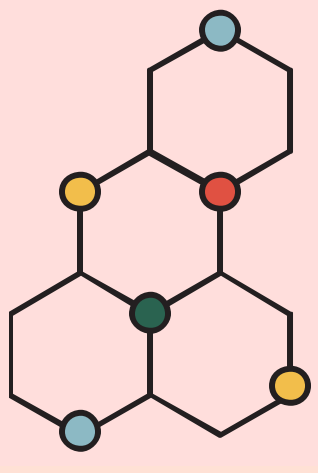
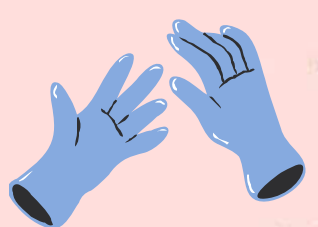
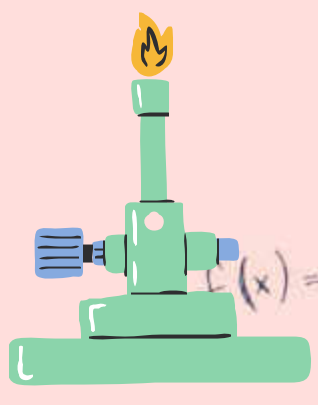
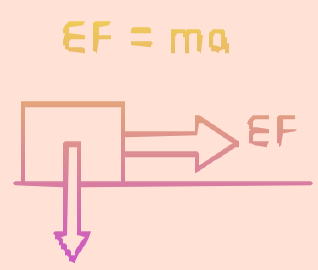
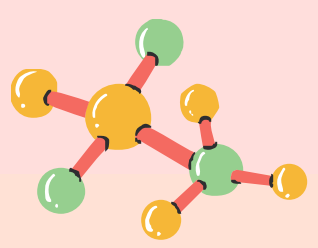
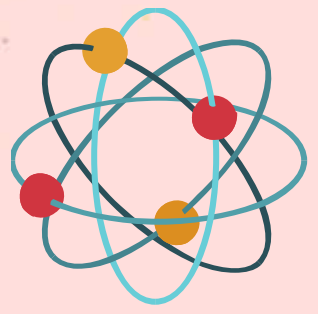
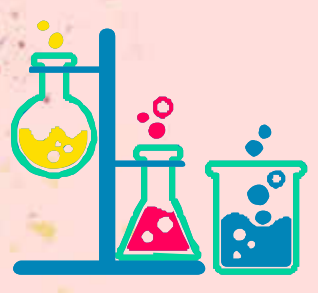




Spectrum



Editor's Note

"There are only two tragedies in life: one is not getting what one wants, and the other is getting it." - Oscar Wilde In this wonderful and awe-inspiring journal, we are committing one of those tragedies by showing you the insights of science and its mysteries which continue to baffle the world till date and I believe, it will continue to do so. I implore you to turn the pages till the end, where you will find the mysteries of this vast and untarnished world where life starts and ends with a single word in mind which is connected to each and every particle in existence which is "Science".

- Shrivansh Agarwal

In this Issue

Smokeless Chulha

The Hidden King

Humour in Science

Easy Money

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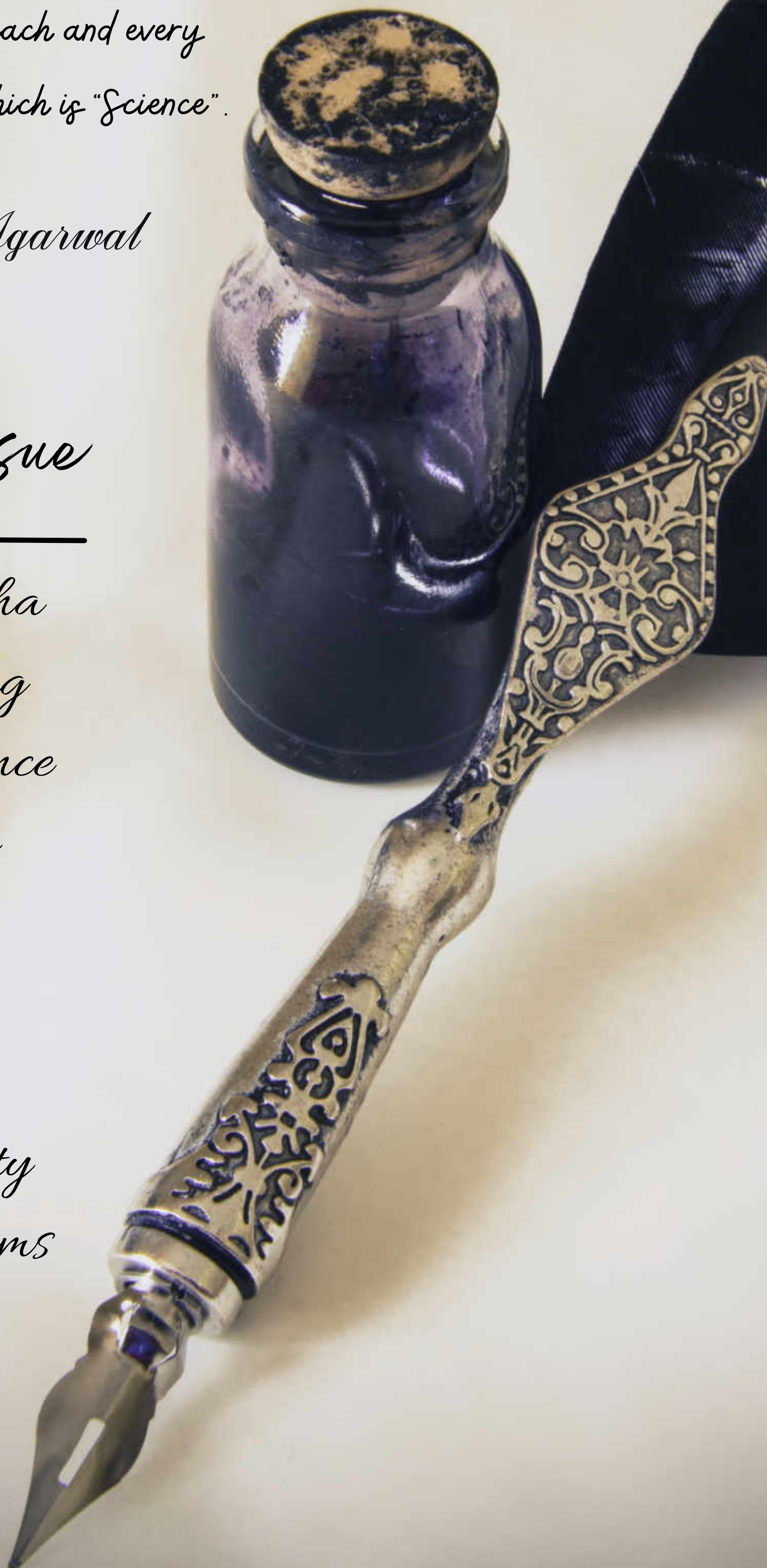
Diy

Picturing Reality

Science of Dreams

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Innovation

Smokeless Energy Efficient Chulha

“Swachh Rasoī” for smokeless cooking area

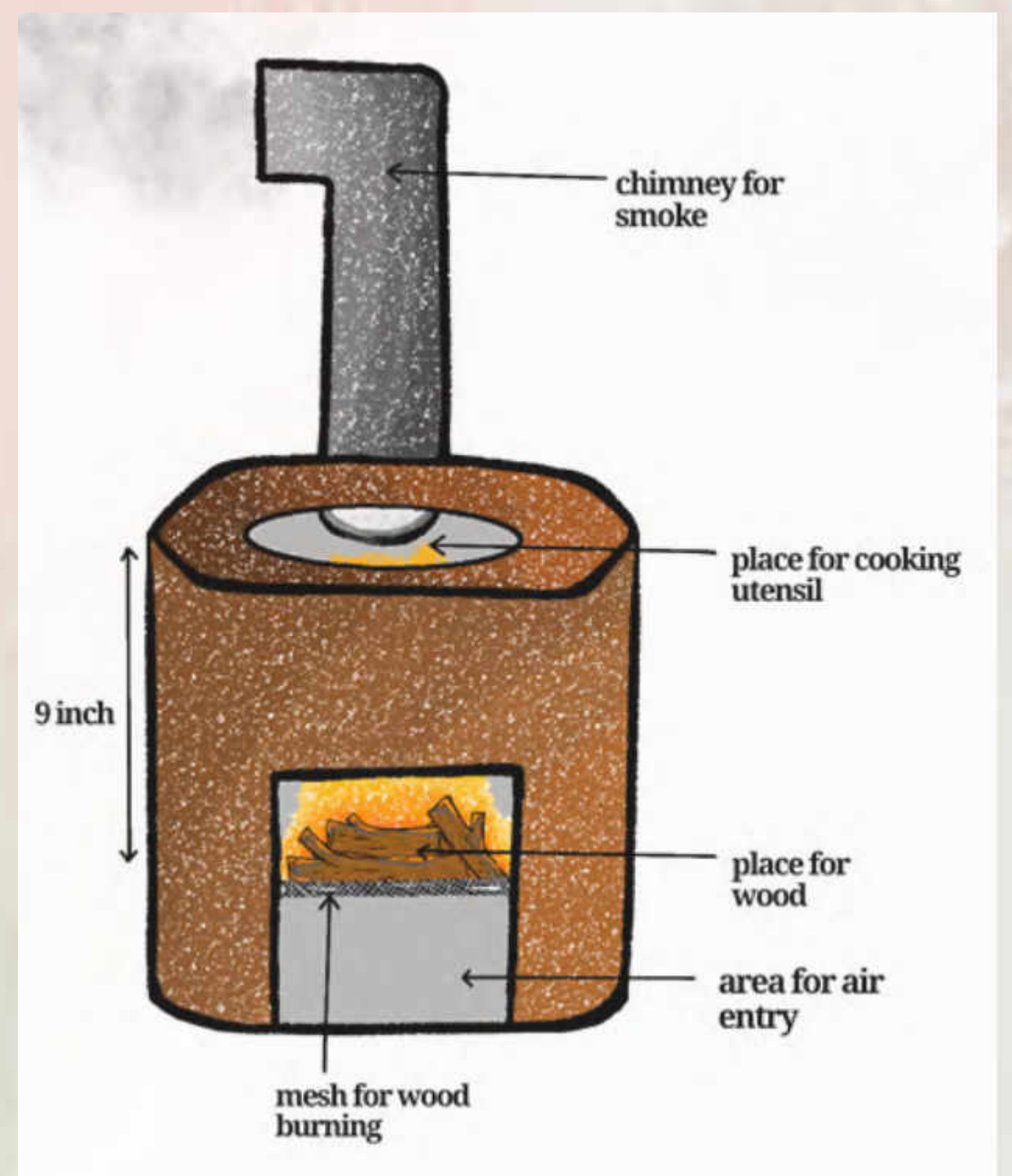
-Anvita Dey X 

This innovative science project was carried out, under the aegis of Science Club, with the objective to provide a “clean smoke free cooking environment” to the underprivileged sections of the society.

The concept - Government of India has provided LPG connection to most of the houses in villages but the matter of fact is, the poor villagers are not able to refill the cylinders regularly and depend upon alternate cooking methods. In the North east, due to dense forest cover, wood is available for free and wood burning in open chulhas is the most popular cooking method; that produces lots of harmful smoke. The smoke spreads in the whole cooking area and causes various lung diseases.

Design and Mechanism - The Model is developed using a 20 L waste oil container, On the top side a gap is left that is attached with an iron ring to support the cooking utensil. A cut is made on the side wall for air and wood supply. In the centre a mesh is made with iron rods to keep the wood logs. A Chimney is attached to the top side just opposite to the cut that will remove any smoke generated during burning of wood.

Sufficient air enters from the cut, and passes through wood that is kept on mesh, which helps in complete combustion of wood, generating sufficient energy that will be is much more than the conventional cooking chulha. This design will also generates less smoke as compared to conventional chulha, Moreover the chimney will remove all the excess smoke.

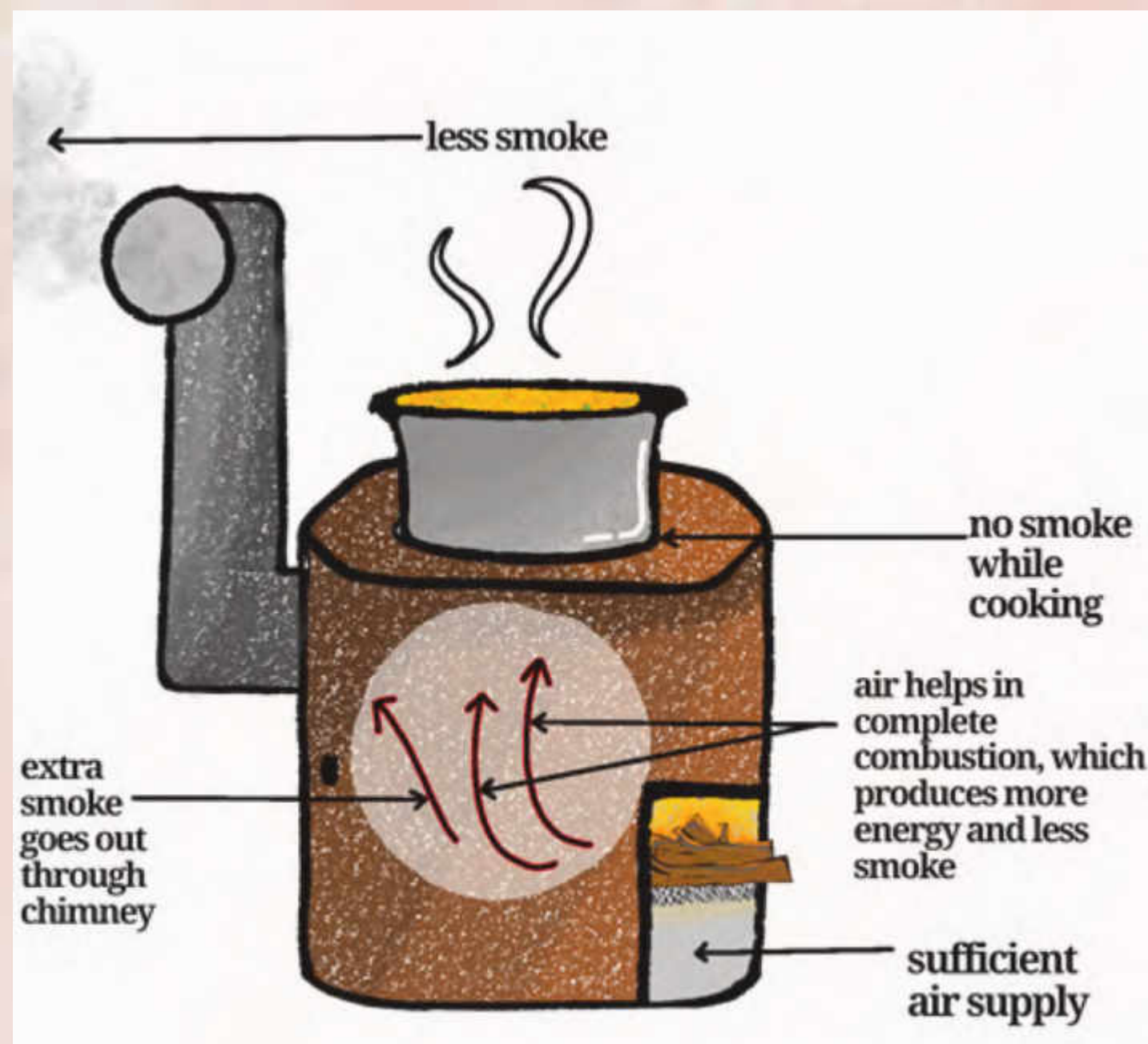


Advantage - This design provides a clean smoke free cooking area with more energy efficiency. More cooking can be done in less wood. This can bring a healthy way of cooking to women of villages. The cost is also very low so that everyone can afford it easily. This is the first innovative project of the Science club of The AVS, the model is developed, using the available waste material.

Way Forward- 1. As the first step, a prototype has been made using waste material, now the plan is to make and distribute it to the needy families in our SESSA community. This is one of the service projects of Science Club in collaboration with the Social Service league of the AVS so that ideas can be taken to various underprivileged sections of the society.

2. This model will be developed further to cut down on the cost of each unit.

3. One of the ideas is to develop “a mud chulha with bamboo as chimney” in collaboration with the Sculpture Department, so that it can be provided free of cost.



Acknowledgement - Special thanks to Dr Alpana Dey (Teacher incharge Science Club) for the Idea, research and design of the model. The Science Club is extremely thankful to Mrs Lipika Bora (Head Social Service League) for her wholehearted, dedicated support towards this idea. Sincere thanks to Mr Shambhunath for the fabrication work and putting up the things together. Heartfelt gratitude to Mr Tapan Baroi for taking keen interest in the project and for the clay art and beatification of the design. Sincere thanks to Headmaster Dr. Vidhukesh Vimal, Administrator Mr Hrishikesh Singh and DAMA, Mr Tushar Bharadwaj for their word of motivation and all the administrative support, without which this project wouldn't have been possible.



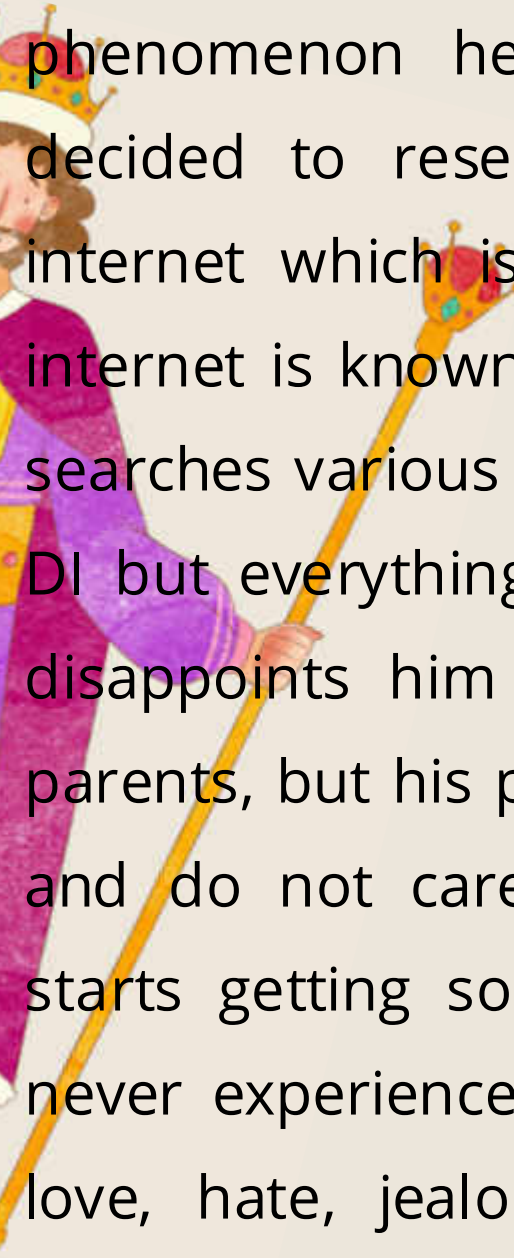
The Hidden King

-Bariskem Khyriem IX 

Walking along the roads of Euphoria High School, Elijah, a freshman in the Euphoria High School is going to his class and he gets a small split second in which he sees something different that others can't see. He is seeing colours. In the world that Elijah lives, no one can feel emotions or see colours. This was done to prevent the world from judging anyone or anything as to have the perfect world with no crimes or imperfections. This was done by a supreme figure called "Father", he is praised and worshipped by the citizens who are known as Drones because they do not feel emotions and cannot judge along with seeing colours. There are only seven people in this world who can feel emotions, see colour and hence can judge people and form the government. These seven people consist of Father, his wife "Mother" and five Elders. These five elders were chosen by Father and Mother and were given special privileges due to their good track record and the least mistakes in society. This world that Elijah lives in is called Euphoria, its first citizen and founder was Father and his wife "Mother". The people were part of the regular world but then were converted into Drones by Father and soon they started obeying all Father's instructions and obeyed each of them without question or

judgement. They were converted into Drones by injecting a special serum into their bloodstream every day. This serum is called Neutralizer. It was invented by Father along with Mother supporting him. Father wanted to create a serum that would control people and make him obey his instructions without a doubt hence he created Neutralizer. Also, this world is mostly automated and humans are just there to monitor the AI that runs the whole of Euphoria. As for Elijah, as soon as his split-second strange phenomenon ends, he goes back to his regular life and goes about his day as regular. When he reaches home he meets his parents. As in this world, human emotions are absent these parents were assigned to Elijah by the government and Elijah was created in a laboratory through artificial processes and was then handed over to his "Parents". Elijah's parents were also a product of a laboratory. The people who were originally transformed into Drones from regular humans had passed away a long time ago and they were known as the founding fathers along with Father. Elijah was a bit curious about this phenomenon he experienced at school. Elijah decided to research this phenomenon on the internet which is embedded into his brain. This internet is known as Deviceless Internet or DI.



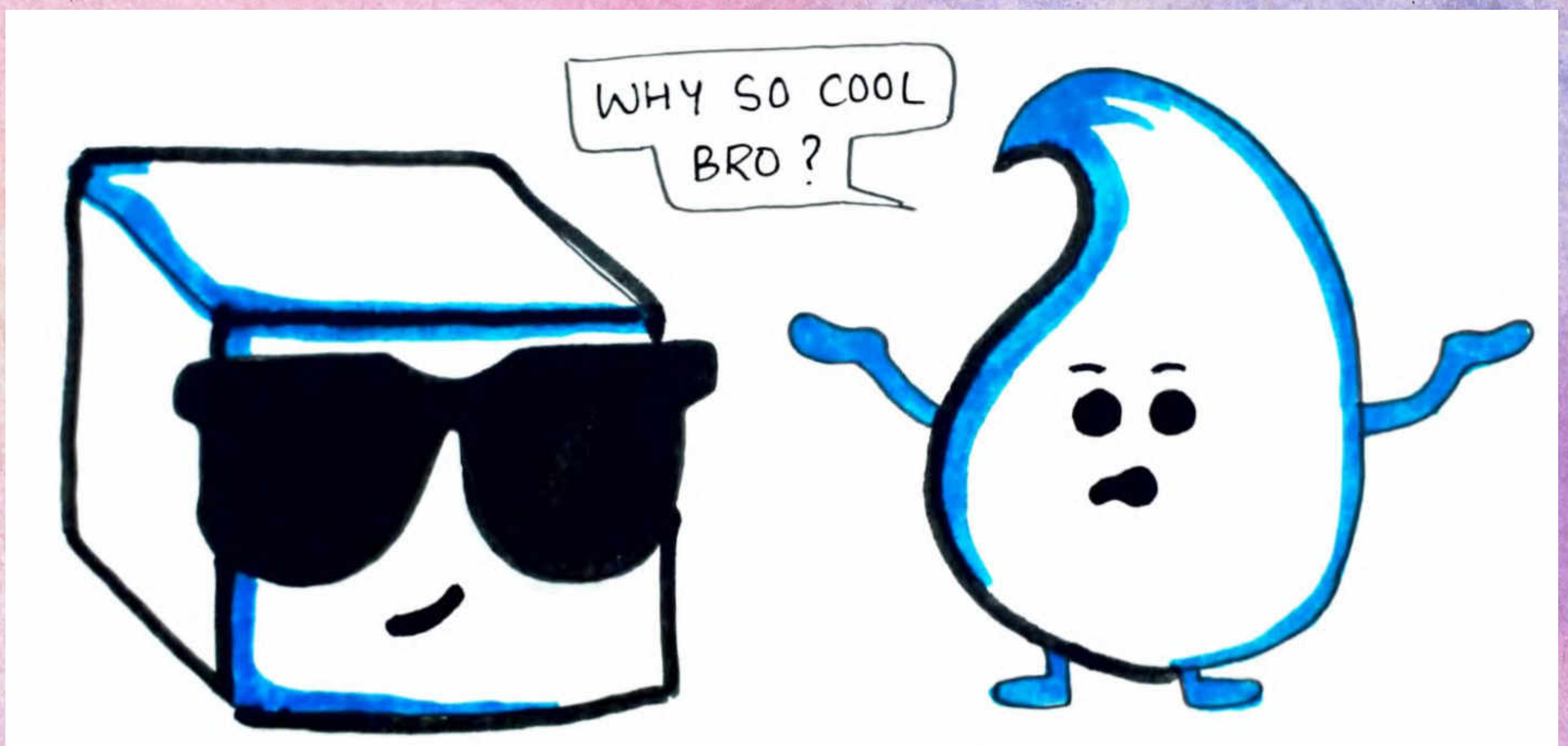
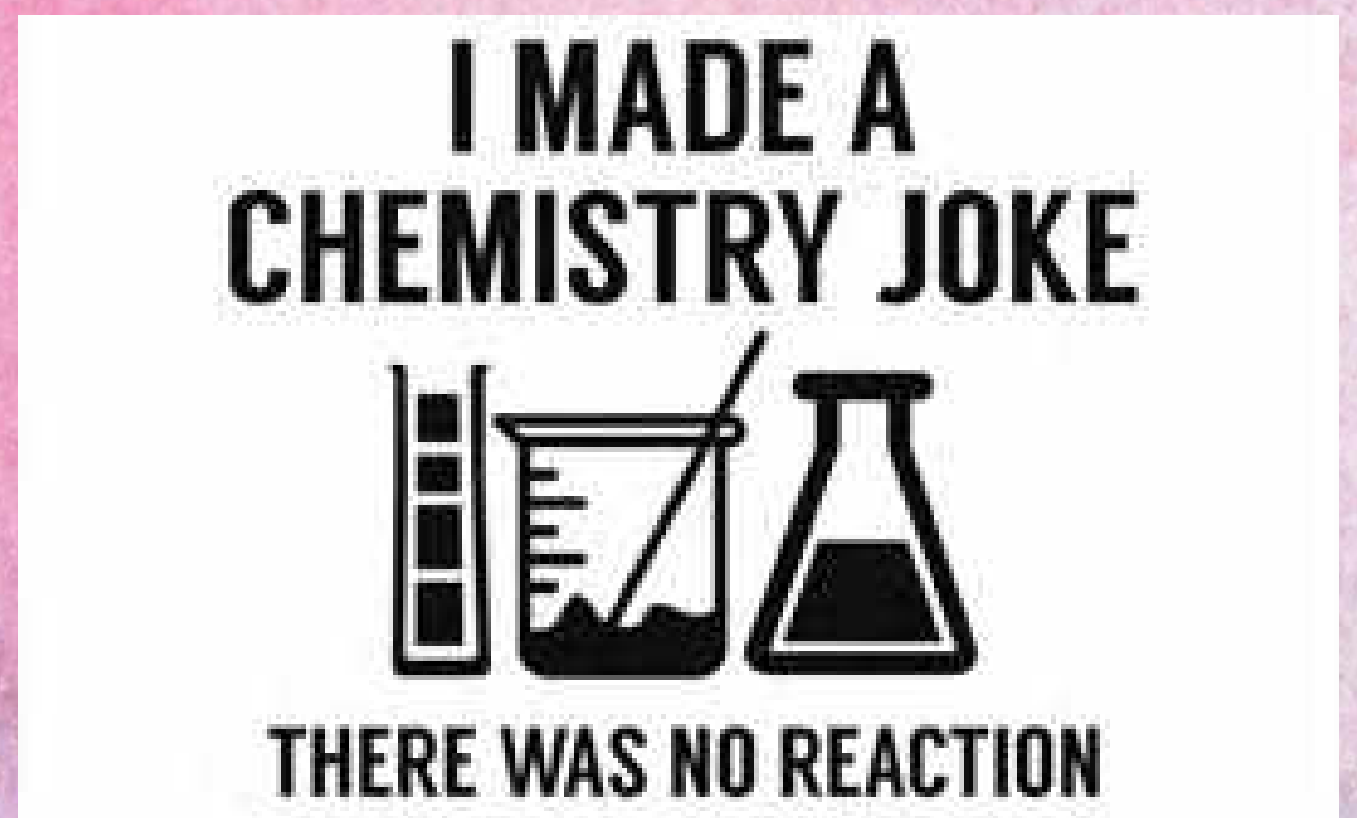
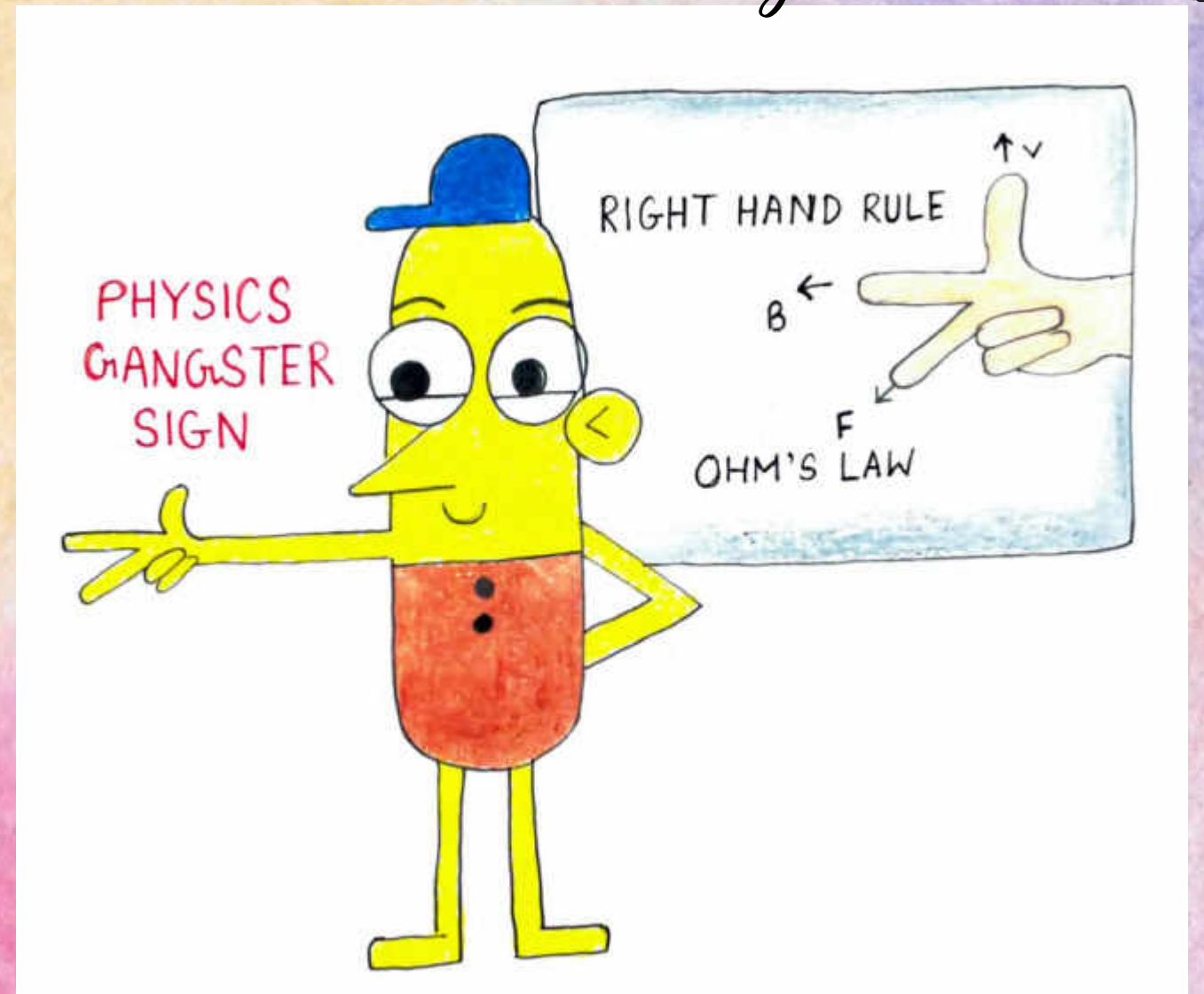
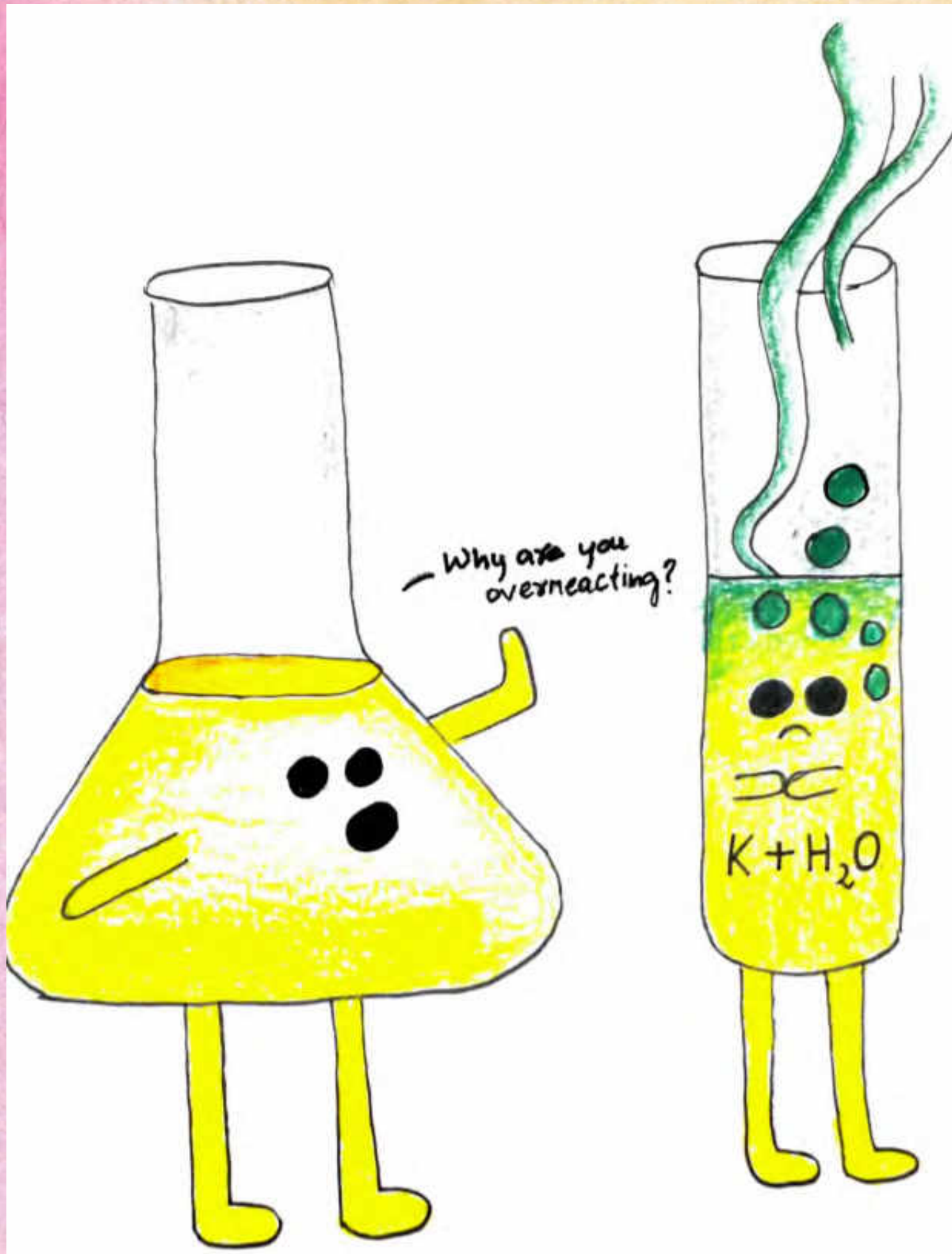


He searches various websites and webpages over the DI but everything he does returns negative. This disappoints him so he decides to question his parents, but his parents deny this and brush it off and do not care about it anymore. Elijah then starts getting some strange feeling that he has never experienced before, he feels emotions like love, hate, jealousy, etc. He also starts seeing colours and starts to judge things and people. He also starts looking at girls, wants to talk to them, and starts having thoughts like normal human beings. Elijah then gets curious about his abilities and decides to infiltrate the Royal Residence where the Father, Mother and the Elders reside. He is curious about who they are really and wants to know their identity as their identity is a secret to the people. He decides not to go to school and bunk it and lies to his parents about baking school. He steals some money for a cab and then goes near the Royal Residence the next day

He reaches there and then sneaks his way into the Residence which was way easier than he thought. The Royal Residence consisted of the governments' offices and working spaces and consisted of the living spaces of the government. The building is in the form of a circle with small rectangles radiating from it which act as entrances to the building. The main entrance is a bigger rectangle than the others. When Elijah enters the Residence, he enters through the main entrance and is then present in the Main Hall or the Entrance Hall. He quietly sneaks past the guards who carry guns that melt and disintegrate people into oblivion. He almost gets spotted by the guard who became suspicious and launched an attack but Elijah evades the attack and just feels the warmth of the laser and was not spotted by the guards again. He then sneaks past the government's officials' offices where there was no presence of guards but he didn't know about the invisible security cameras that were watching every one of his moves. He was oblivious to this fact. Even though the Elders and Father were watching him, they let him come through and enter till the Throne Room. The Room was lined up with futuristic panels that showed the entire city. The panels showed all the Drones' information and job titles and their chances of turning back to humans. Elijah then suddenly fainted when he saw the silhouette of two people coming towards him which he thought were similar to the people he saw in his visions and dreams. Elijah then wakes up to see himself sitting on the same throne he saw before fainting alongside a woman. He was dressed in clothes that seemed to be of really high quality and build. Five people were wearing black cloaks and masks chanting out to him "Long live the Lord".

HUMOUR IN SCIENCE

-Suhani Agarwala XI 



EASY MONEY?

All about Crypto Currency

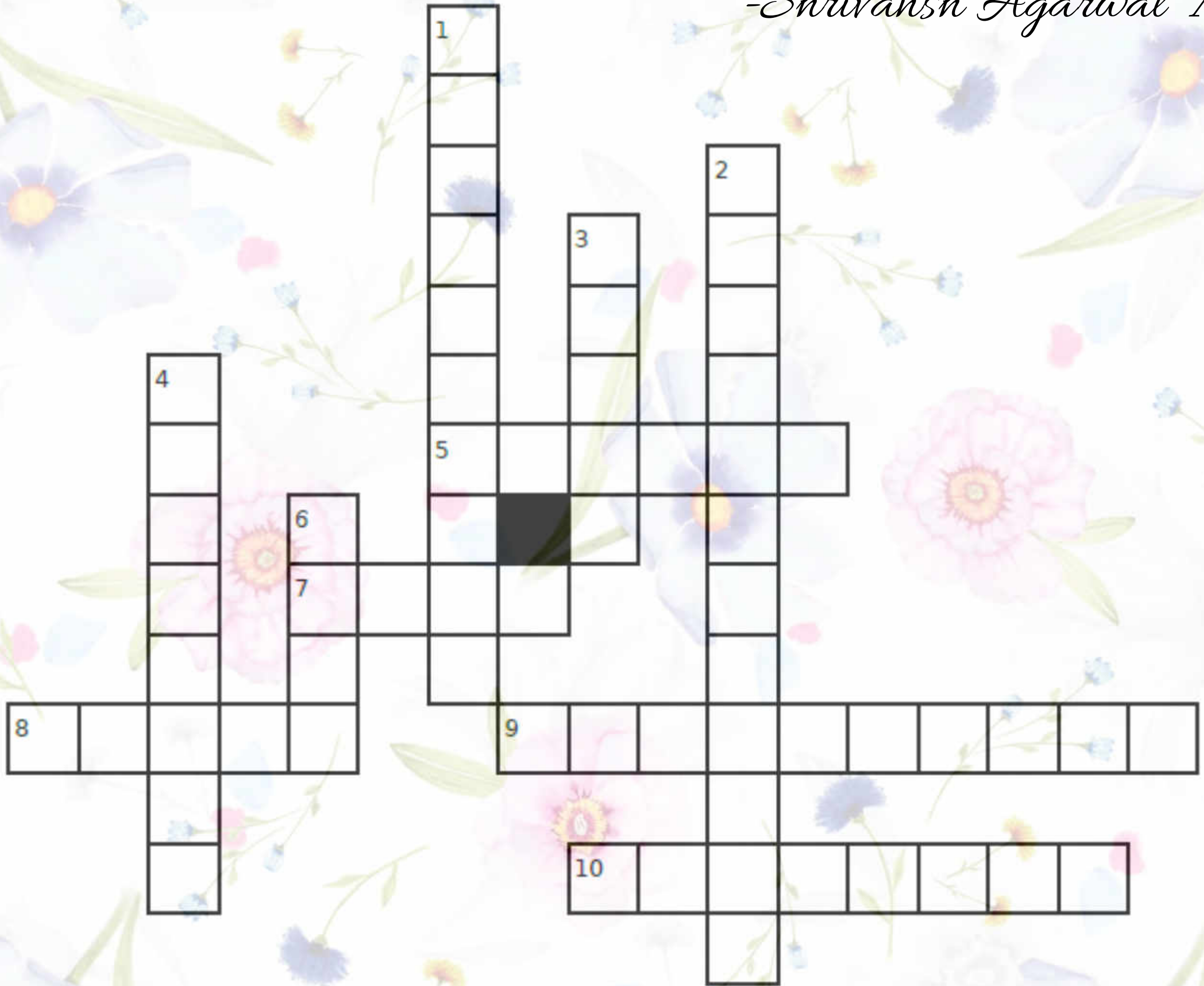
- Yash Raj Agarwal XI 

A cryptocurrency is a new & popular system of digital currency. The person who created Bitcoin back in 2009 was known by the pseudonym "Satoshi Nakamoto" and was also the one who gave birth to cryptocurrency. This currency is secured by cryptography, which is an advanced and secured way to encrypt data and exchange messages which makes it impossible to counterfeit or double-spend. This currency is in a form of decentralized network which is based on a blockchain technology where data and records of transaction are stored in a distributed database that is shared among the nodes of a computer network making it independent and free from the need of trusted third party like banks. Crypto Mining is a transactional process where computers are used to earn cryptocurrencies by solving complex cryptographic equations. This involves validating data blocks and adding transaction records to a public record(ledger) known as blockchain. But the method is complete only a "miner" verifies the transaction as legitimate. Once that's done, the transaction is locked into the blockchain for everybody to ascertain and therefore the transaction is complete. This verification process requires miners to solve very complex equations. They are during a race against one another to unravel the matter. Those who do that first are paid a fraction of the transaction as a fee for their effort. Every successful transaction result in new coins getting into circulation. For aspiring crypto miners, curiosity and a robust desire to find out are simply a requirement . Determining whether crypto mining is worth it depends on several factors. Whether a prospective miner chooses a CPU, GPU, ASIC miner, or cloud mining, the most important factors to consider are the mining rig's hash rate, electric power consumption, and overall costs.

Generally, crypto mining machines consume a considerable amount of electricity and emit significant heat. For instance, the typical ASIC miner will use roughly about 72 terawatts of power to make a bitcoin in about ten minutes. These figures still keep on changing as technology advances and mining difficulty increases. Even though the worth of the machine matters, it's also quite important to think about electricity consumption, electricity costs within the area, and cooling costs, especially with GPU and ASIC mining rigs. It is also important to think about the extent of difficulty for the cryptocurrency that person wants to mine, so as determine whether the operation would even be profitable. The crypto mining space is consistently changing as new technologies emerge. The professional miners who receive the simplest rewards are constantly studying the space and optimizing their mining strategies to enhance their performance. On the other hand, climate change advocates have become increasingly concerned, as more and more fossil fuels are burned to fuel the mining process that are happening worldwide. Such concerns have pushed cryptocurrency communities like Ethereum to think about switching from PoW frameworks to more sustainable frameworks, like proof-of-stake frameworks. We can speculate on what value cryptocurrency may have for investors within the coming months and years, but the truth is it's still a replacement and speculative investment, without much history on which to base predictions. No matter what a given expert thinks or says, nobody really knows. That's why it's important to only invest what you're prepared to lose, and stick with more conventional investments for long-term wealth building. Refernce: <https://en.wikipedia.org>

Brain Quiz

-Shrivansh Agarwal XI 



Down:

- 1. What is a computer?
- 2. What makes us humans?
- 3. What is supposed to be at the bottom of the ocean?
- 4. What does a light year measure?
- 6. What is the name of the planet coloured red?

Across:

- 5. Which Apollo moon mission was the first to carry a lunar rover?
- 7. What was the universe primarily composed of?
- 8. The only planet in the solar system which spins clockwise is
- 9. Why do we Dream?
- 10. What is the study of mushrooms called?

Submit your answers to coptm@aasamvalleyschool.com
Results will be announced next week

TACHYSENSIA

Fast Feeling

-Suhani Agarwala XI 



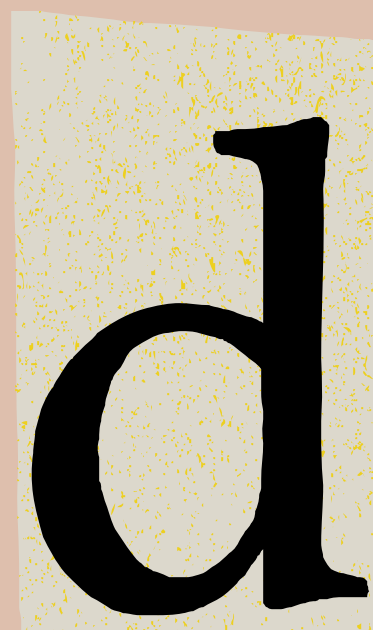
Tachysensia, often called fast feeling, is a rare condition that causes temporary episodes of distorted perception and disorientation. It is the amplification of senses in one's consciousness. These episodes aren't the result of a problem with our eyes or a hallucination. They are caused by changes in how our brain perceives the environment we are in. This can affect multiple senses, including vision, touch, and hearing. We may also lose a sense of time. Time seems to pass faster or slower than we think. I usually experience tachysensia before the examinations, when I am stressed. Stress is the leading cause of tachysensia in adults. In one of my tachysensia spells, I could see space and time dilated, as if in a dream. People in the room seemed very far away, and their motions were disturbingly fast. Also, I could experience a sensation that my movements are hurried or speeded up. Even when I try to purposely move slowly, it seemed more than three times the actual speed. In the spell, every sound, even typically quiet sounds, seems loud and intrusive. Researchers have found that these episodes are different for each person. What you experience may vary from one episode to the next as well. There is a small group of about a thousand 'FAST FEELERS', some found to fall into these fast-feeling episodes for less than 10 minutes, from one to five times a year. The fast-feeling sensation can be alarming, and the noise amplification can be painful at times, like when a soft fan suddenly sounds like a plane taking off. However, most tachysensia symptoms won't harm you. But, if these episodes worsen or happen frequently then you need to consult a psychiatrist.

Reference: <https://www.psychologytoday.com/us/blog/the-speed-life/202010/is-there-such-thing-tachysensia>,

<https://www.healthline.com/health/alice-in-wonderland-syndrome>

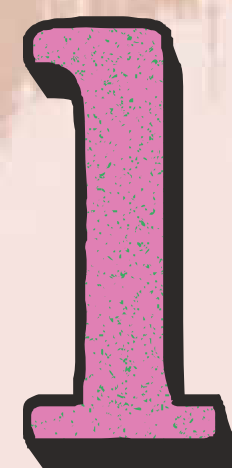


VIBRANT FLOWERS RADIANT SKIN



-Angelica Saikia, Dr. Alpana Dey,
Mrs. Lipika Borah

Introduction- Marigold flowers are commonly grown in gardens for their vibrant colours. The name probably derives from “Mary’s gold” as the flowers were used in ceremonies to crown the Virgin Mary during May. Medicinal properties: In what follows, “marigold” refers only to *Calendula officinalis*. Much laboratory research has been conducted on these flowers and several active ingredients have been purified. These have been found to have anti-inflammatory and antimicrobial effects. In animal studies, experimental wounds were found to heal faster when treated with topical marigold ointment compared with placebo creams. In spite of its long tradition of use, few studies have been published in humans. One study reported on 15 patients with burns and wounds that were not healing with conventional treatment. Many of the patients reported wound healing after using marigold ointment. Another study of people with burns reported better healing after marigold compared with pure Vaseline or a pharmaceutical ointment. Marigolds are generally administered in tinctures, ointments, and infusions to treat wounds for inflammation of the skin and mucous membranes. Polysaccharides having (1→3)-linked β -D-galactan are isolated from aqueous marigold extract, which stimulates phagocytosis of granulocytes in humans .



Method-

1. Take 100 gm petals of yellow marigold flowers and crush it to fine paste in pestle and mortar.
2. Add 20 ml fresh aloe vera juice, 10 ml of rose water, 5 ml honey, 5 ml of vit. E oil, and 10 ml coconut oil and mix it well.
3. Store it in an airtight clean container and store it in a cold and dark place.



Application- Use it as ordinary anti-septic cream; twice a day





PICTURING REALITY



AUGMENTED REALITY & MEDICAL SCIENCE

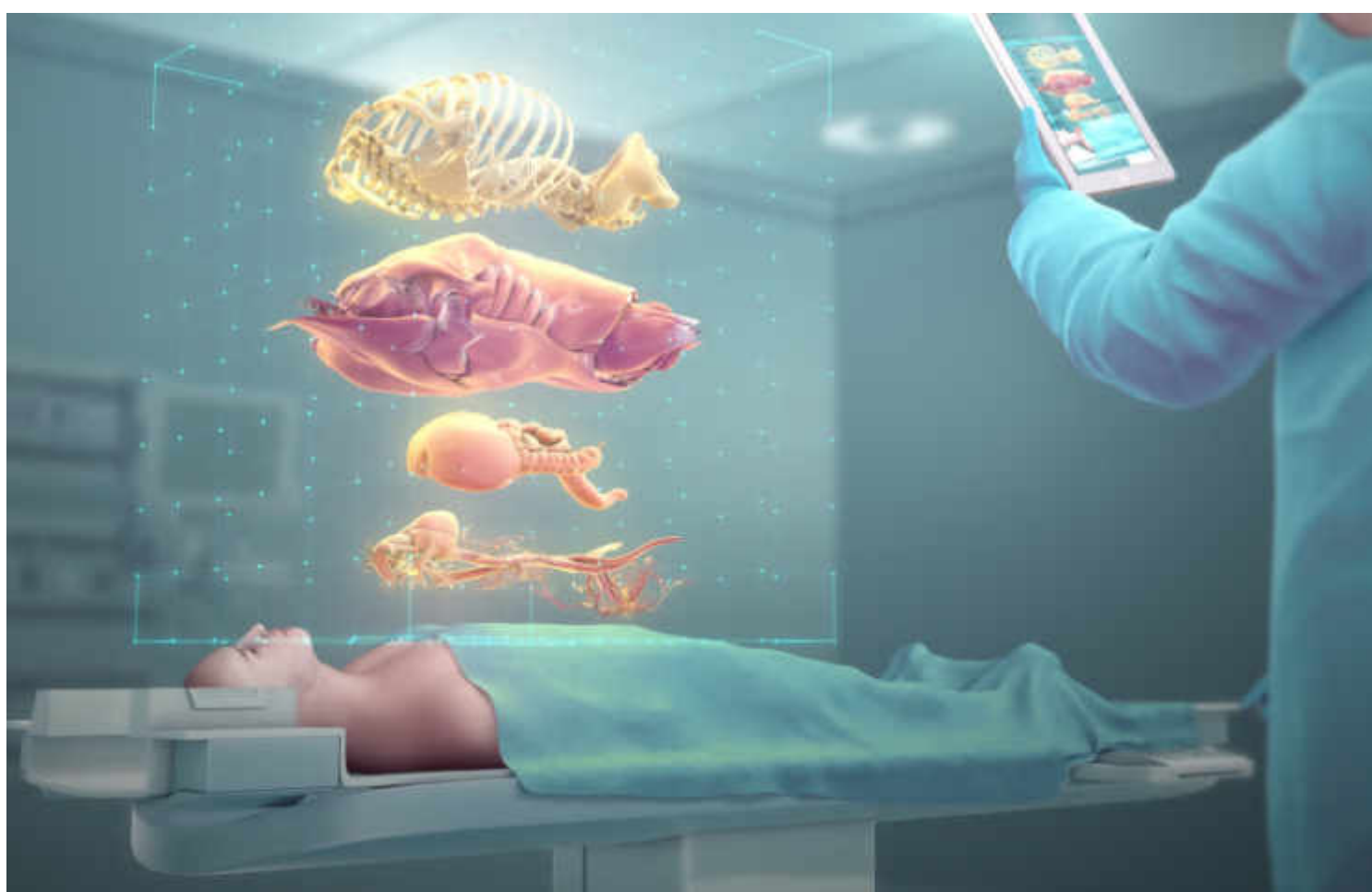
- Chinmay Tamuli XI 

With the latest advancements in processing and imaging technologies, the world has seen the teeny concept of artificial reality turn into one of the biggest trends of the century. The immense versatility it provides opens a plethora of applications; a few harmless ones seen already in our smartphones these days. But the scale at which we have seen this technology grow is remarkable, and as three-dimensional projectors have come to be, artificial reality, or augmented reality as it is called has made concepts straight out of a sci-fi movie very much a reality. So, what exactly is AR?

Let us see the real-life environment right in front of us—trees swaying in the park, dogs chasing balls, kids playing soccer—with a digital augmentation overlaid on it. This allows us to replicate situations and objects virtually and interact with them.¹ The level of possibilities stretches to something like a pterodactyl landing in the trees, the dogs could be mingling with their cartoon counterparts, and the kids could be seen kicking past an alien spacecraft on their way to score a goal. We have accepted the use of augmented reality in our lives without even really realizing it. From Snapchat filters and apps that help you find your car in a crowded parking lot, and to a variety of shopping apps that let you try on clothes without even leaving home. It has silently become a part of our lives and changed them in ways we never thought possible.



AR designers made huge strides in the 2010s — a decade full of inestimable AR assignment and exemplifications while the needed detectors came cheaper. Pokémon GO is noteworthy, a GPS-acquainted app that “inserts” Pokémon characters into users’ surroundings and they can find and capture them on device defences. Google’s AR stickers are another good example; users drop realistic images into their camera shots. Users find AR particularly appealing for its entertainment value. Still, AR’s mainstream future appears assured across a wide range of operations, including education inside galleries. With AR operations, you can bring objects closer to users in their own surroundings through designs that are more directly engaging.² Forbes lists 9 very powerful real-life applications of AR, this includes the Gatwick Airport passenger’s app which is highly commended for the application of creativity. The IKEA developed app that lets people measure the space required for the piece of furniture they are purchasing, while Dulux has an app that recreates the effect of paint on a wall even before it is actually applied. Moreover, luxury brands like Rolex with high-value items let their customers try out their products without really handling such expensive items. There are some incredibly exciting applications for augmented reality in healthcare from allowing medical students to train in AR environments to telemedicine options that enable medical professionals to interact with patients and recreate critical situations without actually risking human lives. Augmented Reality can be expected to have much more such impact in our daily lives as technology advances further. Reference - <https://www.ptc.com/en/resources/augmented-reality>



JAMES WEBB

TELESCOPE

NASA'S 10 BILLION DOLLAR GAMBLE

-Arjan Singh XI 

In the cauldron of the early universe no light could escape the dense opaque fog of primordial gas, but as the cosmic soup of atomic particles began to cool down hydrogen atoms began to form, leading to the universe's first bright violent event, forming new stars burning through the fog that once showed only sign of darkness in the new expanding universe. Some of these early photons have travelled the vast empty expanse of space for 13.5 billion years, and will reach their destination, here on to the marvel of exploration made by mankind for the first time. The telescope is named after James E. Webb, who was the administrator of NASA from 1961 to 1968 and played an integral role in the Apollo program. The main goal of this telescope was to succeed Hubble telescope as NASA's new flagship mission in astrophysics. Its primary mirror, the Optical Telescope Element, consists of 18 hexagonal mirror segments placed in a honeycomb design which is made of gold-plated beryllium which in overall is 6.5-meter (21 ft) diameter mirror for reference Hubble telescope's mirror is 2.4 meters. Unlike Hubble, which observes in the near ultraviolet, visible, and near infrared (0.1–1.0 μm) spectra, James Webb will observe in a lower frequency range, from long-wavelength visible light (red) through mid-infrared (0.6–28.3 μm). This will enable it to observe high-redshift objects that are too old, faint, and distant for Hubble. The telescope must be kept below 50 K

(-223 °C; -370 °F) to observe faint signals in the infrared without interference from any other sources of warmth, so it will be deployed in space near the Sun-Earth L2 Lagrange point, it is a point in space about 1.5 million kilometers (930,000 mi) from Earth, where the gravitational pull of sun and earth is at equilibrium thus protecting its sensors from the massive amount of infrared and ultraviolet light of the sun. Its 5 layer kite-shaped sunshield can protect it from warming by the Sun, Earth and Moon at the same time. (Its outermost layer is 0.05 millimeters thick while the other four are 0.025 millimeter thick) So what's the gamble in it? Even though all the aspects and almost all scenarios have been tested, there is a room for failure, considering the complexity of "remote" preparations. Having a mirror around seven meters diameter makes JWST impossible to launch without folding it, as there is no big enough rocket developed to house the spacecraft in its final configuration. And also the factor when its in outer space, deployed - its still not risk free, there are millions of micro meteors travelling at approx: 10 km's per second can damage the mirror and its components. Apart from being damaged at only is said to have a lifetime of 10 years since its so far enough that once its fuel is exhausted it cannot be refueled or if its damaged it cannot be repaired, thus owning the title as "NASA's 10 Billion Dollar Gamble" Reference ; <https://www.jwst.nasa.gov/>

SCIENCE OF DREAMS

-Sampada Malpani XI 

Even though it is hard to define what a dream is, for the purpose of this article, we will define dreams as our thoughts during sleep that we recall when we wake up. So, sleeping dreams are not the same as 'daydreams'. Dreams are mostly visual (includes scenes and faces) and memories of taste and smell are rare in dreams. Dreams can be fun, romantic, entertaining, disturbing and frightening. They can range from truly strange imaginations to rather boring snapshots from a recent event. Dream frequency (how often they come) and it's content (what they are about) differs from person to person, hence it's subjective in nature and there are numerous reasons why this may be true. It is said that we can recall dreams better when we are woken up by someone or by an alarm clock. This is because that dream memory is still fresh in our minds but if you wake up on your own, you will transition through a few sleep stages and it is possible to lose that particular dream memory. Around 95 percent of dreams are forgotten by the time a person gets out of bed. Older people are less likely to remember their dreams because the capability of remembering reduces with time resulting in weaker memories. Dreams are just part of the sleep cycle but there are some possible explanations attached to them. Some of the explanations could be that dreams represent unconscious wants and wishes, collecting and expressing signals from the brain and body during sleep, processing all the information gathered during the day or working as a form of psychotherapy. Deep inside the temporal lobe of the brain, the hippocampus has a central role in our ability to remember, imagine and dream. There are also genes that affect how much REM (rapid eye movement) sleep people get. People with less REM sleep may not have the strange dreams that tend to come in REM. So, how long you sleep, your age, your genetics may all explain why you dream more or less than someone else.



Mars

-From Calvin XI 

As I wandered through the night,
I saw Mars rotating across the universe
And I couldn't keep my eyes off her.

Her steps created the stars,
As I trailed behind her winds.

Love came into my body,
like lightning without fear.

Rusty red surface
Someday in the future I'll touch you,
With full joy and affection.

Your billet is fear in all our dwellings,
We bar the doors, and board the windows up.

We offer you love and peace,
Friendship and kindness are the way.

Do not be afraid,

Teacher In Charge's note

This Semester "The Spectrum Team" has expanded their horizon and came up with an idea of re-starting science club activities in our school. Marching with the theme of National Science Day- 2022 ie - "Integrated Approach in Science and Technology for a Sustainable Future" the The team wish to use scientific methods to bring in some positive changes in the life of people around us. As Indians, we are genetically empowered with our skills of "Jugaad". This innate capacity is the driving force behind our first innovation "Smoke-free and energy-efficient Chulha". Hopefully, it dries up watery and buring eyes of the ladies in the village.

A highly enthusiastic, talented, and energetic new team of Spectrum is excited to present this new edition; exploring more areas of science and technology. I am sure you will enjoy reading about Cryptocurrency, augmented reality, and our regular quiz sections, DIY, science-vocab , and science humour. We will be happy to receive your comments and feedback to be able to improve it further.

Dr Alpana Dey 



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