अंक-05 वर्ष-02

सितम्बर- 2022

नई उड़ान

त्रैमासिक विज्ञान पत्रिका

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Single use plastic ban, A welcome step

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National Entrance Screening Test

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Theme of this issue is *Alternatives to Single use plastic*

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REASONS TO REFUSE SINGLE - USE PLASTIC

1. Made from fossil fuels
2. Huge carbon footprint
3. Will still be here in hundreds of years
4. Only a tiny percentage is recycled
5. Leaches toxins into food & drink
6. Causes hormone disruption & cancers
7. Pollutes our oceans
8. Kills marine animals and birds

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FROM THE DESK OF THE DIRECTOR

We are in the midst of a revolution. The nation is basking in the glory of a new proud generation that is taking the world by storm!

The entire intellectual community of the world has woken up to the reality that India is a treasure-house of talent and intelligence. The youth of today are taking India to unparalleled heights of prosperity.

The single use plastics being non-biodegradable, their presence in Municipal Solid Waste creates anaerobic conditions and inhibits the process of composting and natural decay and, therefore causes foul smell too. Many of these items including carry bags, packaging films, straws, cups etc. are light in weight and are easily carried by the wind or, along with the other solid wastes, find their way to surface waters & cause choking of drains/sewerage systems causing water logging problems/flooding. The urban stray cattle, which are often found feeding on garbage, consume plastic bags, which may be fatal to them. There are evidences that the toxic chemicals added during the manufacture of plastic, often get transferred to animal, eventually entering the human food chain.

And, in order to control the menace of indiscriminate use of single use plastic and with the aim to minimize the use of single use plastics in day-to-day life and in order to prevent adverse effects on human beings, cattle population, environment friendly alternatives to Single Use Plastics may be used for all official purposes as well as in day-to-day life.

I congratulate the entire team of "NAI UDAAN" for taking the initiative to wide spread the awareness campaign against 'Single Use Plastics' by dedicating the current issue of the magazine to such a noble cause.

HIMANSHU GUPTA

नई उड़ान

त्रैमासिक विज्ञान पत्रिका

संरक्षक
हिमांशु गुप्ता
निदेशक (शिक्षा विभाग)

प्रधान सम्पादक
ज़रीन ताज
अतिरिक्त शिक्षा निदेशक

उप प्रधान संपादक
डॉ सुधाकर भीमराव गायकवाड़
उप शिक्षा निदेशक
(विज्ञान शाखा)

उप प्रधान संपादक, प्रबंधन
संजय सुभाष कुमार
उप शिक्षा निदेशक
(परीक्षा विभाग)

सम्पादक
पुण्डरीकाक्ष कौडिन्य (प्रधानाचार्य)
(रा० प्र० वि० वि० राजनिवास मार्ग)

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कुन्दन कुमार दुबे (ओएसडी,विज्ञान शाखा)
सुमन रेलन, प्रवक्ता (अंग्रेजी)
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भावना सावनानी, प्रवक्ता
(जीव विज्ञान)
सर्वोदय कन्या विद्यालय, पटपड़गंज
डॉ अनुराग कुमार मिश्र
(प्रवक्ता,हिन्दी)
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डॉ नील कमल मिश्र
(टी जी टी विज्ञान)
सर्वोदय बाल विद्यालय ,फतेहपुर बेरी
रविंद्र कुमार ,
(टी जी टी,विज्ञान)
GBSSS आदर्श नगर, नंबर -1
चन्दन झा ,
(टी जी टी,विज्ञान)
GBSSS, घिटोरनी

डिजाईन एवं ग्राफिक्स
नवीन कुमार श्रीवास्तव
(कला अध्यापक)
सर्वोदय बाल विद्यालय ,फतेहपुर बेरी

एक पुरानी कहावत है – "अब पछताए होत क्या, जब चिड़िया चुग गई खेत"। इस उक्ति का शाब्दिक अर्थ है कि नुकसान होने के बाद पछताने से कुछ नहीं होने वाला है लेकिन इसका आशय यह है कि हमें किसी भी नुकसान या आपदा का पूर्वानुमान होते ही जागरूक हो जाना चाहिए। यदि समय रहते बचाव के उपाय नहीं किये गये तो पश्चाताप के अतिरिक्त कुछ शेष नहीं रहता है । पर्यावरण के लिए यह कहावत बहुत प्रासंगिक है। दुनिया भर के सरकारी, गैर सरकारी एवं पारिस्थितिकी तंत्र के संतुलन के लिए कार्य करने वाले संस्थानों ने भविष्य में एक विकराल आपदा का रूप धारण करने जा रही समस्या को पहचान कर उसका गणितीय आकलन कर लिया है । विश्व की कार्यकारी संस्थाओं द्वारा इसके निदान के लिए आवश्यक ठोस उपायों के क्रियान्वयन की दिशा में अभी उस स्तर पर कार्य आरम्भ नहीं किया है , जिस स्तर पर इसे करने की आवश्यकता है।

भारत सदा से पर्यावरण संरक्षण के प्रति दृढ़ संकल्प रहा है। पारम्परिक रूप से हमारी दिनचर्या भूमि, जल, वायु की शुद्धता के इर्दगिर्द ही घूमती है। हमारे ऋषियों ने तालाबों, नदियों व वृक्षों में देवत्व की अवधारणा विकसित कर उसके संरक्षण को जन सामान्य के साथ जोड़ा तथा हमारी भोजन और वस्त्र सम्बन्धी जरूरतें भी पर्यावरण की शुद्धता को बनाये रखने के संकल्प के साथ निर्धारित की गयी।

भूमण्डलीकरण के दौर ने पर्यावरण संरक्षण की हमारी महान् परम्पराओं को बहुत तेजी से हानि पहुंचायी है। आर्थिक उदारीकरण के साथ हमारे यहाँ भी उपभोक्तावाद की संस्कृति ने विकराल रूप धारण किया है, जिसके अनेक वीभत्स परिणामों में पर्यावरण सम्बन्धी उदासीनता भी एक पक्ष है। यद्यपि विश्व संस्थाओं के बीच हुए विभिन्न समझौतों और सरकार के पर्यावरण सम्बन्धी कार्यक्रमों ने जागरूकता के स्तर को बढ़ाया है। सरकारी स्तर पर कारखानों के अपशिष्ट के निस्तारण के कठोर नियम, प्रदूषण के स्तर को कम करने के लिए प्राकृतिक ऊर्जा स्रोतों के उपयोग पर विशिष्ट ध्यान एवं सिंगल यूज प्लास्टिक पर प्रतिबन्ध जैसे कुछ बड़े कदम उठाये जा रहे हैं लेकिन ये प्रयास तब तक प्रभावकारी नहीं होंगे, जब तक जन-जन की इस दिशा में सहभागिता नहीं होगी।

पत्रिका का यह अंक 'सिंगल यूज प्लास्टिक' व पर्यावरण के प्रतिकूल चीजों के उपयोग से बचने की दिशा में हमारे संकल्प का दस्तावेज है। यह अंक न केवल पर्यावरण संरक्षण के हमारे सामूहिक प्रयासों को 'नई उड़ान' देगा अपितु हमारे बच्चों, अभिभावकों और पत्रिका के सभी पाठकों को इस दिशा में समुचित विचार एवं ठोस कार्य करने के लिए प्रेरित करेगा। 'माता भूमिः पुत्रो अहं पृथिव्याः'अर्थात् भूमि हमारी माता है और हम इसकी सन्तान हैं' इस उत्तरदायित्वबोध के साथ पत्रिका का यह नवीन अंक पाठकों को सादर समर्पित .....।

'नई उड़ान' त्रैमासिक विज्ञान पत्रिका का प्रकाशन शिक्षा निदेशालय, दिल्ली सरकार द्वारा किया जाता है।
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Single use plastic ban

A welcome step

AN ALARMING SITUATION

Single use plastics are the goods that are made from the fossil fuels- based chemicals (petro-chemicals). The process of extracting and creating these plastics emit huge amount of greenhouse gases.

Everybody is aware of the littering of plastic items at garbage dumps. Single use plastic products may epitomize convenience, but with the damage they cause through production, distribution and litter, they are the major threat to the environment and human health.

Single Use Plastic (SUP) refers to the plastic items and packaging materials that cannot be used again and may or may not be recycled depending on the type of plastic.

The impacts of this plastic waste on the environment and health are global and can be drastic.The SUPs are non-biodegradable products, so they just slowly turn into micro-plastics (tiny particles).

These micro-plastics release toxic chemicals that eventually transfer into the atmosphere, plant life and animal tissue.

The micro-plastics enter respiratory system of the animals, including humans, lodged deep inside the lungs. From where, they enter blood stream and finally reach the vital organs like brain, kidneys etc.

Accumulation of such particles in cells causes disruption of metabolic activities and can lead to unforeseen risks to the health of the animals and plants concerned.

SUPs also contain a number of chemical additives such as endocrine disruptors which are associated with negative health effects including cancer, birth defects and immune system suppression in humans and wildlife. SUPs affect marine life also equally.

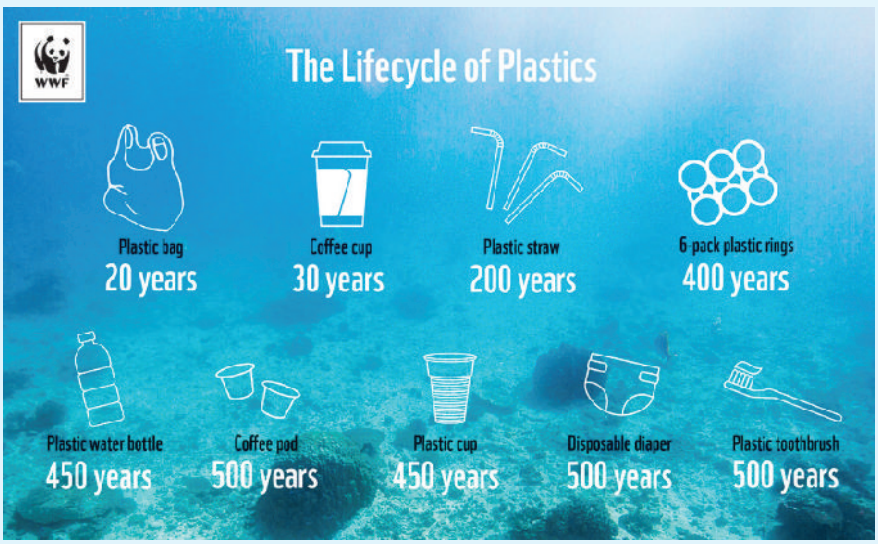
FINALLY, INDIA DECIDES TO TAKE A CALL

The Government of India has banned the manufacture, import, stocking, distribution, sale and use of 19 identified single use plastic items w.e.f. July 1 2022. These items have low utility but high littering potential with effect.

Plastic carry bags of thickness less than 75 microns are also prohibited under the Plastic Waste Management Rules. Plastic wrapping materials less than 50 microns in thickness and plastic sachets selling and storing tobacco, pan masala and gutkha are also not allowed.

MEASURES WE CAN TAKE AS INDIVIDUALS

We can all be more aware of what single use plastic we have in our homes. it's definitely time to own up, take action and change!



Courtesy: wwf

We should start practice the following steps:

- Prioritise reusable products.
- Start your day by brushing with a twig toothbrush.
- Don't use shopping bags made of plastic instead use cloth bags or paper bags and take them out with you when you go for shopping.
- Don't buy plastic Water bottles
- Never buy plastic straws.
- For grocery shopping, carry jute or cloth bags from home While all the banned SUP items may have been of great help for daily use, there are numerous eco-friendly alternatives. Below is a list of some eco-friendly options that will make life hassle-free.

MEASURES WE CAN TAKE AT COMMERCIAL LEVEL

Stainless steel straws:

Tonnes of plastic straws get accumulated each year. This shows how widely they are used, hence switching over to a stainless alternative can be a great option. For those who like the flexibility of plastic straws, the market is brimming with straws made of paper and reusable silicon. Try stainless steel straws,bamboo straws, pasta straws and rice straws

Bamboo stirrers: Corporate offices and public places have gradually replaced plastic coffee/tea stirrers with those made of wood or bamboo.There are also stirrers that are made of herbs.

Fluid ear care products: Instead of using earbuds that have plastic sticks, ear drops can be a great alternative. According to a rough estimate, nearly 1.5 billion cotton buds are produced every year; an average person disposes of close to 415 buds every year. If one is not comfortable with fluid ear washes, there are also buds that are made using sticks made of paper. If you use the ear buds for makeup, opt for cotton as a makeup remover tool.

No more plastic Bottles: Get yourself a steel bottle for the long-term instead of a plastic one.

Reusable glasses and cups: A large number of disposable cups made of plastic ends up in landfills each year. As a corrective measure, one can stick to reusable glasses and cups. From glass to ceramic, there is a wide variety of cups and lids available.

No more plastic cutlery: Each time you order food, request the restaurant to not include plastic cutlery. Reusable bamboo utensils are an ideal alternative. One can also try keeping travel cutlery set to make it easier for oneself and the planet. So, try using reusable bamboo utensils or invest in a travel cutlery set. Crockery using sugarcane residue is also a good alternative.

Eco-friendly containers: Opt for reusable and decomposable containers in place of plastic containers. Stainless steel lunch boxes can come in handy. One needs to encourage others to ditch plastic containers for packaging.

Eco-friendly decoration: Instead of balloons, choose more environmental-friendly decorations such as flowers, DIY paper flowers, paper lanterns, recycled bunting.

Reusable Glass or Mug: Take a reusable glass or mug to office or school and save the environment.

Crop waste to packaging material: Conversion of crop stubble waste into biodegradable packaging material utilizing the power of Bio-technology.

Eco-lution cups: Eco friendly biodegradable cups in which dormant seeds were embedded which later on grow into healthy plants.

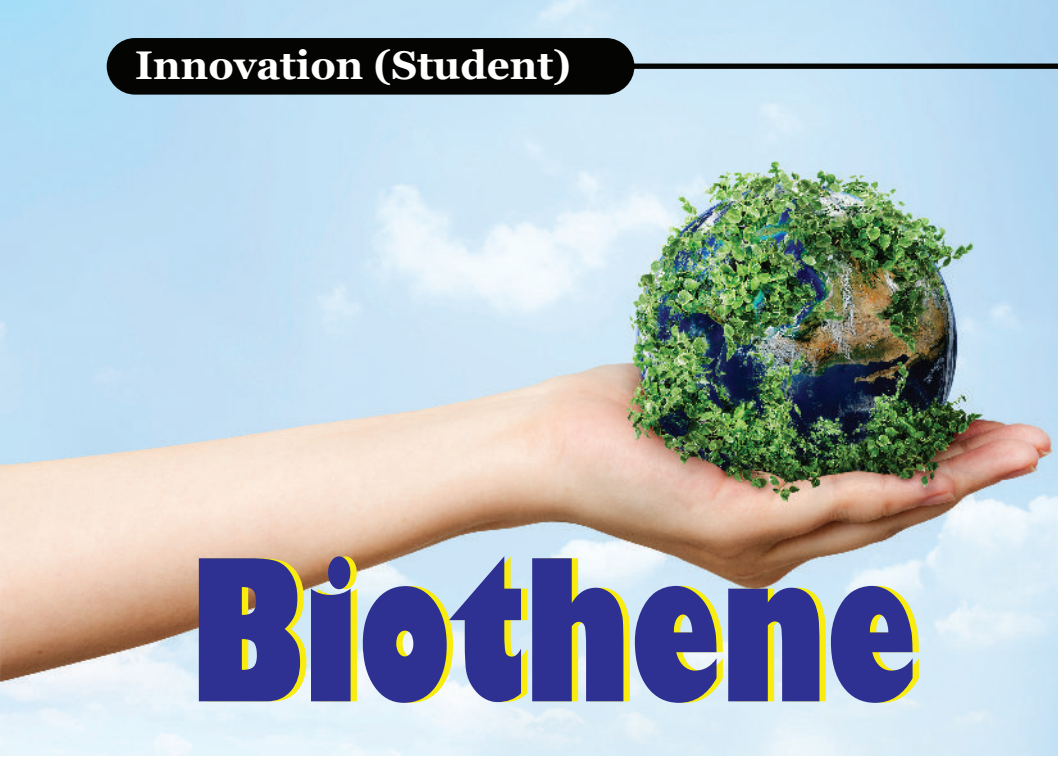
As you take the leap and switch to these eco-friendly options, you'll find yourself living more sustainably and happily, knowing that you're not harming the environment.

The single use plastic ban in India was recently imposed. So it will take time for it to be effectively implemented. As educationists, we can advocate for mass scale awareness through different mass communication media available so that the larger section of our society may be brought under the ambit.

The responsibility of the implementation of Government's orders lies on us so today we take oath to eliminate Single Use Plastics from the country.

Dr. Racchna Saddi
Principal
Sumermal Jain
Public School

References:
News articles, Social Media, Visit to 3 day fair on phasing out of single use plastic organised by Department of Environment.



Biothene

BIOTHENE
Making dream into reality

Biothene, are plastic materials produced from renewable biomass sources, such as vegetable fats and oils, corn starch, straw, woodchips, sawdust, recycled food waste, etc. Some bioplastics are obtained by processing directly from natural biopolymers including polysaccharides (e.g. starch, cellulose, chitosan and alginate) and proteins (e.g. soy protein, gluten and gelatin), while others are chemically synthesised from sugar derivatives (e.g. lactic acid) and lipids (oils and fats) from either plants or animals, or biologically generated by fermentation of sugars or lipids. In contrast, common plastics, such as fossil-fuel plastics (also called petro-based polymers) are derived from petroleum or natural gas. Bioplastics are plastic materials produced from renewable biomass sources, such as vegetable fats and oils, corn starch, straw, woodchips, sawdust, recycled food waste, etc.

Some bioplastics are obtained by processing directly from natural biopolymers including polysaccharides (e.g. starch, cellulose, chitosan and alginate) and proteins (e.g. soy protein, gluten and gelatin), while others are chemically synthesised from sugar derivatives (e.g. lactic acid) and lipids (oils and fats) from either plants or animals, or biologically generated by fermentation of sugars or lipids. In contrast, common plastics, such as fossilfuel plastics (also called petro-based polymers) are derived from petroleum or natural gas.

Process

We purchased some Raw materials like starch,cellulose,banana peel, Sodium thiosulphate,etc from the local market and our workstation was the kitchen of our home which we used at night time. After 500+ experiments and complete failures, we made a fine solution and spread it for drying on the back of the utensils due to lack of equipment used sunlight for drying the mixtures and the result came out very well.

Motive

Saves Non-renewable Sources of Energy: Biodegradable plastics help conserve petroleum supplies. Traditional plastics come from heating and treating oil molecules until they turn into polymers. Bioplastics come from natural sources including crops like corn and switch grass. This makes them conserve non-renewable sources of energy such as petroleum.

Reduces Carbon Emission:

One of the main advantages of using biodegradable plastic is a significant reduction in carbon emissions during the manufacturing process. Furthermore, since the materials used to create biodegradable plastics are plant-based, minimal carbon is emitted during the composting process.

Consumes Less Energy:

The manufacturing process of biodegradable plastics requires fewer amounts of energy. Also, they do not need fossil fuels to be recycled. Since the energy requirement is less, the pollution and environmental impact are significantly reduced.

Provides an Eco Friendly Solution:

Biodegradable plastics require composting or recycling to ensure proper breakdown of the plastic pieces. The requirement of properly disposing of biodegradable plastic products automatically reduces the amount of waste. This waste would otherwise be sent to landfills in order to discard them. Moreover, the land areas can be used for agriculture, residence or industrial applications instead of converting them to landfills.

• Thus, biodegradable plastic is extremely significant and proves to be of great importance when it comes to reducing waste and helping the environment. With the increased use and manufacturing of bioplastics, we can expect a greener and a more sustainable future for our planet.

ADVANTAGES OF BIOTHENE IN COMPARISON OF COMMON PLASTIC

• The primary benefit and advantage in using bioplastics is their capability to improve the environmental impact of a product.
• Reduction of greenhouse gas emission.
• It can be easily decomposed.
• It can be converted into fertilizers.
• It can be dissolved in water within a few months.
• Reduction of the Carbon-dioxide levels.
• Saving fossil fuels.
• Reduction of the amount of waste product produced.
• No harmful effect.

COMMON PLASTIC

-Natural decomposition to last 400-1000 years and few types are non-degradable as well.
-Plastic materials clog waterways,ocean,-seas,lakes,etc. In 3 species of Marine mammals have been found entangled in marine litter.
-Many animals eat plastic materials and die. Over 90% of all sea birds have plastic pieces in their stomach.
-Plastic is widely used in packaging. Eating food from plastic container may cause cancer.
-Both creation and recycling of plastic produce toxic gases and residuce which causes air , water and land pollution etc.

Disadvantages of common plastic

• Few additives such as phthalates etc. which are added in plastics to prevent its structure may cause serious hormonal imbalance in males and females.
• Plastic causes many fire hazards.
• Its cost of recycling is also very high.

• Disadvantages of plastic bags are well known, this is the reason why use of plastic bags have been restricted in most of the countries in the world.

QUESTION:-

How does "Common Plastic" kill Birds and Animals ?

Ans):- When animals eat plastic, it can block their digestive system, causing a long, slow death from starvation. Sharp pieces of plastic can also pierce the gut wall, causing infection and sometimes death. As little as one piece of ingested plastic can kill an animal. There will be no death by biothene because is it made up of organic raw material which can be decomposed and are water soluble.

Team Members

- **MOHD WASIM**
- **VIRENDER KUMAR VERMA**
- **VISHAL GAUTAM**
- **NITIN KUMAR**
- **MOHIT KUMAR**
- **CHETAN**

Social impact

- The materials used in the production of our bio-plastic is 100% organic and natural. Thus, it is biodegradable, water soluble and eco-friendly.
- It will help to reduce the most dangerous pollution caused because of "Single Use of Plastic"
- Since our Bio-Plastic is 100% natural if there would be any leftover, we can use it as a organic fertilizers.

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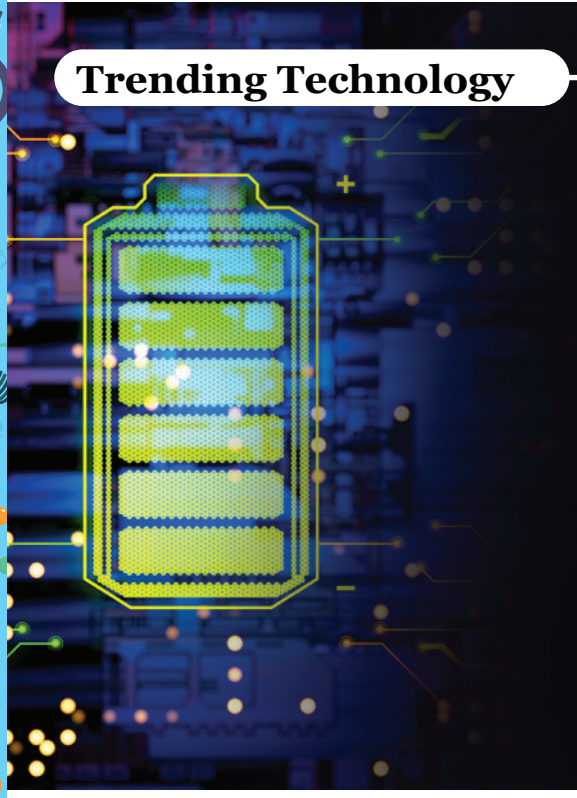
- Any consumer can access the producer directly at a local store or a farm market. They thus act as a support for the economy as well.
- Our business startup if gains popularity and becomes successful then it will generate a large number of employments.

#FunFacts बिना सिर (हेड) का जीवन

कॉकरोच से ज्यादातर महिलाये और बच्चे डरते है लेकिन क्या आपको पता है यह दुनिया मे अपनी मेहनत और परिश्रम के लिए जाना जाता है। इनका परिसंचरण तंत्र खुला होता है इसलिए यह अपने शरीर के प्रत्येक खंड से सांस ले सकते है। यह मुख या फिर सिर से निर्भर नही होते है इसलिए सिर कट जाने के बाद भी कोई फर्क नही पड़ता है। यह एक सप्ताह या अधिक दिनों तक जिन्दा रह सकते है। इनकी मौत इसलिए होती है क्योंकि यह मुंह के बिना पानी नही पी सकते इसलिए ये प्यास के कारण मर जाते है।

अमित कुमार मान, लैब असिस्टेंट साइंस सेंटर नंबर-1 , पीतमपुरा



Freeze-thaw battery

A leap towards storing energy

Scientists have created a battery designed for the electric grid that locks in energy for months without losing much storage capacity. The development of the "freeze-thaw battery" which freezes its energy for use later, is a step towards batteries that can be used for seasonal storage: saving energy in one season, such as the spring, and spending it in another, like autumn.

The prototype is small, about the size of a hockey puck. But the potential usefulness of the science behind the device is vast, foretelling a time when energy from intermittent sources, like sunshine and wind, can be stored for a long time.

The work by scientists at the Department of Energy's Pacific Northwest National Laboratory (PNNL) was published online March 23 in Cell Reports Physical Science. "Longer-duration energy storage technologies are important for increasing the resilience of the grid when incorporating a large amount of renewable energy" said Imre Gyuk, director of Energy Storage at DOE's Office of Electricity, which funded the work. This research marks an important step toward a seasonal battery storage solution that overcomes the self-discharge limitations of today's battery technologies.

Harnessing and packaging nature's energy

Renewable sources ebb and flow with nature's cycles. That makes it difficult to include them in a reliable, steady stream of electricity. In the Pacific Northwest in the spring, for instance, rivers heavy with runoff water power hydroelectric dams to the max just as winds blow fiercely down the Columbia Gorge.

All that power must be harnessed immediately or stored for a few days at most. Grid operators would love to harness that springtime energy, store it in large batteries, then release it late in the year when the region's winds are slow, the rivers are low, and demand for electricity peaks.

The batteries would also enhance utilities, ability to weather a power outage during severe storms, making large amounts of energy available to be fed into the grid after a hurricane, a wildfire or other calamity.

Graphical abstract

"It's lot like growing food in your garden in the spring, putting the extra in a container in your freezer, and then thawing it out for dinner in the winter". said first author Minyuan Miller Li.

The battery is first charged by heating it up to 180 degrees Celsius, allowing ions to flow through the liquid electrolyte to create chemical energy. Then, the battery is cooled to room temperature, essentially locking in the battery's energy. The electrolyte becomes solid and the ions that shuttle energy stay nearly still. When the energy is needed, the battery is reheated and the energy flows.

The freeze-thaw phenomenon is possible because the battery's electrolyte is molten salt -a molecular cousin of ordinary table salt. The material is liquid at higher temperatures but solid at room temperature.

The freeze-thaw concept dodges a problem familiar to anyone who has let their car sit unused for too long: a battery that self-discharges as it sits idle. A fast discharge rate, like that of batteries in most cars or laptops, would hamper a grid battery designed to store energy for months. Notably, the PNNL freeze- thaw battery has retained 92 percent of its capacity over 12 weeks.

In other words, the energy doesn't degrade much; it's preserved, just like food in a freezer.

Ordinary ingredients a plus:

The team avoided rare, expensive and highly reactive materials. Instead, the aluminum-nickel molten- salt battery is chock full of Earth-abundant, common materials. The anode and cathode are solid plates of aluminum and nickel, respectively. They're immersed in a sea of molten-salt electrolyte that is solid at room temperature but flows as a liquid when heated. The team added sulfur -another common, low- cost element - to the electrolyte to enhance the battery's energy capacity.

One of the biggest advantages of the battery is the composition of a component, called a separator, placed between the anode and the cathode. Most higher-temperature molten-salt batteries require a ceramic separator, which can be more expensive to make and susceptible to breakage during the freeze- thaw cycle.

The PNNL battery uses simple fiberglass, possible because of the battery's stable chemistry. This cuts costs and makes the battery sturdier when undergoing freeze-thaw cycles.

'Reducing battery costs is critical. That is why we've chosen common, less-expensive materials to work with, and why we focused on removing the ceramic separator, said corresponding author Guosheng Li, who led the study. The battery's energy is stored at a materials cost of about $23 per kilowatt hour, measured before a recent jump in the cost of nickel. The team is exploring the use of iron, which is less expensive, in hopes of bringing the materials cost down to around $6 per kilo-watt hour, roughly 15 times less than the materials cost of today's lithium-ion batteries.

The battery's theoretical energy density is 260 watt-hours per kilogram higher than today's lead-acid and flow batteries.

Researchers point out that batteries designed for seasonal storage would likely charge and discharge just once or twice a year. Unlike batteries designed to power electric cars, laptops or other consumer devices, they don't need to last hundreds or thousands of cycles.

You can start to envision something like a large battery on a 40-foot tractor-trailer parked at a wind farm, said coauthor Vince Sprenkle, senior strategic advisor at PNNL. The battery is charged in the spring and then the truck is driven down the road to a substation where the battery is available if needed during the summer heat. Battelle, which operates PNNL, has filed for a patent on the technology.

Chandana Raj
XI (Science) Kerala Education Society Sr. Sec. School, R.K. Puram

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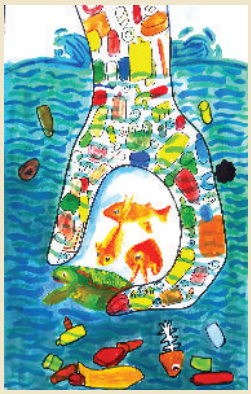
#OurBuddingArtists **Online Posters received for Alternatives to Single use plastic**

Arya, Gyandeep Vidya Bhawan

Shristi, Arya Girls Senior secondary school, Karolbagh

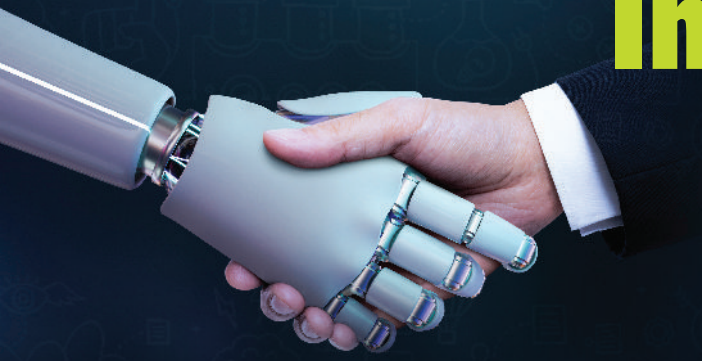
Bharvi Nayak Kalita, Bal Bharti public school



Prachi Sharma, A SoSE Ip Extn

Komal, 9th, RPVV, IP Extn

Anita Maity, Salwan Girls SSS Old Rajinder Nagar



Inspiring young minds to innovate

A collaborative effort of Students, Teachers and School

Creative young minds have the audacity to make changes believed to improve the outcomes of existing system that should be nurtured under the guidance of experienced mentors and bolstered by new educational policies to solve identified problems especially in national context.

This article highlights some inspiring initiatives and innovative projects that showcased how application based learning enhanced student's creativity and innovation, by boosting their experimental nature and enquiry cum research based learning at our school,with targeted focus on United Nation's Sustainable Goals solving unaddressed social problems.

C.A. O'Reilly believes that risk-taking, tolerance, team-work, and speedy operation are the key to innovation culture .The source of innovation is creativity, but successful innovation needs more: specific social, economic, and political environment. Therefore, innovation requires proper organisational culture to thrive.

Innovations at School level 01

Directorate of Education (DOE) organizes science competition at school level annually to boost scientific temperament amongst students. 21 major Indian cities (Delhi, Bengaluru etc) are reaching to zero groundwater levels by 2020, affecting access for 100 million people -CWMI report, Niti Aayog in 2018. The project ***"Quencher"*** bagged Gold medal at zonal level in National Science designed by Sumedha Longani and Sabal Handa Quencher is an innovation that is easy to use and affordable solution that aims to provide long-term in situ moisture conservation and improving biological health of degraded and deserted soil. It not only prevents stagnation of waste water that can be breeding grounds of mosquitoes but can also channelize water to ground level boosting microbiota and moisture content in underlying levels of soil bolstering its fertility. This is a life saver in areas with low rainfall and scarce water resources.

Fig.1 (a) Quencher (b) Students presenting their project

Innovations at National level 02

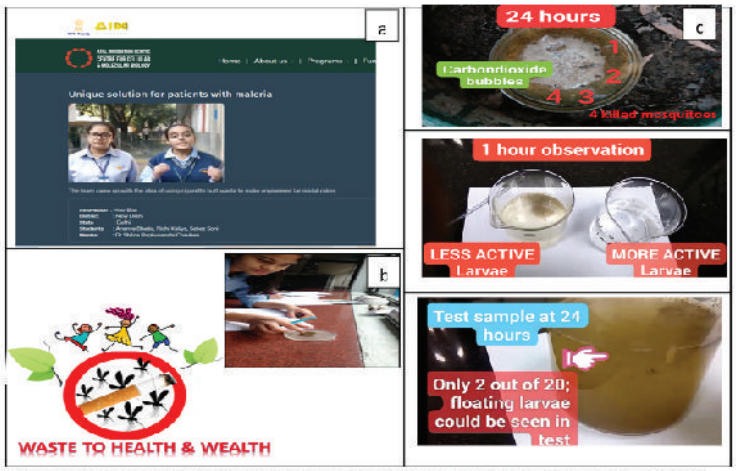


Fig.2 (a) ATL marathon national award (b) Larvaecidal cake made by student in school laboratory (c) Research done at NIMR

ATL Marathon is a national level innovation challenge, where students identify community problems and develop innovative solutions in the form of working prototypes. Project "Engineered larvaecidal cakes" bagged National award for this unique innovative project from our school. Mosquitoes cause more human suffering than any other organism -- over one million people worldwide die from mosquito-borne diseases every year. Ananya Bhatia, Ridhi Kalia and Sehej Soni of class XII began their research to develop a solution which would be unique, practical, cost-efficient and accessible. The main focus of this innovation was to tackle both mosquito borne illnesses and reuse cigarette butt waste. The cake had sugar, desiccated yeast, binding material to initiate fermentation once cake is immersed in water that produced carbon dioxide that acts as a bait to attract adult mosquitoes. Nicotine from waste cigarette butt is lethal not only to the breeding larvae but also the adult mosquitoes and kills them very effectively.

It can be put in your cooler, a flower pot, or a puddle of stagnant water and it will start working its magic in 24 hours. The product was tested at the National Institute of Malarial Research on Anopheles mosquitoes.

Our participations

03 'Ideate for India – Creative Solutions Using Technology' , a national challenge by National eGovernance Division, Ministry of Electronics and Information Technology, Government of India and Intel India is one such initiative to spread awareness and make the future citizens understand how they can participate and contribute in this movement. Our school bagged award in top listed schools in north zone of India for the innovative project and shortlisted in Regional Tech created Boot Camp 7 th - 10 th May 2019. The project addressed an upcoming problem which was unnoticed and will intensify with increased usage of technology in generations to come: Radiations.

After intense research, World Health Organization has already declared EMFs as type II carcinogens. Visualization of lethal effects of invisible radiation on living cells would effectively sensitize civilians, hospital workers and nuclear power plant workers. So, we have developed a unique E.coli based disposable badges that can indicate whether the radiation exposure to a worker. All the research work done under guidance of Dr. Bhupinder Singh, Principal Scientist and Radiological Safety Officer, Nuclear Research Laboratory, Centre for Environment Science and Climate Resilient Agriculture, ICAR-Indian Agricultural Research Institute, New Delhi.

Inspire Manak awards

04

Plastoscope: Inspire Manak awards is a national programme in India to support the spirit of innovation in students from class VI-X. It is one of the flagship programmes of Department of Science &, Technology (DST), Government of India which gave National Award to Project "Plastoscope" which was designed by Ananya Singh of class X. In this project, a microscope was made from waste plastic bottle that began as an idea to make science more accessible to all and transform waste to wealth. This project can be scaled up to a company that can deliver low-cost microscopes to lab less schools around the world. This microscope can be integrated to the projector or the laptop to educate masses. It was awarded by Vice president Sri Venkayanaidu and was showcased at IIT Delhi and ISRO under National "DHRUV" program by Government of India.

Fig.1 (a) Plastoscope (b) Award by Vice President of India (c) Images from plastoscope

International exposure

05

International Inter school Technofest-2022 was global Event to Nurture Young Minds and building an Innovation Ecosystem. Schools across India, Kuwait, Oman Qatar and UAE participated in this international competition. Our project "Sustainable housing plan" was shortlisted in top 50 finalists. Deshna Jain from class XII designed aesthetic mud tiles and eco-friendly plastering material that. Manufacturing of ceramic tiles and cement creates emission that lead to environmental hazards leading to air pollution and health hazards. So, we innovated aesthetic mud tiles and eco friendly plaster made in environment friendly way from eco-friendly raw material.

Conclusion

The role of education in promoting innovation is critical. Innovation-friendly culture in education systems, supported by government policies, will help re program young minds to look problems as source of opportunity and solving problems as a well-used path to innovation. Education is perceived in India as a means of enhancing equity and equality. At school-level problem-solving activities can be fostered by interactive projects and games under the guidance of effective mentors which can tie up with nearby research laboratories to achieve a beautiful equipoise of learning and innovating.

Dr. Shilpa Raghuvanshi
PGT, Biotechnology
Salwan Public School,
Rajendra Nagar

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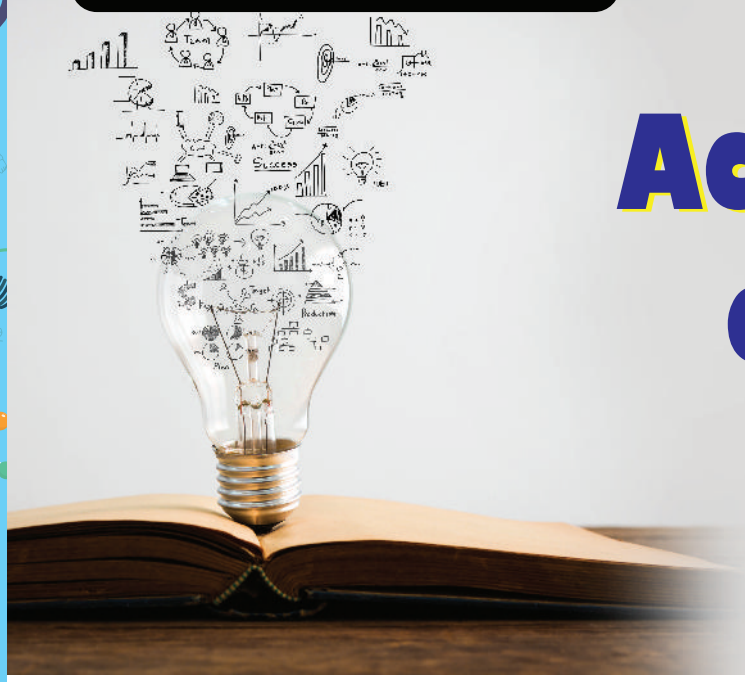


Activity based classroom

Every thing you can,
any time you can,
from any where you can!!

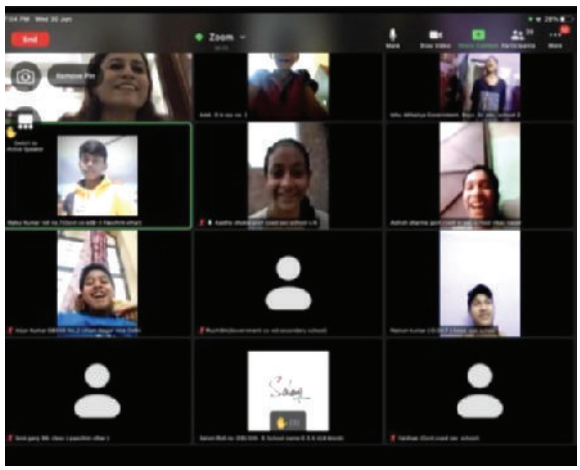
Learning is a life long process.An educator is a 'learner' throughout his/her journey. We, the educators, witness learning happening in all walks of life, specially in our professional life.

My journey as a learner reached new horizons, when I joined as a mentor teacher with DOE.These years, as a mentor, have been full of challenges , zealous efforts and steps towards finding sustainable solutions.

As a science mentor, I tried to live 'science' through activities, to inculcate the values of 'learning by doing' and taking baby steps towards doing 'my little' for the environment and my surroundings. Keeping these goals in my mind, I made a small effort to involve the students of all of my mentee schools on a common platform.

The pandemic times had also been like a wonderful 'learning period'too,which paved the way to a 'technically sound' ME -the teacher.

So,I formed a common group for class ninth students of all my mentee schools, in the name of 'ACTIVITY CLASS-ROOM'.We met over zoom platform, twice a week, in the evenings.



Students shared their learnings and understanding with each other in a congenial atmosphere where everyone got an opportunity to express their views.

In one of these sessions on 'Pandemic and its share of problems', we discussed about the rising issue of disposal of used masks..While we needed to protect ourselves against the pandemic, we also needed to do it in a way that does not cause any harm to our environment. We thought about the problem of disposal of used masks and shared our views with each other.

During these discussions, students came up with this wonderful idea of converting the 'used masks to planters' The first step towards this was to collect, wash and disinfect the 'used' masks from their own families.Students washed and dried these masks and then carefully separated the holding elastic strings.They stitched together 5 to 6 masks and give it the shape of a planter. Soil was added into it and plants planted in these 'mask planters'.

As the spread of the virus stopped and the situation outside improved, paving way to restoring of outdoor activities, students went to the nearby neighbourhood plant nursery.

They asked the gardeners to replace the plastic holders of saplings with used mask planters which they happily agreed to.Thus,we found our own way of dealing with used masks and did our little bit for the environment.

Subsequently, to foster healthy eating habits and to increase the immunity of the children, we made a puppet character by the name of 'Miss Shiksha' and ' Little Gyan'.We then tried to explain different ways to increase immunity like sprouting dals in a easy way.

The sessions made the students self motivated and helped them to live a healthy,active life while also helping their parents at home.

As the spread of the pandemic declined, we became more and more aware of the importance of living a healthy life post corona.In this series,'Yoga Day'was celebrated with great enthusiasm wherein all students made posters on the theme and had yoga sessions to enhance emotional,-mental and physical well-being.This paved the way to give up the sedentary lifestyle which the pandemic had brought in and shift to an active one.

The journey continued and we celebrated events like developing nationalism on the 'Independence Day' and 'organ donation sensitisation'... all in the 'Activity Classroom'.

हूँ मैं एक अदद छोटा सा हिस्सा
दास्तानें जिंदगी का मगर
है मेरा हौसला बुलंद
हो सार्थक मेरा हर नन्हा कदम !!

Ritu Puri
Mentor Teacher
SKV No1 ,C Block
Janak Puri

Where There is a will, There is a way

Plastic has been a curse for our mother nature. Its presence, in any form, is affecting not only our environment but also every living organism on this planet. It blocks the surface of the land where seeds are supposed to grow into plants and subsequently into trees. Time required for decomposition of plastic ranges from centenary to millennia. Destruction of plastic causes even more harm to the air we breathe. These problems are a collective challenge for survival of the current generation as well for upcoming generations for whom, Directorate of Education, is committed to bring light of hope through awareness and learning among its students.

Keeping our commitment in mind, we are conducting many activities under the IEC (Information, Education and Communication) Plan for awareness regarding Alternatives to single Use Plastic and Plastic Waste Management. The activities included in the IEC plan are; Pledge by students at morning assembly, Short Videos/Documentary Clips in the classrooms, Poster Making, Slogan Writing, making of E-Brochures/ E-Booklets, workshops, Drama/ Nukkad Natak/ Role Play, Seminars and Webinars under different themes such as Waste Segregation, Discouraging Use of Single Use Plastic and Encouraging use of alternative, Plastic Bags (Harmful impacts and feasible alternatives), Littering of Plastics, and Reuse of Plastic Waste (Best out of Waste).

Our students are much more interested in the activities and also aware of the harmful effect of Single Use Plastic than we are. This is evident by the month-wise number of participating students as given under:

Activity	Month	Total Number of Students Participated
IEC Plan and Development of Public movement by engaging with Youth Organizations such as NCC, NSS, NYK and School Students	July-2022	**11,23,419 Students**
	August-2022	**11,48,630 Students**

After engaging with students, a single-use plastic free environment is required for students to give them a conducive environment in school premises. Therefore, an initiative was taken by the Science Branch of Directorate of Education for Phasing Out Single Use Plastic from our schools.

The first phase was new to everyone but we got what we desired. Science Branch, Direcotorate of Education has made deliberated effort to get the idea flowing all schools while making it simple at the same time. A circular No. *F.No. DE.40(6)/Sci.Br./2022-23/168-173 dated 13.05.2022* gave the clear idea to all schools about setting of 'Bartan Bhandar' and what it would include. Many meetings were held with higher authorities and district coordinators of our department. Result of the deliberation was much more than we anticipated. All the Govt. Schools of DoE GNCT of Delhi has set-up Bartan Bhandar in their premises including the alternative items to single use plastic such as, dishes made of steels, glass, and eco-friendly materials.

2223 Schools of DoE, GNCT of Delhi have set up Bartan Bhandars in their Schools till May 2022.

Awareness regarding phasing out of single use plastic through various activities are planned and conducted to provide an opportunity to schools through the collective work of students and staff. All HoSs of Govt. Schools certified that their schools have become "Single Use Plastic Free". This was a cheerful moment for every officer. This made an old saying come true: "***Where there is a will, there is a way".***

All the activities under IEC plan by engaging with youth organizations such as NCC, NSS, NYK and other school students are significant to inculcate a sense of responsibility towards mother nature by active learning.With this I congratulate all students, teachers, all HoS and District Officers for their hard work and hope that the same will continue in future.

Dr. Sudhakar Bhimrao Gaikwad
DDE, Science Branch

THE EATABLE PLANET

Once covered in green,
Now full of polythene
Once full of life,
Now stinking every side

Sure, Nobody likes the stories of elders,
But have you ever wondered
The kind of world they lived in
Full of greenery and wonder?

Looking at the sides of the streets,
Which were once full of mischief.
Now all one could are plastics,
On which the animals are choking to grief

Our humongous mountains,
Our holy rivers and vast forests.
Everybody likes to visit them,
Yet not care for them.

Poster Designed by Student of Brain International School

Is it a blessing or is it a curse?
Sure, it helps us a lot
But what about the reverse?
Is this an unsuccessful symbiosis
the mighty has plot?

For sure, we humans are wise,
For sure, we humans create,
But have our hearts become
non biodegradable?
Just like the plastics that considers
our planet an eatable?

Kaushiki Kumar
XIIth , RSKV, Patparganj

नेशनल एंट्रेंस स्क्रीनिंग टेस्ट (NEST)

राष्ट्रीय विज्ञान शिक्षा एवं अनुसन्धान संस्थान (एनआईएसईआर), भुवनेश्वर और बुनियादी विज्ञान में उत्कृष्टता के लिए परमाणु ऊर्जा केंद्र विभाग (यूएम-डीएई सीईबीएस) मुंबई विश्वविद्यालय - ये दोनों संस्थान अपने यहाँ स्नातक में प्रवेश के लिए एकमात्र मानदंड के रूप में NEST का उपयोग करते हैं। एनआईएसईआर और यूएम-डीएई सीईबीएस दोनों की स्थापना 2007 में परमाणु ऊर्जा विभाग (डीएई), भारत सरकार द्वारा की गई थी। इन संस्थाओं का कार्य अत्याधुनिक वैज्ञानिक अनुसंधान करने और परमाणु ऊर्जा विभाग और अन्य संस्थानों के वैज्ञानिक कार्यक्रमों हेतु इनपुट प्रदान करने के लिए वैज्ञानिक जनशक्ति को प्रशिक्षित करना है।

एनआईएसईआर होमी भाभा राष्ट्रीय संस्थान (एचबीएनआई) का एक ऑफ-कैंपस केंद्र है और एनआईएसईआर के अन्य शैक्षणिक कार्यक्रम भी एचबीएनआई से सम्बद्ध हैं । सीईबीएस डीएई के अंतर्गत एक संस्थान है, यह मुंबई विश्वविद्यालय के कलिना परिसर में स्थित है। इसके छात्रों को डिग्री मुंबई विश्वविद्यालय द्वारा प्रदान की जाती है। इन संस्थानों में एकीकृत एमएससी कार्यक्रम सेमेस्टर आधारित पाठ्यक्रम का अनुसरण करता है।

एक लचीले और अभिनव शैक्षणिक पाठ्यक्रम की संरचना, निरंतर मूल्यांकन, अनुसन्धान की गुणवत्ता और प्लेसमेंट NISER और CEBS दोनों संस्थानों की सफलता का आधार है। NISER और CEBS आवासीय संस्थान है जो अत्याधुनिक अनुसन्धान प्रयोगशालाओं, आधुनिक कम्प्यूटेशनल सुविधाओं, उत्कृष्ट पुस्तकालय और शिक्षण सुविधाओं से सुसज्जित हैं। इन संस्थानों में एकीकृत एम०एस०सी० पाठ्यक्रम में प्रवेश पाने वाले उम्मीदवार परमाणु ऊर्जा विभाग, भारत सरकार के दिशा कार्यक्रम के माध्यम से 60,000 रुपये की वार्षिक छात्रवृत्ति प्राप्त करते हैं। इसके अलावा, छात्रवृत्ति प्राप्तकर्ताओं को गर्मियों में इंटर्नशिप के लिए प्रतिवर्ष 20,000 रुपये का अनुदान मिलता है।

INSPIRE & SHE कार्यक्रम के लिए DST द्वारा चुने गए उम्मीदवारों की NISER और CEB द्वारा INSPIRE छात्रवृत्ति के लिए अनुशंसा की जाती है । पाठ्यक्रम के पूर्व छात्र वर्तमान में भारत और विदेशों में प्रतिष्ठित विश्वविद्यालय संस्थानों में पीएचडी कर रहे हैं।

NEST 2022

एकीकृत एमएससी कार्यक्रम 2022-27 के लिए NISER में प्रवेश पाने के इच्छुक उम्मीदवारों को कक्षा XI और XII में विज्ञान वर्ग से उत्तीर्ण होना चाहिए। सभी इच्छुक उम्मीदवारों के लिए NEST परीक्षा में बैठना अनिवार्य है। वे ही उम्मीदवार इस परीक्षा के लिए पात्र हैं, जिन्होंने वर्ष 2020 या 2021 में भारत में स्थापित किसी परीक्षा बोर्ड से बारहवीं कक्षा उत्तीर्ण की हो अथवा 2022 में बारहवीं की बोर्ड परीक्षा में सम्मिलित होने जा रहे हैं ।

दोनों संस्थानों में प्रवेश हेतु उम्मीदवारों के लिए बारहवीं कक्षा की परीक्षा में कुल 60 प्रतिशत या समकक्ष ग्रेड प्राप्त करना अनिवार्य है। उपरोक्त सभी मानदंडों को पूरा करने वाले उम्मीदवारों को अन्तिम मेरिट सूची के आधार पर संस्थानों में प्रवेश दिया जाता है ।

प्रवेश सम्बन्धी अर्हता में अनुसूचित जाति (एससी), अनुसूचित जनजाति (एसटी) और दिव्यांग श्रेणियों के उम्मीदवारों के लिए बारहवी कक्षा की परीक्षा में अंकों की न्यूनतम आवश्यकता में 5% की छूट दी गई है।

1 अगस्त 2002 से पूर्व जन्म लेने वाले उम्मीदवार इस परीक्षा में बैठने के लिए योग्य नहीं होंगे यद्यपि अनुसूचित जाति (एससी), अनुसूचित जनजाति (एसटी) और दिव्यांग श्रेणियों के उम्मीदवारों के लिए 5 वर्ष की अतिरिक्त छूट उपलब्ध है। जिन संस्थानों द्वारा जारी अंकपत्रों में केवल ग्रेड उपलब्ध हैं, उनके उम्मीदवारों को सम्बन्धित बोर्ड से अंकों के समकक्ष प्रतिशत को निर्दिष्ट करने वाले सर्टिफिकेट की आवश्यकता होती है।

प्रवेश सम्बन्धी प्रक्रिया के मामलों में संस्थान की प्रवेश समिति का निर्णय अन्तिम रूप से मान्य होता है।

परीक्षा प्रक्रिया -

प्रश्नपत्र में वस्तुनिष्ठ (MCQ) प्रकार के प्रश्नों के 4 (चार) खण्ड होंगे। प्रत्येक खण्ड 50 अंकों होगा, जिसमें जीव विज्ञान, रसायन विज्ञान, गणित और भौतिकी से विषयाधारित प्रश्न होंगे। दोनों संस्थानों के लिए मेरिट सूची चार खंडों में से सर्वश्रेष्ठ 3 खण्डों के अंकों के आधार पर तैयार की जाती है और सबसे खराब अंक वाले खण्ड को छोड़ दिया जाता है।

उम्मीदवार द्वारा सभी खण्डों में अच्छे अंक हेतु प्रयास करने से उसके लिए कुल प्राप्त अंकों की संभावना बढ़ जाती है। प्रत्येक खंड में, कुछ प्रश्नों के लिए गलत उत्तरों के लिए नकारात्मक मूल्यांकन होता है। कुछ प्रश्नों के एक या एक से अधिक सही उत्तर हो सकते हैं, जिसके लिए केवल सही उत्तरों को विह्नित करके अंक अर्जित किए जा सकते हैं।

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NEST परीक्षा का विस्तृत पाठ्यक्रम और पिछले वर्षों के प्रश्नपत्र NEST की वेबसाइट www.nestexam.in पर उपलब्ध हैं। यह परीक्षा एक कंप्यूटर आधारित टेस्ट (सीबीटी) है जिसमें प्रश्नपत्र की भाषा केवल अंग्रेजी होगी।

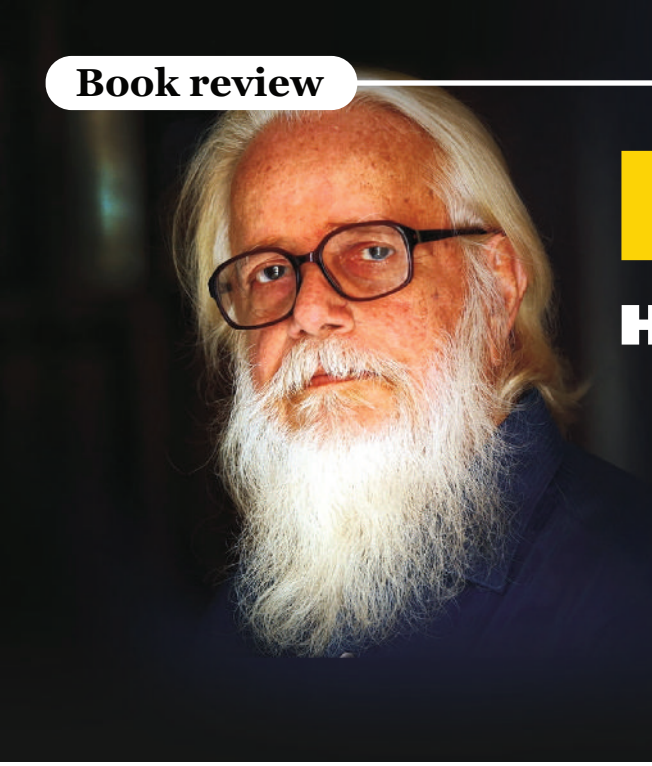
#FunFacts Drinking too much water can result in death.

01 It is difficult to drink too much water by accident, but it can happen, usually as a result of overhydrating during sporting events or intense training. The symptoms of water intoxication are general — they can include confusion, disorientation, nausea, and vomiting. In rare cases, water intoxication can cause swelling in the brain and become fatal.

The human brain takes in 11 million bits of information every second but is aware of only 40

02 The human brain can process 11 million bits of information every second. But our conscious minds can handle only 40 to 50 bits of information a second. So our brains sometimes take cognitive shortcuts that can lead to unconscious or implicit bias, with serious consequences for how we perceive and act toward other people.

Supreet Singh, *XI A, Tagore Sr. Sec. School*



Ready to fire

How India and I survived the ISRO spy case

By Arun Ram and Nambi Narayanan

This riveting book is about the struggle of a top scientist, S. Nambi Narayanan who was falsely accused of selling Space Technology secrets and his fight for justice.

A top scientist is falsely accused for espionage charges. A Police inspector's misadventure with a Maldivian women results in a fabricated espionage case.

A faction within a political party capitalizes on the case to bring down a government. An intelligence agency obligingly plays into the hands of vested interest to slow down India's space program. And a complex investigation finally proves the allegations untrue.

Nambi walks through the events leading to his rise as an eminent engineer to alleged espionage charges, physical and mental cruelty against him. It takes four years for the CBI to exonerate Nambi, but his fight for justice to ensure action against the officer who faked the case and tortured him in custody continues.

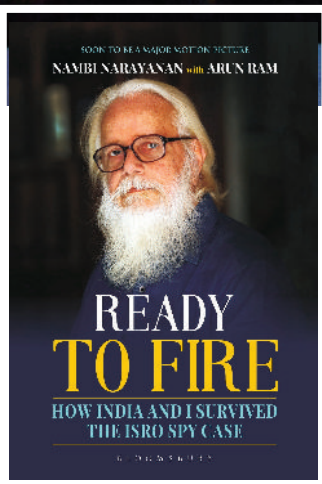
The autobiographical book begins from his childhood and quickly takes you through his journey till he became a rocket scientist.

S. Nambi Narayanan (born 12 th December 1941) rocket scientist and aerospace engineer worked at the Indian Space Research Organization (ISRO) and contributed in the development of Vikas rocket engine. He was awarded the Padma Bhushan, the third highest civilian award by government of India in 2019 for developing Vikas engine.

He led the team that acquired technology from the French for the Vikas engine used in the first PSLV that India launched. As a senior official at the ISRO, he was in-charge of the cryogenics division.

In 1994 he was charged with espionage and got arrested. He spent 50 days in jail. The charges against him were dismissed by The Central bureau of investigation (CBI) in April 1996. The Supreme Court of India also stopped the Kerala government on technical grounds from continuing its investigation.

The movie Rocketry: The Nambi Effect is based on his life, starred and directed by actor R. Madhavan and was released on 1 st July 2022.



This book is as much a history of the early days of India's ambitious space program as it is a record of one of the most sensational cases that enthralled the nation long before the era of online updates and 24 hour new cycles.

Senior journalist Arun Ram meticulously picks the ISRO spy case, revisits old material and discover new details to expose the international plot that delayed in India's cryogenic engine by at least a decade.

The ISRO Spy case was one of the first major stories he covered as an intern in his home town of Thiruvananthapuram in 1994. He has covered an array of beats including politics, Science and Technology with several pieces of investigated journalism to his credit.

This book is equally fascinating as it gives the reader a ring side view of the development of India's liquid propulsion engine as well as the evolution of ISRO and its politics which has developed India's efforts in outer space. The author, bitter from his experience and a seemingly straight forward gentleman by nature, holds back no punches as he talks freely about his disagreements with APJ Abdul Kalam and various others at ISRO. He presents a rather human side of himself and not just that of a glorified victim, when he talks of his own pettiness during this saga as he enters his fellow accused.

A very easy to read, written with a lot of precision and details, The plot moves quite easily between the ISRO and Nambi's past and weaves in the present controversy. His life is an inspiration for all. Nambi's life teaches us how to stand by truth, how to fight back , for true dedication that one should have towards his work and nation.

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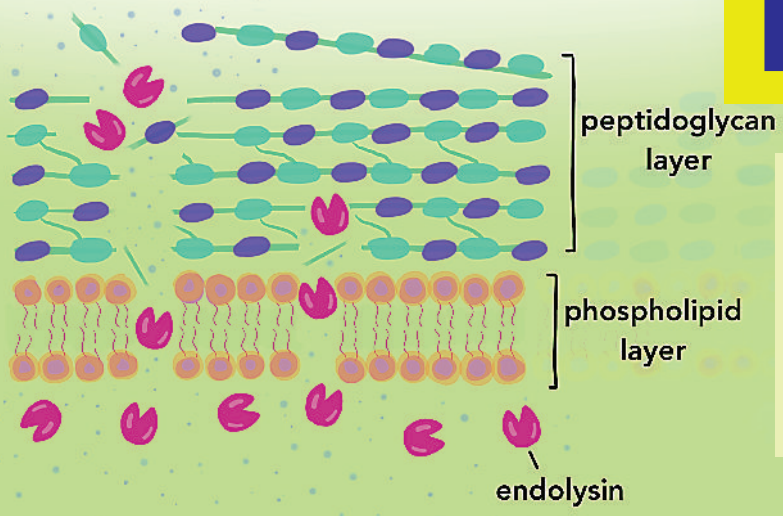
Reference:*Times of India,good reader.com, Wikipedia*

Enzybiotics

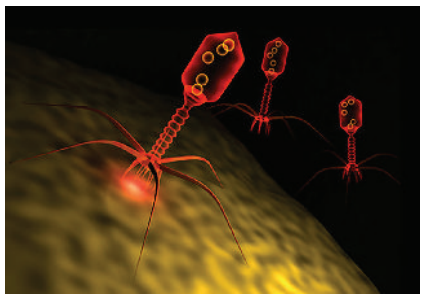


Antibiotics have served millions of lives. However, the overuse and misuse of antibiotics have contributed to a rapid emergence of antibiotic resistance worldwide.

WHAT ARE ENZYBIOTICS?

The term is derived from a combination of the words "enzyme" and "antibiotics". Proteolytic enzymes called endolysins have particular effectiveness in combating a range of bacteria and are the basis for enzybiotic research.

Enzybiotics are featured by a rapid and unique mode-of-action, a high specificity to kill pathogens, a low probability for bacterial resistance development and a protein-aceous nature.



WHY ENZYBIOTICS?

Enzybiotics are capable of destroying certain bacteria, when they are being added externally.Enzybiotics are researched largely to address the issue of antibiotic resistance, which has allowed for the proliferation of drug-resistant pathogens posing great risk to animal and human health across the globe.

ANTIBIOTIC RESISTANCE

As of July 2020, the World Health Organization considers antibiotic resistance as "one of the biggest threats to global health, food security, and development today". There are several examples of antibiotic misuse, including self-medication and over- prescription of antibiotics. Once easily- treatable condition urinary tract infections have become very difficult to address as infection- causing bacteria have developed resistance to multiple drugs. The growing number of antibiotic-resistant pathogens have prompted calls for research into innovative antimicrobial therapies.

7 TIPS FOR SAFE ANTIBIOTIC USE:

1. Do not demand an antibiotic when you come to see your doctor.

2. Always take your antibiotics as prescribed and use all pills even if you are feeling better.

3. There should not be leftovers, and if for some reason there are, do not save them to take another time.

4. Never share your antibiotics with someone else.

5. Always take antibiotics with food to prevent stomach upset.

6. If the antibiotic is making you feel worse, talk to your doctor about your symptoms. You may need a different antibiotic or something that will help with the side effects.

7. Diarrhoea is a common side effect of antibiotics. As a preventive measure, you can take an over-the-counter probiotic to help reduce diarrhoea symptoms.

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3. https://researchgate.net/publication/280088985

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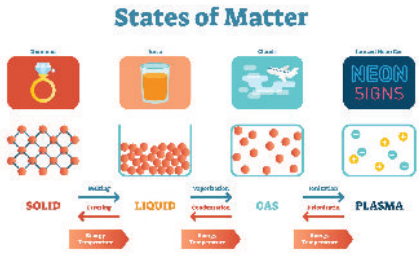
#FunFacts There are over two dozens of states of matter

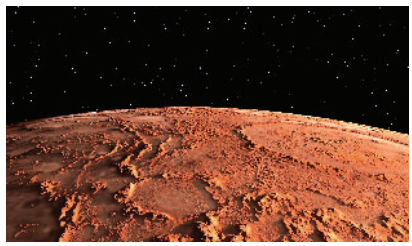
01 Everybody knows about at least three states of matter: solids, liquids and gases. Those who are well versed in physics may also know of Plasma and Bose Einstein condensate. But there are over two dozen states of matter that include ones like time crystals and superfluids.



Bhavishya Dhiman, XG, Govt Coed Sr Sec school, Preet vihar

Mars constantly makes a humming noise.

02 NASA's Insight lander has detected a strange humming sound coming from the Red Planet which could indicate the presence of water in Mars. Scientists haven't figured out yet the exact cause of the humming sound made by Mars, but it is thought to be a coalescence of wind and the geological movement of the planet.



Supreet Singh, *XI A, Tagore Sr. Sec. School*

Beyond Our Universe

Melody is a 14-year-old, tall and slender, pretty girl with big blue eyes with a tinge of green, cute, pointed nose and long, wavy blonde hair, soft and fair cheeks, and pink lips. She is independent and bold which makes her the most popular girl at her school. Life was smooth and easy for her until one day, when she travelled somewhere far away, beyond our universe.

"Ssh. Sshh," Melody whispers to her best friends, Chloe, and Ashley "let's bunk the math class after the break." "Good idea," both agree. The break ends, and the trio is nowhere to be seen in the school! They wander here and there, chatting with each other and licking their softies. While walking along the street they come across an old, creepy mansion. Melody is stunned, she had never seen it there before. She is excited to explore the mansion from inside. Her friends try to warn her about its dark history, but she doesn't care.

It was 1998. The mansion belonged to a scientist who was at that time working on his new discovery, but one day he suddenly disappeared and was never seen again. People had no clue what had happened.

They say that some bright light was coming out of his window just minutes before the scientist was found vanished, the light was strong enough to shatter the windowpane into thousands of pieces.

Melody enters the mansion. She is fascinated to see how spacious it is. She starts running all around, her shoes constantly tapping on the wooden floor. She runs upstairs, while her friends follow her sluggishly. Melody bangs into a door unknowingly. She finds herself in a musty, dust covered room, with weird scientific devices and colourful chemicals. The three girls are in the scientist's laboratory!

Chloe and Ashley start to shake like a leaf. They tiptoe out of the room leaving Melody alone, before some mishap takes place. Melody doesn't realise that she's the only one present in the laboratory and continues to study the various objects and gadgets carefully. Her eyes are soon caught by an armoire. She opens it and in seconds she sees something building up in front of her, something resembling a black hole. She was taken aback. It was ready in no time, a massive hole with a pink passage in the middle and bright light being emitted by it. A strong force pulled her towards the hole, she tried to hold onto something, but the force was so strong that she didn't get any time to do so. She was inside the hole. She lost her consciousness.

When Melody opened her eyes, she was surprised to find herself in a different place. A place like paradise – green, clean, and highly developed. Melody thought she had time travelled to the future. The residents of the place looked like duplicates of each other. There was no difference in their appearances, all of them were tall and fair and had a big jawline, S shaped eyebrows, brown eyes, straight nose, and short rainbow coloured hair.

A crowd gathered around Melody and tried interacting with her. They seemed to be sweet and welcoming, but Melody couldn't communicate with them as they spoke a different language, not known to her. They then switched on a watch/band tied to their wrists and closed their eyes. They were translating her thoughts into their language and reading her mind!

They got to know everything about her. They talked among themselves and then one of them sent Melody to a big room through teleportation. A warm and comfortable room. She saw a man wearing a lab coat sitting on a couch in front of her. He looked like he belonged to Earth and so she sat beside him and started talking with him.

The man explained that he was the lost scientist named Mark, and that both of them are in a different planet called Gaudium which is in a different galaxy called Dulcis which is in a totally different universe, very far from our universe. He said that he wanted to convert his armoire to a teleportation machine but somehow it got connected to a parallel universe.

He said that when he reached this planet the creatures residing here were very kind to him and they are currently helping him create an opening to our universe. He had been researching about this planet all this while and he found that Earth and Gaudium are very different from each other. In Gaudium a person can never get old, and the citizens of this planet multiply through cloning so there is no difference in their physical features. Melody was surprised, and found all this information to be very interesting, but she was worried about getting back to her planet. Mark understood her concern and assured her that they'll get back to their homes soon.

He said, "The opening has been found just today but it had some defect in it so we are just trying to fix it, it will only take us an hour to do so, thanks to the high technology present here and of course the inhabitants of this planet who are trying so hard to help us."

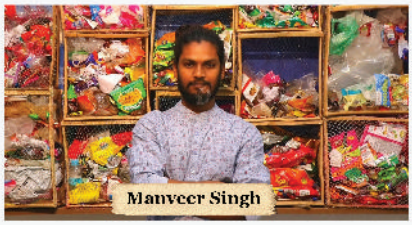
After an hour, Mark was called to examine the opening. He verified it. A wave of happiness passed through everyone. Melody couldn't find words to express how glad she was. Mark and Melody jumped into the opening one after the other and in a few minutes, they were back on Earth.

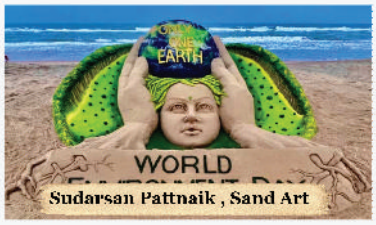
Melody found herself at her school with her friends, studying math while Mark was back in his mansion which was not anymore creepy or dusty, his face was covered with wrinkles. He was old, he was 68. Everything was back to normal, the way everything was supposed to be.

What about the armoire you ask? It lost its ability to transfer a person to some other parallel universe and became an ordinary wardrobe.

Even though both Mark and Melody chose to remain silent and not share their experiences, their memories always get a bright smile on their faces, after all they had journeyed somewhere beyond our universe!

Jeevika Umesh
Tagore International School, Vasant Vihar


Manveer Singh



Sudarsan Pattnaik , Sand Art


Sand turtle using plastic bottles


'Plasticvalla'


Veronika Richterova


Maria Arceo

Feature article

Stop the Pollution be part of the Solution

**"Using Plastic is quite drastic
Avoiding it makes you fantastic"**

Change is all that remains constant in the world. Our Earth too changes, grows and recycles year after year continuously on its own with its well defined ecosystem where all that grows, goes back and the cycle continues.

One of the most striking and drastic of departure is human waste, and the issue of reducing single use plastic, the most burning issue of current civilisation. It cannot be right to manufacture billions of objects that are used for a matter of minutes, and then are with us for centuries.

Using plastic bags is very harmful for the environment as they pose a serious threat to the health of all living beings on the earth. We don't need a handful of people doing zero waste perfectly, we need millions of people doing it imperfectly. Hence, it is essential to educate people about the hazardous and dangerous effects of single use plastics. As we all know now, the production and disposal of plastic generates greenhouse gases and hazardous waste. Further plastic products often break down into very small fragments called micro plastic that can pollute the ecosystem and harm organisms.

Due to mass production of plastic in the form of food containers, bottles, fibers etc, the plastic waste has become a major problem for Marine and terrestrial ecosystems.

Turning Art into action against plastic menace:

Art has been an important means to reflect the spirit of the times. Artists have been trying to relate between time and space between the physical and psychical and between finite and infinite. Art also has a strong influence on issues related to environmental preservation. Artworks are essential tools for ecological activities that alert population to urgent matters and help mobilize people to fight for any cause of national interest

What is single-use plastic?

As the name recommends, it alludes to plastic things that are utilized once and disposed of. Single utilized plastic are used in bundling of things to bottles, polythene sacks, facial coverings, espresso cups, grip film, garbage sacks, food packaging and so on.

Nowadays plastic contamination has turned into a significant issue because of the Rapid creation of PET (Polyethylene Terephthalate) which is a single-use plastic. The manufacturing, disposal of plastic produces ozone depleting substances that will create major atmospheric pollution and can lead to exposure of civilisation to harmful ultraviolet rays.

Diffrent curricular activities in School. SKV SAWDA A-BLOCK,GHEVRA (1413266)

RECYCLED ART

The environmental benefits of recycled art include its contribution to society to an extent to mobilise a cause with pouring in emotions and responsibility for each &, every individual. This moment can be a very interesting educational tool to raise awareness in society, especially among children regarding the consequences of our action on the environment and the importance of recycling. To celebrate world environment day this year within the theme & ONLY ONE EARTH which draws attention towards playing one role effectively while living in perfect harmony with nature without proving a word and on it.

Art installation under the theme "only one Earth" by sand artist Sudarshan Pattnaik from Odisha unrevealed his latest sand art at Puri beach marking word Environment day 2022.

Another delhi based artist Manveer Singh known as the 'Plasticvalla' has successfully converted over 350 kgs of used plastic into artwork. Every week, he collects plastic waste from more than 70 families in his neighbourhood and repurposes it to create never-before-seen artwork with a strong message against plastic pollution. Recently, he installed a 15-feet Olive Ridley sea turtle artwork made completely of plastic waste at Puri beach, Odisha. The artwork comprises 200-250 small turtles made with plastic. For this, he collected over 50 kgs of MLP.

Ambers Countryman, Veronika Richterova and Maria Arceo are among a growing number of artistsworld wide who are using Visual Art to raise awareness of the devastating effect that single-use plastic has on our oceans and ocean life.

Inspired by these world-famous interventions, we Art teachers at the educational helm can also be a contributor to our society by using school building as a canvas to convey social causes to reach masses through our students! This simple thought inspire me to write this article for Science E Magazine.

Our schools are already giving us platforms to show our talent through Wall Art.

Suman
Drawing Teacher,
SKV, Sawda,
A-Block,Ghevra

Suman Relan
Mentor Teacher
Ggsss, B1, Vasantkunj

जगदीश चंद्र बोस

विज्ञान एक ऐसा विषय है, जिसमें किसी वस्तु, प्रक्रिया या घटना के व्यावहारिक और सैद्धान्तिक दोनों पक्ष सम्मिलित हैं। विज्ञान ने हमें अपने परिवेश को बेहतर तरीके से समझने में मदद की है और हमारे आसपास होने वाली हर चीज के बारे में तार्किकता के पहलू को उजागर किया है। यह विज्ञान की ही देन है कि पूरी दुनिया विभिन्न क्षेत्रों में तेज गति से विकसित हो रही है। मानव सभ्यता के आरम्भ से अब तक बहुत सारी खोजें हुई हैं।

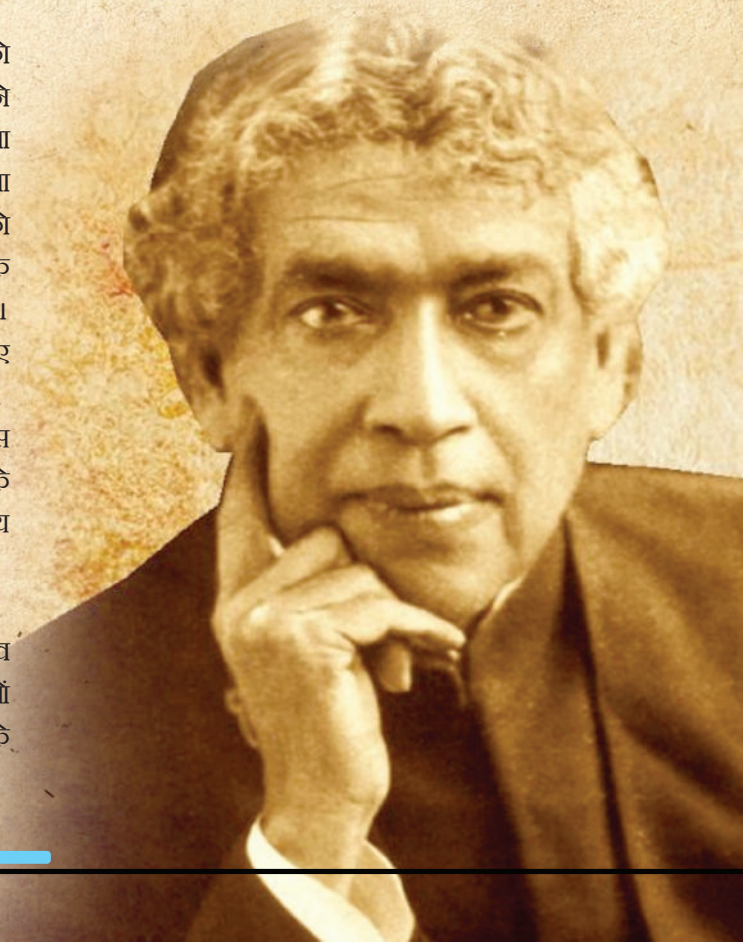
बहुत सारे वैज्ञानिक हैं जो लगातार नए-नए अविष्कार कर रहे हैं। हम इन वैज्ञानिको के बारे में खूब पढ़ते और जानते हैं लेकिन दुर्भाग्यवश जगदीश चंद्र बोस द्वारा की गई खोजों के लिए दुनिया भर के लोगों द्वारा उनको समुचित श्रेय नहीं दिया जा सका। जगदीश चंद्र बोस एक प्रसिद्ध भौतिक विज्ञानी, जीवविज्ञानी, वनस्पतिशास्त्री और पुरातत्वविद् थे। उन्होंने मुख्य रूप से रेडियो प्रौद्योगिकी और अर्धचालक उपकरणों के विकास में अपना महत्वपूर्ण योगदान दिया। उन्हें रेडियो विज्ञान के पिता के रूप में भी जाना जाता है। वे पहले भारतीय वैज्ञानिक थे, जिनकी खोज के लिए अमेरिका में पेटेंट किया गया था ।

श्री जगदीश चंद्र बोस का जन्म 30 नवंबर 1858 को बंगाल में हुआ था। उन्होंने अपनी प्राथमिक शिक्षा अपने गांव से प्राप्त की तथा आगे की पढ़ाई के लिए कोलकाता चले गए। उन्होंने कोलकाता से भौतिकी में बीए की परीक्षा पास की और फिर मेडिसिन की पढ़ाई के अपने सपने को पूरा करने के लिए लंदन गए। अफसोस की बात है कि वह स्वास्थ्य कारणों से इसे पूरा करने में असमर्थ रहे। आगे चलकर प्राकृतिक विज्ञान का अध्ययन करने के लिए उन्होंने कैंब्रिज के क्राइस्ट चर्च कॉलेज में प्रवेश लिया। 1885 में जब वे भारत लौटे तो चीजें बदल चुकी थीं। उस समय उन्हें प्रेसीडेंसी कॉलेज, कलकत्ता में भौतिकी के प्रोफेसर के रूप में नियुक्ति मिली। वहां उन्हें यूरोपीय प्रोफेसरों की तुलना में कम वेतन दिया जाता था।

बिना किसी वेतन के छात्रों को पढ़ाकर वे इस भेदभाव के विरुद्ध खड़े हुए। लगभग 3 वर्ष बाद ब्रिटिश अधिकारियों की नींद खुली, तब उन्होंने इनकी क्षमता और कार्य के प्रति समर्पण को देखते हुए एक साथ पिछले तीन वर्षो का वेतन दिया।

वैज्ञानिक अनुसन्धान के क्षेत्र में उन्होंने माइक्रोवेव का अध्ययन किया और यह सिद्ध किया कि रेडियो तरंगें ठोस वस्तुओं से गुजर सकती हैं, एक दीवार के माध्यम से भी यात्रा कर सकती हैं, एक घंटी की अंगूठी बना सकती हैं और गन पाउडर में विस्फोट भी कर सकती हैं। अपने सफल प्रयोग के आधार पर वे मर्करी कोहेरर रेडियो वेव रिसीवर को कुशलता से संचालित करने वाले पहले व्यक्ति बने। अपने प्रयोग को सिद्ध करने के लिए उन्होंने गन पाउडर के लिए एक ट्रिगर रखा, रिले से जुड़ी एक घंटी जिसे माइक्रोवेव द्वारा नियंत्रित किया जा सके उसको लगाया तथा दीवार के दूसरी तरफ एक ट्रांसमीटर लगा दिया।

जैसे ही सिग्नल प्रसारित हुआ रिले से जुड़ी घंटी बजी और गन पाउडर में सफलतापूर्वक विस्फोट हो गया। उन्होंने उस समय एक नये विचार को सामने रखा कि एक दिन माइक्रो वेव हवा के माध्यम से यात्रा करेंगे।



ब्रिटिश भारत की तत्कालीन सरकार को विज्ञान के क्षेत्र में उनकी प्रगति बर्दाश्त नहीं हुई इसलिए उन्हें प्रयोगशाला के रूप में एक छोटा सा कमरा और अपेक्षाकृत कम वेतन दिया गया। उन्होंने माइक्रोवेव सम्बन्धी अपने प्रयोग को प्रदर्शित करने के लिए लंदन की यात्रा की, जिसमें गुग्लिल्मो मार्कोनी ने भी भाग लिया था।

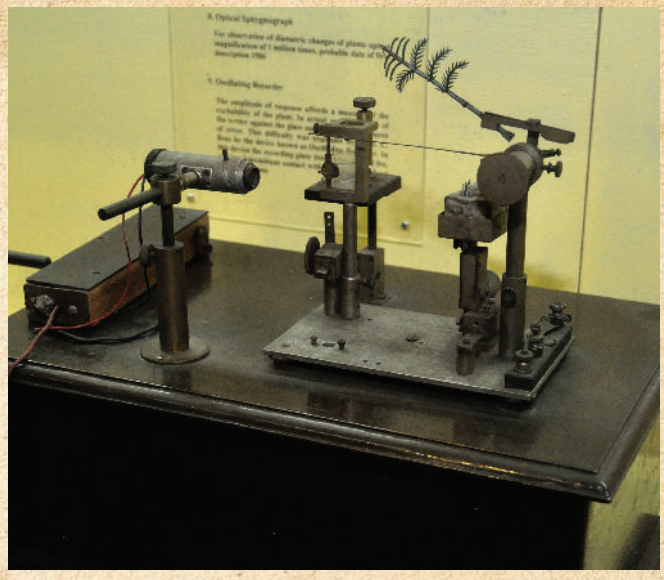
गुग्लिल्मो इस विचार का व्यावसायीकरण करना चाहता था, हालांकि बोस जी इसके खिलाफ थे। इनके द्वारा बनाये गये मरकरी कोहेरर ट्रांसमीटर ने गुग्लीलमो मार्कोनी के रेडियो के विकास में मदद की। कई लोगों ने जगदीश से अपनी तकनीकों का पेटेंट कराने का आग्रह किया लेकिन उन्हें पैसा कमाने में कोई दिलचस्पी नहीं थी।

आगे चलकर उन्होंने रेडियो तरंगों का पता लगाने के लिए सेमी कंडक्टर जंक्शन पर गहन शोध किया। नोबेल पुरस्कार विजेता सर नेविल मॉट के अनुसार P और N प्रकार के अर्धचालकों की खोज की वजह से जगदीश चंद्र बोस समय से 60 साल आगे जी रहे थे ।

अपने अनुसन्धान से उन्होंने यह भी सिद्ध किया कि पौधों में उत्तेजना रासायनिक माध्यम से प्रेषित न होकर विद्युत माध्यम से होती है। उन्होंने पादप कोशिकाओं में विद्युत संकेत के प्रभाव पर गहन शोध किया और बताया कि पेड़-पौधों में भी जीवन होता है और वे तनाव के अधीन भावनाओं का प्रदर्शन करते हैं। कुछ समय बाद गुग्लिल्मो मार्कोनी के पोते ने बोस के विचार को अपना तो लिया लेकिन इसके लिए उन्हें कभी कोई श्रेय नहीं दिया।

जगदीश चंद्र बोस ने ही क्रेस्कोग्राफ का भी आविष्कार किया, जो एक पौधे की वृद्धि को मापने के लिए इस्तेमाल किया जाने वाला उपकरण है। सन् 1915 में वे सेवानिवृत्त हुए उसके बाद भी अपनी उसी प्रयोगशाला में शोध करना जारी रखा जो मूल रूप से उनका घर था। 30 नवंबर,1917 को उन्होंने कोलकाता में बोस संस्थान की स्थापना की। 23 नवंबर, 1937 को 73 वर्ष की आयु में उनका निधन हो गया।

जगदीश चंद्र बोस की वैज्ञानिक खोजों के बारे में पूरी दुनिया को बहुत बाद में पता चला। इंस्टीट्यूट ऑफ इलेक्ट्रिकल एंड इलेक्ट्रॉनिक्स इंजीनियर्स (IEEE) में उन्हें प्रथम भारतीय वैज्ञानिक के रूप में चित्रित किया गया तथा रेडियो विज्ञान के पिता के रूप में स्थापित किया गया। उसके नाम पर चाँद के एक क्रेटर का नाम रखा गया ।



उन्हें प्राप्त कुछ पुरस्कारों की सूची निम्नवत् है

1- 1896 में लंदन विश्वविद्यालय से विज्ञान में डॉक्टरेट की उपाधि।

2- 1911 में, जगदीश चंद्र बोस को ब्रिटिश सरकार द्वारा कंपेनियन ऑफ द ऑर्डर ऑफ इंडियन अम्पायर की उपाधि।

3-1917 में ब्रिटिश सरकार द्वारा 'नाइट' की उपाधि से सम्मानित किया गया।

4- 1920 में, जगदीश चंद्र बोस को ब्रिटिश रॉयल सोसाइटी का फेलो चुना गया।

यदि उनके काम को सही समय पर मान्यता दी गई होती तो उन्हें दो नोबेल पुरस्कार मिले होते - एक रेडियो तरंगों के अध्ययन में उनके योगदान के लिए और दूसरा सेमीकंडक्टर पर उनके शोध के लिए।

हालांकि उनके अनुसन्धान का श्रेय लेने वाले गुग्लिल्मो मैक्रोनी को नोबेल पुरस्कार दिया गया। जगदीश चंद्र बोस को अपने कार्यक्षेत्र में बहुत भेदभाव का सामना करना पड़ा, जिसके कारण उनकी उन खोजों को मान्यता नहीं मिली, जिन खोजों ने विश्व स्तर पर वैज्ञानिक गतिविधियों को दिशा दी।

बिना किसी संदेह के हम यह कह सकते हैं कि वे भारत के महानतम वैज्ञानिक थे। उन्होंने अपने आविष्कारों से पूरे देश को गौरवान्वित किया है।

तनिष्का कुमार
XI-D
न्यू एरा पब्लिक स्कूल

Fun Tricks that you can do at home

Ayat Alam
VI A, Railway Colony Tuglakabad

01 A Can That Can "Walk"

Take an aluminum can. Inflate a balloon and tie a knot at the end. Rub a napkin on the balloon. Put the balloon near the can, it will start moving toward the balloon.

Trick behind it?
When we rub the balloon with a napkin, the balloon gets a negative electric charge of several thousand volts. When we put the balloon near the can, electrostatic induction affects the molecules in the metal. The outside of the can gets a positive charge, so it is drawn toward the balloon and starts moving in that direction.

02 Egg Into Bottle

Take a glass bottle that has a mouth slightly smaller than an egg. Put some hot water into the bottle, shake it vigorously and empty the bottle. Peel a soft-boiled egg and put it on the mouth of the bottle. Leave it there for a while and it will get sucked inside.

Trick behind it?
The vapor from the hot water drives the air out of the bottle. Once the egg seals the top of the bottle, the air can't get back in. As the water vapor cools, it turns back into water, causing the pressure inside the bottle to drop. The higher pressure of the outside air pushes the egg into the bottle.

03 Toothpick Torpedo

Take some shampoo at the end of a wooden toothpick. Put the toothpick in a pan of water. The toothpick will start moving in the direction of the sharp end.

Trick behind it?

Shampoo contains agents that reduce the surface tension of liquids. As the shampoo dissolves, it reduces the water's surface tension around it, thus releasing the water's hold. The water around the other end of the toothpick still has surface tension, so it pulls the toothpick in that direction.

04 Flying Tea Bag

Hollow out the center of the tea bags with your fingers and stand them up on end on the solid metal or stone surface. With a match, quickly light the top tip of each standing tea bag. Watch as the tea bag burns to the bottom, and then quickly floats up into the sky.

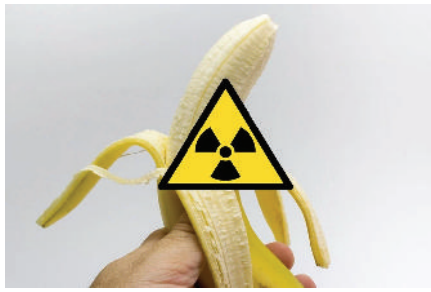
Trick behind it?

The flying tea bag experiment is a heat experiment. As the flame burns it heats the air inside the tea bag. As the air gets hotter the molecules become less dense and move around.The less dense warmer air rises above the denser cooler air around the tea bag. Since the tea bag is very light it rises with it and appears to fly.

References: 1. https://scoutlife.org/ 2. https://www.coffeecupsandcrayons.com/

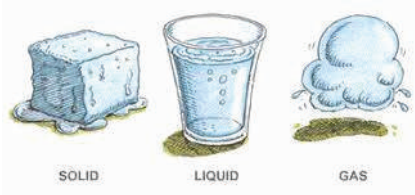
#FunFacts Bananas are Radioactive!

01 Bananas contain potassium and since potassium decays, that makes the fruit radioactive. However, 10 million bananas would be required in order to kill a person due to radioactive poisoning. Still, more radiation enters our body on eating a banana than on living within 50 miles of a nuclear power plant.



Water can exist in 3 states at the same time

02 At a specific point of temperature and pressure, materials can exist as solid liquid and gases at the same time. This is known as the triple point or triple. All substances have different triple points. Water reaches its triple point at 0.1°C of temperature and 0.006 pascals of pressure.



Bhavishya Dhiman, *X-G, Govt Coed Sr Sec school, Preet Vihar*

Forthcoming Exam

Mukhyamantri Vigyan Pratibha Pariksha (MVPP)

When
Registration for the Mukhymantri Vigyan Pratibha Pariksha is generally invited in the month of September every year by the Science Branch of Directorate of Education, GNCT of Delhi.

Conducted By
Science Branch Directorate of Education,GNCT of Delhi.

Contact
- Mrs. Zareen Taj
(Addl. Director of Education) (Contact: 9958029752)
- Dr. Sudhakar Gaikwad
(Dy. Director of Education) (Contact No: 9911221724)
- Mr. Ashwani
(SNO/In-Charge Examination)(Contact No: 9899519963) Science Branch, Directorate of Education,GNCT of Delhi , Lajpat Nagar-IV, Delhi-110024
Mail Id: **nmmssexam.sciencebranch@gmail.com**

Who is Eligible

All students presently studying in class IX in Govt., Govt. Aided and Unaided recognized Pvt. schools including KVS, JNV, NDMC, DCB, NIOS etc. situated in NCT of Delhi and secured minimum 60% (for General Category) and 55% (for OBC/SC/ST/Divyang) in class VIII.

About the Examination

Mukhyamantri Vigyan Pratibha Pariksha is a scheme to award a one-time scholarship to the talented students in field of Science and Mathematics. In this examination, only **two areas are included**

1- Mental AbilityTest (MAT),
2: ScholasticAptitudeTest (SAT).

After the examination, top 1000 meritorious students become eligible for the scholarship.

Scholarship Amount:

Top one thousand meritorious students get Rs. 5000/- as one-time scholarship for their talent shown in the examination.

Reservation: As per norms of GNCT of Delhi.

National Means Cum Merit Scholarship Scheme - NMMS

A CENTRE SECTOR SCHEME UNDER THE DEPARTMENT OF SCHOOL EDUCATION AND LITERACY, MINISTRY OF EDUCATION, GOI

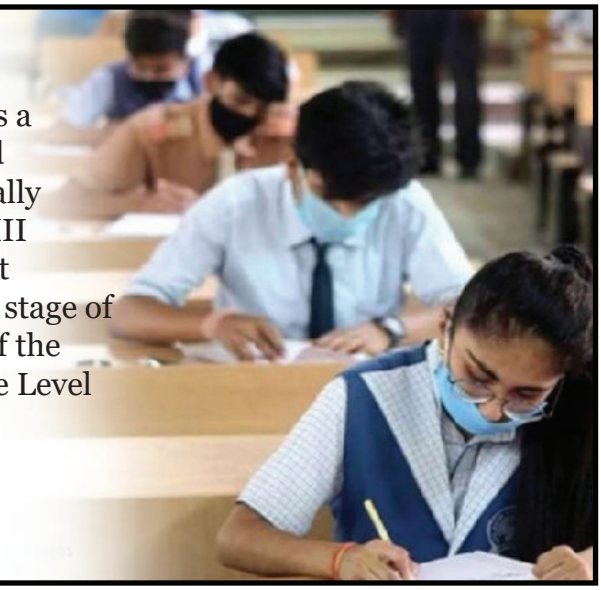
FOR NCT OF DELHI, THE EXAMINATION IS CONDUCTED BY:
Directorate of Education, GNCT of Delhi

As per state quota, 1576 meritorious students are nominated to Ministry of Education, Government of India for disbursing scholarship Rs. ***1000/-*** per month up to class 12th (subject to the conditions prescribed by the Ministry of Education, GoI, time to time).

WHEN AND WHERE:
Registration for the National Means Cum-Merit Scholarship Sceme is generally invited in the month of August to September every year by the Science Branch of Directorate of Education, GNCT of Delhi.

CONTACT
Mr. Ashwani
Science Branch
Directorate of Education,
GNCT of Delhi.
Lajpat Nagar-IV, Delhi-110024
Mail Id: **sciencebranch@gmail.com**

ABOUT THE EXAMINATION

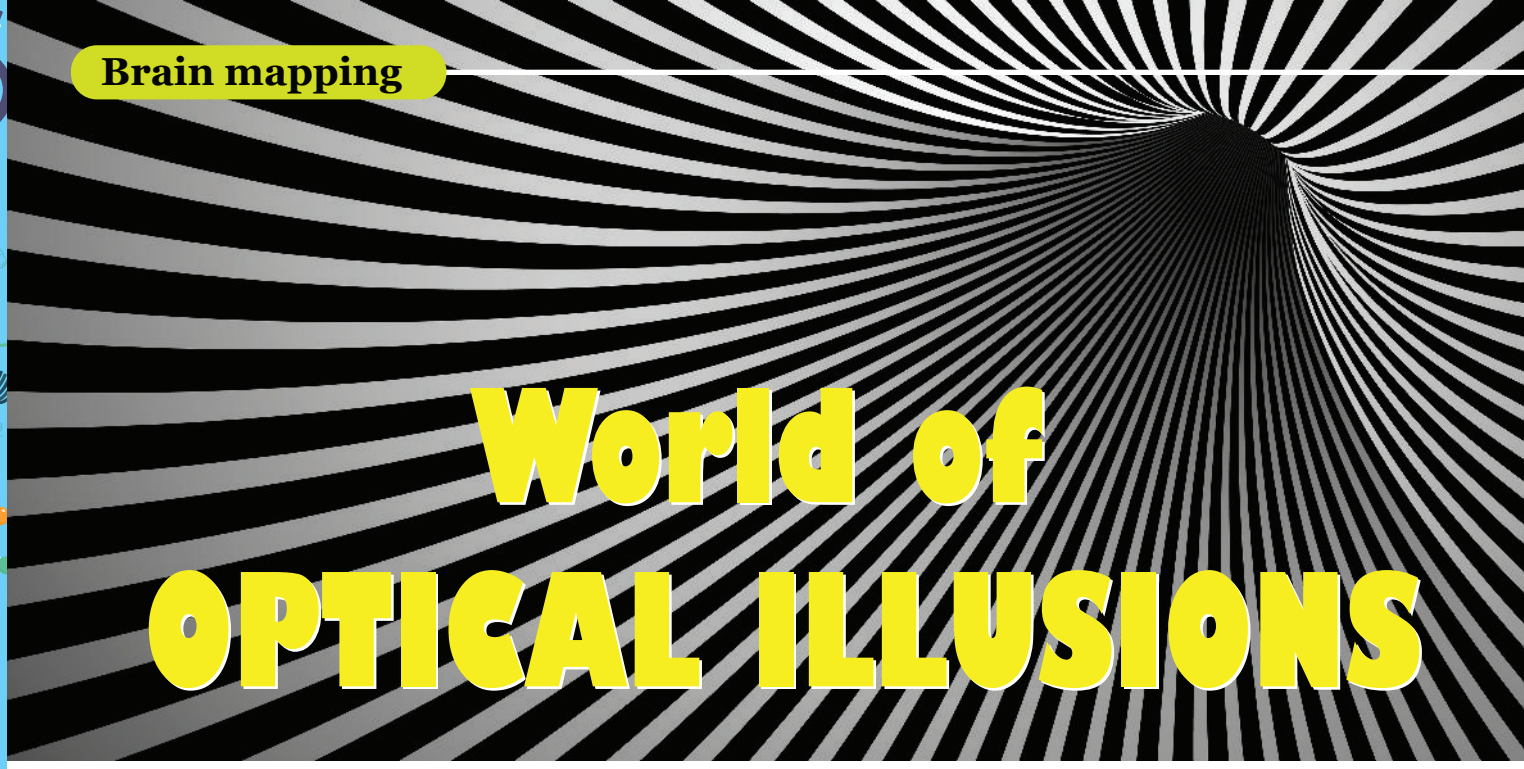


National Means-cum-Merit Scholarship Scheme is a Central Sector Scheme with the objective to award scholarships to meritorious students of economically weaker sections to arrest their drop out at class VIII and encourage them to continue their education at secondary stage.Delhi conducts its own test at the stage of class VIII for selection of students for the award of the National Means-cum-Merit Scholarship. The State Level Examination consists of the following two tests:
i. Mental Ability Test (MAT)
ii. Scholastic Aptitude Test (SAT)

Reservation: As per norms of GNCT of Delhi.

Who are eligible

1- Students presently studying in Class-VIII in Govt. /Govt. Aided and Local Body Schools situated in NCT of Delhi.
2- Students whose parental income from all sources is not more than Rs. 3,50,000/- per annum.
3- Students must have minimum 55% (50% for SC/ST) marks or equivalent grade in Class VII examination.
4-Students of NVS, KVS and residential schools are not entitled for the scholarship



World of OPTICAL ILLUSIONS

We all have seen various optical or visual illusions over time.Optical illusions can be fascinating, but do we really know how these optical illusions actually work? Our eyes are fooling us, or our eyes are perceiving reality?

In order to see, our eyes must focus light on its retina, convert the light into electrical impulses, and send those impulses to brain to be interpreted. When the electrical impulses arrive in the visual cortex of the brain, the brain "reads" them and interprets them into an image of color and light. It then flips the image (the light gets projected on our retina upside down) and fills in for the blind spot if necessary.

All this happens almost instantaneously, allowing us to read a book or enjoy a beautiful sunset. Generally the process works flawlessly, but sometimes the color, light, or pattern of an object can "trick" the brain into interpreting the image incorrectly, so we think we see something differently from how it really is. This is an optical illusion.

Types of optical illusions

Some optical illusions happen naturally: like moon looks much bigger when it's close to the horizon than when it is high in the sky. Or it looks like water on the highway when driving in the sunshine. These are both optical illusions- the moon doesn't really change size, and the road may be dry as a bone!

Other illusions happen because of a certain combination of colors and shapes, changes in background, because our eyes get tired.

So there are three main types of visual or optical illusions :-

- Literal Optical Illusions
- Physiological Optical Illusions
- Cognitive Illusions

1.Literal Optical Illusions

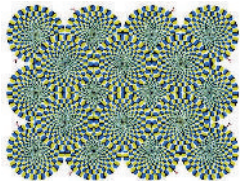
These illusions are created when our eyes perceive an image and our mind fills in gaps that don't actually exist creating an image that's different from the object that makes them, or focuses on specific areas of the image resulting in us "seeing" something that isn't actually there.

This also occurs when our brain creates images of faces in the clouds, or in everyday objects. Ex-Elephant Legs

How many legs do I have?

In the example here, since our eyes uses the edges of objects to distinguish what that object is, we see that the elephant has a multitude of legs.

Physiological Optical Illusions



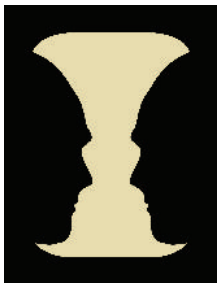
These are caused when we have an excessive amount of stimuli for a certain period of time (light/brightness, colour, movement, flashes, etc.) and the affect it has on our brain or eyes.Now take a look at the image below for a minute, and then take a look at the blank space while blinking.

COGNITIVE OPTICAL ILLUSIONS

These are caused by "unconscious inferences" that our brain makes when looking at certain objects. Aspects like shape, color and size pop up naturally from our neural circuit and influence what we see. These illusions then occur when this natural, unconscious process of organisation by our brain conflicts with our reasoning when we consciously look and take in the image.

Ambiguous Illusions

These are illusions that have two pictures in them; which one you see depends on how you look at them. Ex:- Rubin Vase : Now have a look at this picture, what do you see? A vase or two faces?



Distorting or geometrical-optical illusions are characterized by distortions of size, length, position or curvature.

Ex:- Muller-Lyerillusion : Which horizontal line is shorter: the top or the bottom? They're of the same size, even though your mind perceives the one with outward wings to be longer.

Paradox illusions (or impossible object illusions) are generated by objects that are paradoxical or impossible. It may look okay on paper, but the minute you consider whether it can exist in real life, you'll be scratching your head.

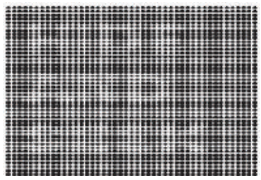
Ex- Penrose triangle. It's an illusion dependent on a cognitive misunderstanding that adjacent edges must join. Fiction is when a figure is perceived even though it is not in the stimulus, like with the Kanizsa triangle. This one is common cognitive illusions in which we see a bright white triangle when there actually isn't one there.This is due to the contrast in colours and the angles of the Pac Man disks,leading our mind to create the white triangle in the middle.

Anomalous Motion

Sometimes things look like they are moving, but they really aren't! This complex illusion depends on color, contrast, and peripheral vision. Focus very hard in the middle of the image and the motion will stop.

Ex-Rotating wheels When your eyes dart to one seemingly spinning circle, the others around them appear to start rotating. Your eyes don't know where to look!

Pattern illusions Hidden messege Lose your focus a bit (try to go a little cross-eyed) and you'll spot a secret message in the black dots. Take a closer look, though, and the words will disappear from sight. **After images** Have you ever seen something even after you've stopped looking at it.

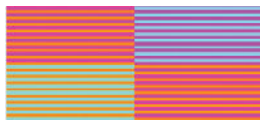


Light Bulb- Stare closely at this light bulb for 25 seconds. Then immediately stare at a white wall or sheet of paper. What do you see?

3. Large and small

Which blue dot is bigger: the one on the left or the one on the right?

4. How many colors?



Can you figure out how many colors are in this image in total? Did you guess four? Now enjoy these illlusions and share with your family and friends.

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Source:-https://en.m.wikipedia.org/wiki/Optical_illusion
https://kids.niehs.nih.gov/games/riddles/illusions/index.htm
https://www.rd.com/article/optical-illusions/

Answers to the previous Edition's You have asked

1.The blue blood is because the protein, haemocyanin, which carries oxygen around the octopus's body, contains copper rather than iron like we have in our own haemoglobin.

2.As a general rule, animals with a high metabolic rate die early, and those that burn energy more slowly plod on for decades. That's why Tortoise and turtles live for so long.

3.Goosebumps are the result of tiny muscles flexing in the skin, making hair follicles rise up a bit. This causes hairs to stand up.

4.As we get older , the pigment cells in our hair follicles gradually die and colour changes.

5.Four forces keep an airplane in the sky . They are lift, weight , thrust and drag. Lift pushes the airplane up. The way air moves around the wings gives the airplane lift.

6.As the epithelial cells within the follicle and matrix multiply, the older cells are pushed out, upwards through the skin. These cells die and harden thus turning into hair or nails . The process is called keratinisation and makes our hair and nails grow.

7.The water is in fact not colorless: even pure water is not colorless, but has a slight blue tint to it, best seen when looking through a long column of water. The blueness in water is not caused by scattering of light, which is responsible for the sky being blue.

8.Most dreaming occurs during REM (rapid eye movement) sleep, which we cycle through periodically during the night. Sleep studies show our brainwaves are almost as active during REM cycles as they are when we're awake. Experts believe the brainstem generates REM sleep and the forebrain generates dreams.

9.Cornea

10.All consciousness arises from the brainstem, and it starts as feelings. Electromagnetic energy in the brain enables brain matter to create our consciousness and our ability to be aware and think, according to a new theory developed by Professor Johnjoe McFadden from the University of Surrey.

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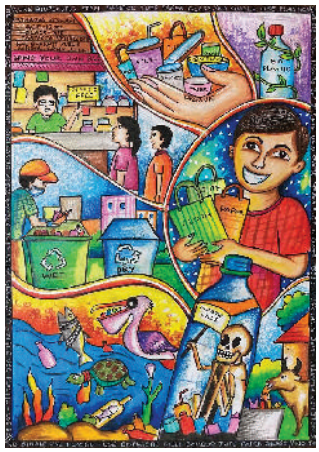

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