



2023-24





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# SPACE TOURISM: THE NEXT FRONTIER IN TRAVEL

## Introduction

Space tourism, a concept that was once considered science fiction, is now becoming a reality. With private companies like Virgin Galactic, SpaceX, and Blue Origin leading the charge, space tourism is poised to revolutionize the way we travel. In this article, we will explore the definition and types of space tourism, its history, current state, benefits, challenges, future prospects, companies and players, cost and accessibility, regulations and safety, and conclude with a summary of the industry's potential.



## Definition and Types

Space tourism refers to the practice of traveling to space for recreational purposes. There are several types of space tourism, including:

**Suborbital flights:** These flights take passengers to the edge of space, providing a brief experience of weightlessness and a view of the Earth's curvature.

**Orbital flights:** These flights take passengers into orbit around the Earth, providing a longer duration experience of weightlessness and a view of the Earth from space.

**Lunar tourism:** This type of tourism involves traveling to the Moon, either for a brief visit or for an extended stay.

**Mars tourism:** This type of tourism involves traveling to Mars, either for a brief visit or for an extended stay.

## History of Space Tourism

The concept of space tourism has been around for decades, but it wasn't until the 1990s that the first space tourists began to emerge. In 1990, Japanese businessman Toyohiro Akiyama became the first space tourist, paying \$12 million to fly to the Mir space station.

Since then, several other space tourists have followed, including Dennis Tito, Mark Shuttleworth, and Guy Laliberté.

### **Current State of Space Tourism**

Today, space tourism is a rapidly growing industry, with several private companies and government agencies working to develop the necessary infrastructure and technologies. Virgin Galactic, for example, has developed a suborbital spaceplane called SpaceShipTwo, which is designed to take passengers to the edge of space. SpaceX, on the other hand, is developing a reusable rocket called the Falcon 9, which is capable of carrying passengers to orbit.

### **Benefits and Challenges**

#### **Space tourism offers several benefits, including:**

- The opportunity to experience weightlessness and see the Earth from space
- The potential to inspire new generations of scientists, engineers, and explorers
- The possibility of developing new technologies and industries

#### **However, space tourism also poses several challenges, including:**

- The high cost of accessing space
- The risks associated with space travel, including launch accidents and space debris
- The need for specialized infrastructure and training

### **Future of Space Tourism**

Despite the challenges, the future of space tourism looks bright. With several private companies and government agencies working to develop the necessary infrastructure and technologies, it is likely that space tourism will become more accessible and affordable in the coming years. Some of the potential developments that could shape the future of space tourism include:

- Reusable rockets and spacecraft
- Space stations and habitats
- Lunar and Mars bases

- Space tourism packages and itineraries

### **Companies and Players**

Several companies and players are involved in the space tourism industry, including:

**Virgin Galactic:** A private company founded by Richard Branson, which is developing a suborbital space plane called Spaceship Two.

**SpaceX:** A private company founded by Elon Musk, which is developing a reusable rocket called the Falcon 9 and a spacecraft called the Dragon.

**Blue Origin:** A private company founded by Jeff Bezos, which is developing a suborbital rocket called the New Shepard and an orbital rocket called the New Glenn.

**NASA:** A US government agency that is working to develop the necessary infrastructure and technologies for space tourism.

### **Cost and Accessibility**

The cost of space tourism is currently very high, with prices ranging from \$200,000 to \$20 million per person. However, as the industry develops and more companies enter the market, it is likely that prices will come down and space tourism will become more accessible to a wider range of people.

### **Regulations and Safety**

Space tourism is a highly regulated industry, with several government agencies and international organizations working to develop and enforce safety standards and regulations. Some of the key regulations and safety standards include:

- The Federal Aviation Administration (FAA) in the US
- The European Aviation Safety Agency (EASA) in Europe
- The International Civil Aviation Organization (ICAO) globally
- The International Space Exploration Coordination Group (ISECG) for space tourism safety standards

## Conclusion

Space tourism is a rapidly growing industry that offers a unique and exciting experience for those who dare to venture into space. While there are several challenges and risks associated with space tourism, the benefits and potential rewards are significant. As the industry continues to develop and mature, it is likely that space tourism will become more accessible and affordable for a wider range of people.



**Akash A**  
**II Year Student Teacher**

## HORNBILLS BIRDS

### Introduction

Hornbill, (family Bucerotidae), any of approximately 60 species of Old-World tropical birds constituting the family Bucerotidae (order Coraciiformes). They are noted for the presence, in a few species, of a bony casque, or helmet, surmounting the prominent bill. They are typically large-headed, with thin necks, broad wings, and long tails. The plumage is brown or black, usually with bold white markings.



### History about Hornbills

They are monogamous breeders nesting in natural cavities in trees and sometimes cliffs. A number of mainly insular species of hornbill with small ranges are threatened with extinction, mainly in Southeast Asia. In the Neotropical realm, toucans occupy the hornbills' ecological niche, an example of convergent evolution.

### Purpose of Hornbills

Hornbills have large, usually de-curved bills, with which they can deftly pluck fruit — like toucans in the New World. Most hornbills also eat insects and small animals, and use their bills to snatch and subdue prey.

Hornbill beaks have a distinct feature called a casque, which can range from a subtle ridge along the top of the bill to a knob or a large bulky structure. Casques are covered with keratin and usually hollow, reinforced by bony struts. Some are dull, while others become yellow, orange, or red after the bird applies oils wiped from the preen gland. Casques can add strength or counterweight to the bills (handy when chiselling in bark or hard soil) or act as sound chambers to augment vocalizations. Because casques are typically larger in males and may take years to reach full size, it is believed that they signal sexual maturity or status.

### **Theme 2024**

The Hornbill Festival 2024, themed “Cultural Connect,” is a grand celebration of Nagaland’s rich heritage and cultural diversity. With daily cultural performances featuring folk dances, songs, indigenous games, and rituals, the festival is a spectacular showcase of the state’s living traditions.

### **Highlights**

Hornbills are the farmers of the forest. They are large, fruit-eating birds which live in sub-tropical forests of Asia and Africa. Because of their ability to commute over long distances, they are of extreme importance for the dispersal of seeds and therefore for plant reproduction.

The Bucerotinae have a very unique way of nesting. The female hornbills that incubate the eggs will close the entrance of the nest with a wall made of mud with one narrow hole for the male to transfer the food and throw away droppings. Afterwards, the females will shed their feathers to warm the eggs.

Hornbills have a close relationship with the noble culture of Indonesian society. In Kalimantan, Dayak tribe consider hornbills as a symbol of purity, power, and strength. For example, they use hornbill feathers as many accessories in the traditional dance costumes.

The tribe often communicate with their ancestors through the mediation of hornbills. The Dayak community believe that the natural spirits protect the island of Kalimantan and often manifest themselves in the form of a giant hornbill known as the Bird Commander.

Interactions between humans and hornbills also happened in Java Island. The discovery of hornbill sculpture in Prambanan Temple in Central Java also proves that hornbills have a distinctive position in the traditional societies.

## **Importance of Hornbills**

The existence of hornbills in the nature is closely related to the forest conservation. Cruising almost 100 kilometre squares, hornbills are effective seed dispersers in the forest. The seeds are spread through their food scraps or droppings because the hornbill's digestive system does not damage the fruit seeds.

The presence of hornbills in the forest will reflect the condition of the forests that are still healthy and indicate that there are still large trees in the area. This is because hornbills require a variety of fruit trees as feeding and large trees with holes for nesting.

This way, the large trees indicate that the forests are in good condition. In other words, protecting the hornbills in the wild means protecting the forest.

## **Conclusion**

PROFAUNA is intensively conducting education and campaign activities for the conservation of hornbills and forests which are their habitats. The campaign is carried out through the following activities:

Education at schools and universities Education to the local people living by the forests. Monitoring of hornbills in the wild. Advocacy of the protection of forests that become the habitats of the hornbills.



**Anusha M P**  
**II Year Student Teacher**

## **WORLD ENVIRONMENT DAY: A STEP TOWARDS A GREENER FUTURE**

### **Introduction**

World Environment Day, celebrated annually on June 5th, serves as a global platform to inspire positive action for the environment. Established by the United Nations, it unites people worldwide to address pressing ecological challenges.



## **History**

First observed in 1973, World Environment Day was initiated during the Stockholm Conference to spotlight global environmental concerns. Over the years, it has grown into a global movement, with different countries hosting the event annually.

## **Purpose**

The day aims to raise awareness and encourage collective action for environmental preservation, combating climate change, pollution, and biodiversity loss.

## **Theme 2024**

The theme for 2024 is "Ecosystem Restoration: Building Back Better," emphasizing the urgent need to rehabilitate degraded ecosystems for a sustainable future.

## **Highlights**

Events include tree-planting drives, clean-up campaigns, educational seminars, and policy discussions, fostering collaboration among governments, businesses, and individuals.

## **Impact and Importance**

World Environment Day has mobilized millions to adopt sustainable practices, influenced policies, and spotlighted critical environmental issues globally.

## **Quotes/Interesting Facts**

- "The Earth is what we all have in common." – Wendell Berry
- Over 1 billion people participate in World Environment Day activities annually.

## **Conclusion**

World Environment Day is a reminder of our shared responsibility to protect our planet. Let us act now to secure a healthy, sustainable future.

## **Reflection/Call to Action**

Every small effort counts. Start today by reducing waste, conserving energy, or planting a tree. Together, we can make a difference!



**Bharath M L**  
**II Year Student Teacher**

# ELEPHANT AND EMPATHY

## Introduction

Elephants, with their majestic size and intelligent gaze, have long fascinated humans. Beyond their impressive physical characteristics, elephants possess a profound capacity for empathy, making them one of the most empathetic animals on the planet. This article explores the history, purpose, and impact of elephant empathy, highlighting its importance and relevance in today's world.



## History

Elephant empathy has been observed and documented for centuries. In ancient India, elephants were revered for their compassion and social bonds. Modern research has confirmed these observations, demonstrating elephants' ability to:

1. Recognize and respond to emotional states (e.g., comforting distressed family members)
2. Display self-awareness and cooperation
3. Demonstrate altruism and empathy towards other species, including humans

## Purpose

Elephant empathy serves multiple purposes:

1. Social bonding: Strengthens family ties and community cohesion.
2. Conflict resolution: Helps resolve disputes and maintain social harmony.
3. Emotional regulation: Allows elephants to manage stress and emotions

## Theme 2024: "Empathy in Action"

The 2024 theme highlights the importance of empathy in conservation efforts and human-elephant coexistence. By understanding and respecting elephant empathy, we can:

1. Improve conservation strategies
2. Enhance human-elephant relationships
3. Promote compassion and understanding

### **Highlights**

1. Elephants have a large brain-to-body mass ratio, indicating high cognitive and emotional intelligence.
2. They display empathy towards other species, including humans, in various contexts (e.g., rescue, comfort).
3. Elephant empathy is crucial for maintaining social stability and cooperation.

### **Impact and Importance**

Elephant empathy has significant implications:

1. **\*Conservation\***: Informing effective conservation strategies that prioritize social bonds and emotional well-being.
2. **\*Animal welfare\***: Recognizing elephants' emotional needs and promoting humane treatment.
3. **\*Human-elephant coexistence\***: Fostering mutual understanding and respect.

### **Quotes/Interesting Facts**

1. "Elephants are the ultimate empathizers." - Dr. Cynthia Moss, elephant research

Elephant empathy is a powerful reminder of the importance of compassion and understanding in our relationships with animals and each other. By embracing empathy, we can:

Enhance conservation efforts promote animal welfare Foster a more harmonious coexistence



**Chandana H R**  
**II Year Student Teacher**

# CHANDRAYAAN 3 - A NEW LEAP IN SPACE EXPLORATION

## Introduction

Chandrayaan-3, India's ambitious lunar mission, marked a significant milestone in space exploration when it achieved a successful soft landing on the Moon's south pole in 2023. This feat placed India among a select group of nations capable of lunar exploration and demonstrated ISRO's advanced technological prowess.



## History

India's journey to the Moon began with Chandrayaan-1 in 2008, which discovered water molecules on the lunar surface. Chandrayaan-2 in 2019 showcased India's capability in orbiter design, though its lander mission faced challenges. Learning from these experiences, ISRO meticulously planned Chandrayaan-3, ensuring a robust design to meet mission objectives.

## Purpose

The primary goal of Chandrayaan-3 was to study the Moon's surface composition, conduct in-situ analysis, and enhance understanding of the unexplored south pole. This region holds potential clues to the Moon's geological history and resources like water ice, critical for future lunar missions.

## Theme for 2024

Chandrayaan-3 continues to inspire the theme "Expanding Horizons: Innovating for Space Exploration," encouraging nations to explore collaborative and sustainable approaches to space science.

## Highlights

- Successful soft landing on the Moon's south pole on August 23, 2023.
- Deployment of the rover, Pragyan, to analyze lunar soil and rocks.

- Data transmission to Earth via the Chandrayaan-2 orbiter, enhancing scientific understanding.

### **Impact and Importance**

Chandrayaan-3 demonstrated India's ability to execute complex space missions economically, fostering global admiration. Its discoveries could pave the way for advancements in lunar colonization and resource utilization. Additionally, it inspired countless young minds to pursue STEM fields.

### **Quotes/Interesting Facts**

“India is on the Moon!”—A historic announcement by ISRO Chairman S. Somanath.

Chandrayaan-3's mission cost was approximately \$75 million, showcasing India's cost-effective space technology.

It became the first mission to explore the Moon's south pole successfully.

### **Conclusion**

Chandrayaan-3 symbolizes India's growing stature in global space exploration, blending innovation with determination. Its success is a testament to the relentless efforts of ISRO scientists and engineers.

### **Reflection**

This monumental achievement invites us to dream bigger and explore further. It underscores the importance of investing in science and technology to address global challenges. Let Chandrayaan-3 inspire us to pursue knowledge, curiosity, and collaboration, transcending boundaries to explore the unknown.



**Chandana M C**  
**II Year Student Teacher**

# PLASTIC POLLUTION IN MARINE ECOSYSTEM

## Introduction

The marine ecosystem, covering over 70% of the Earth's surface, is a vital component of our planet's life support system. It regulates climate, supports biodiversity, and provides food for billions. However, human activities have drastically polluted these waters, threatening marine life and the health of coastal communities. Addressing marine pollution is critical for sustaining life on Earth.



## History

Marine pollution became a global concern in the mid-20<sup>th</sup> century with industrialization and the rapid increase in plastic production. The London Convention of 1972 was among the first international agreements addressing marine pollution. Over time, issues like oil spills, chemical runoff, and plastic waste accumulation have led to significant international efforts to protect marine environments, including the UN's Sustainable Development Goal 14 (Life Below Water).

## Purpose

The goal of tackling marine pollution is to preserve oceanic health, which directly impacts human livelihoods, climate stability, and global biodiversity. Preventing pollution safeguards marine species, supports sustainable fisheries, and ensures clean water for recreational and economic activities.

## Theme

The theme for addressing marine pollution in 2024 centers around fostering sustainable practices to combat plastic waste, chemical runoff, and habitat degradation. It aligns with initiatives like the "Ocean Decade", emphasizing innovation, collaboration, and community action to restore marine ecosystems. The theme highlights the need to strengthen society's connection to the ocean, promoting responsibility and long-term sustainability.

## Highlights

1. Plastic Waste
2. Oil Spills and Chemicals
3. Microplastics and Debris

## **Impact and Importance**

1. **Ecosystem Disruption:** Pollutants destroy coral reefs, deplete oxygen levels, and harm marine organisms.
2. **Biodiversity Loss:** Endangered species like sea turtles and dolphins face increased risks due to habitat degradation.
3. **Human Health Risks:** Polluted seafood and contaminated water affect millions globally.
4. **Economic Consequences:** Coastal tourism and fisheries suffer immense losses due to pollution

## **Interesting Facts**

- Over 8 million tons of plastic enter the oceans yearly, equivalent to dumping a garbage truck of plastic every minute.
- The Great Pacific Garbage Patch is twice the size of Texas.
- Ocean dead zones, caused by nutrient pollution, have increased from 49 in 1950 to over 400 today.
- Microplastics have been found in 100% of marine species tested.

## **Conclusion**

Marine pollution is a pressing environmental challenge with far-reaching consequences. Urgent actions, including reducing waste, adopting sustainable practices, and enforcing stricter regulations, are essential to restoring marine health. Governments, industries, and individuals must collaborate to combat this crisis effectively.

## **Reflection**

Reflecting on marine pollution underscores the interconnectedness of human activities and ocean health. By protecting the marine ecosystem, we secure the future of biodiversity, economic stability, and our own well-being. Individual actions, like reducing plastic use and advocating for sustainable policies, can collectively make a substantial difference.

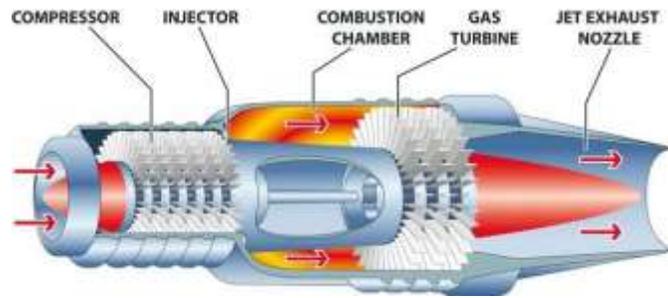


**Deepika M**  
**II Year Student Teacher**

# THRUST CHAMBER LINER AND FABRICATION METHOD

## Introduction

The thrust chamber liner is a critical component of rocket engines, designed to contain the high-temperature gases generated during



combustion and manage extreme thermal and mechanical loads. It plays a vital role in ensuring the engine's efficiency and reliability by dissipating heat and maintaining structural integrity under extreme conditions. With the increasing demand for high-performance, reusable rockets, advancements in liner materials and fabrication methods are critical for the future of aerospace technology.

## History

The evolution of thrust chamber liners began in the mid-20<sup>th</sup> century with early rocket designs employing simple steel or ablative materials. Over time, as engine performance demands increased, copper alloys like CuCrZr were introduced for their excellent thermal conductivity. The advent of regenerative cooling in the 1960s marked a turning point, enabling rockets to reuse propellants for cooling. In recent years, innovations like additive manufacturing (3D printing) and hybrid material designs have revolutionized liner fabrication, offering greater precision and efficiency.

**Purpose:** The primary purpose of the thrust chamber liner is to:

1. Contain Combustion: Withstand high-pressure, high-temperature combustion gases.
2. Dissipate Heat: Ensure effective heat transfer using materials with high thermal conductivity.
3. Enhance Engine Life: Reduce thermal stresses, erosion, and wear for prolonged operational use.
4. Support Reusability: Enable multiple launches through advanced materials and cooling systems.

## **Theme of 2024**

The theme for advancements in thrust chamber liners in 2024 revolves around “Innovation for Reusability and Sustainability.” As the aerospace industry pushes for cost-efficient and eco-friendly solutions, there is a focus on creating lighter, stronger, and more durable liners using cutting-edge fabrication techniques and materials like additively manufactured copper alloys and ceramic matrix composites.

## **Highlights**

### **1. Innovative Fabrication:**

Additive Manufacturing allows for integrated cooling channels and weight reduction.

Hot Isostatic Pressing (HIP) ensures defect-free, dense components.

Electroforming enables thin, precise liners with excellent heat dissipation.

### **2. Material Advancements:**

The adoption of GRCop-84, a high-strength copper alloy, for superior heat transfer and durability.

Development of thermal barrier coatings to resist extreme temperatures.

### **3. Reusability:**

Focus on liners that can endure multiple launches, reducing cost and environmental impact.

## **Interesting facts**

1. Modern liners use regenerative cooling, where propellants like liquid hydrogen flow through channels to absorb heat.
2. 3D printing reduces production time by 30-50% compared to traditional methods.
3. Some liners are capable of withstanding temperatures exceeding 3,000°C, almost half the surface temperature of the sun.
4. NASA’s RS-25 engines, used in the Artemis program, feature advanced copper-alloy liners for extreme durability.
5. Electroforming was one of the earliest methods used to produce thin, precise copper liners for rocket engines.

## Conclusion

Thrust chamber liners are indispensable to the performance and longevity of rocket engines. As the demand for reusable rockets grows, innovations in fabrication methods, materials, and designs are shaping the future of space exploration. The 2024 focus on sustainability and efficiency highlights the importance of developing cost-effective and environmentally conscious solutions for next-generation aerospace systems.

## Reflection

The advancement of thrust chamber liners reflects the broader progress in space technology—bridging material science, engineering, and innovation. It serves as a testament to humanity's pursuit of efficiency, reusability, and exploration beyond our planet. As we reflect on these advancements, it is evident that continued collaboration between research institutions and the aerospace industry will unlock new possibilities for space travel, ensuring sustainable exploration for future generations.



**Gayitra N Kerakanavar**  
II Year Student Teacher

## WORLD MALARIA DAY

### Introduction

World Malaria Day is observed annually on April 25th to raise awareness about malaria, a life-threatening disease that affects millions of people worldwide. This day is a call to action for governments, healthcare organizations, and individuals to join forces in the fight against malaria.



### History

Malaria has been a major public health concern for centuries. The disease was first identified in ancient civilizations, with evidence of malaria found in Egyptian medical texts from around 1550 BCE. In the 20th century, malaria was a major cause of illness and death

worldwide, particularly in tropical and subtropical regions. The launch of the Global Malaria Eradication Programme in 1955 marked a significant turning point in the fight against malaria.

### **Purpose**

The purpose of World Malaria Day is to:

1. Raise awareness about malaria and its devastating impact on individuals, families, and communities.
2. Mobilize global efforts to control and eliminate malaria.
3. Promote the use of effective prevention and treatment measures.

### **Theme 2024**

The theme for World Malaria Day 2024 is "Zero Malaria Starts with Me." This theme emphasizes the critical role that individuals, communities, and governments play in the fight against malaria.

### **Highlights**

1. **\*Progress in malaria control:\*** According to the World Health Organization (WHO), the number of malaria cases decreased by 38% between 2000 and 2019.
2. **\*Increased funding:\*** Global funding for malaria control has increased significantly, with the Global Fund to Fight AIDS, Tuberculosis and Malaria being a major contributor.
3. **\*New technologies:\*** The development of new technologies, such as rapid diagnostic tests and insecticide-treated bed nets, has improved malaria diagnosis and prevention.

### **Impact and Importance**

Malaria has a significant impact on individuals, families, and communities. The disease can cause severe illness, death, and long-term health problems. In addition, malaria has economic and social implications, including:

1. **\*Lost productivity:\*** Malaria can lead to lost productivity and economic opportunities.
2. **\*Strain on healthcare systems:\*** Malaria can put a significant strain on healthcare systems, particularly in resource-poor settings.

### **\*Quotes/Interesting Facts\***

1. "Malaria is a preventable and treatable disease. We have the tools to defeat it, and we must use them." - Dr. Tedros Adhanom Ghebreyesus, WHO Director-General
2. Malaria is responsible for approximately 435,000 deaths annually, mostly in Africa.
3. The mosquito that transmits malaria is the female Anopheles mosquito.

### **Conclusion**

World Malaria Day serves as a reminder of the importance of continued efforts to control and eliminate malaria. While significant progress has been made, there is still much work to be done. We must continue to raise awareness, mobilize resources, and support research and development to ultimately achieve a world free of malaria.

### **Reflection/Call to Action**

As we observe World Malaria Day, let us reflect on the impact that malaria has on individuals, families, and communities. Let us also recognize the progress that has been made in the fight against malaria. However, we must not become complacent. Instead, we must continue to work together to achieve a world free of malaria. We can all play a role in this effort by:

1. **\*Raising awareness:\*** Share information about malaria with friends, family, and community members.
2. **\*Supporting malaria research and control efforts:\*** Donate to reputable organizations working to combat malaria.
3. **\*Advocating for malaria control policies:\*** Encourage your government to prioritize malaria control efforts.

Together, we can make a difference and create a world free of malaria.

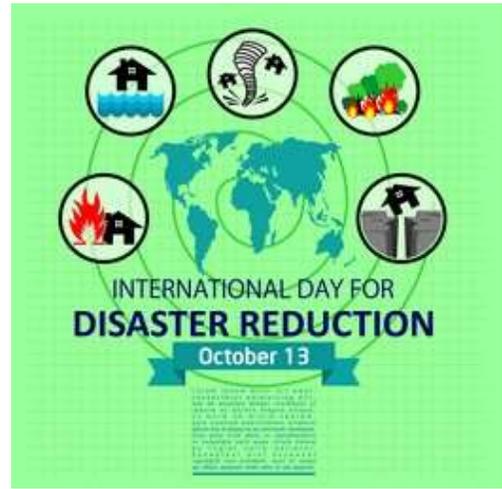


**Jayashankara R Angadi**  
**II Year Student Teacher**

# INTERNATIONAL DAY FOR DISASTER RISK REDUCTION

## Introduction:

International Disaster Risk Reduction Day, observed annually on October 13, is a United Nations-designated day to raise awareness and promote actions that reduce disaster risks globally. It highlights the importance of building resilience and mitigating the impacts of disasters.



## History

The UN General Assembly through a resolution in 1989 designated the second Wednesday of October as International Day for Natural Disaster Reduction. But on December 21, 2009, the Assembly adopted a new resolution in which it decided to commemorate the Day on 13 October. The day was renamed as International Day for Disaster Risk Reduction.

## Purpose

The purpose of conducting International Disaster Risk Reduction (IDRR) Day is to promote awareness, understanding, and actions that reduce the risks and impacts of disasters. It emphasizes the importance of proactive measures to save lives, protect livelihoods, and safeguard the environment.

## Theme of 2024

The theme for the International Day for Disaster Risk Reduction (IDRR) in 2024 is “The Role of Education in Protecting and Empowering Youth for a Disaster-Free Future.”

## Highlights

### 1. Thematic Focus

Each year, IDRR focuses on a specific theme to address global challenges in disaster risk management. For 2024, the theme is “The Role of Education in Protecting and Empowering Youth for a Disaster-Free Future.” This highlights the critical role education plays in preparing the next generation to tackle disasters effectively.

## **2. Awareness Campaigns**

Public forums, webinars, and social media campaigns are organized worldwide to spread awareness about disaster risks and preparedness. Governments, NGOs, and educational institutions often participate in promoting the Sendai Framework for Disaster Risk Reduction goal.

## **3. Community Engagement**

Activities such as disaster drills, risk mapping, and preparedness workshops are conducted to involve local communities in disaster risk reduction efforts. Focus is placed on empowering vulnerable populations, particularly youth and marginalized groups

## **4. Success Stories and Recognitions**

Celebrations often highlight best practices and successful DRR initiatives globally. Awards may be presented to individuals or organizations contributing significantly to disaster risk reduction

## **5. Educational Initiatives**

Schools and universities conduct special programs emphasizing disaster preparedness and resilience among students. Collaborative learning and digital tools are used to enhance awareness and foster international cooperation

## **6. Advocacy for Policy and Investment**

IDDRR serves as a platform to call for increased investments in disaster risk reduction, particularly in infrastructure, early warning systems, and community resilience. Leaders advocate for aligning these efforts with the Sustainable Development Goals (SDGs)

### **Impact and importance**

The International Day for Disaster Risk Reduction (IDDRR) has a significant impact and plays a vital role in shaping global efforts to reduce disaster risks. Here's why it is important:

#### **1. Raising Awareness**

**Impact:** IDDRR brings global attention to disaster risk and the need for proactive measures. It educates the public on the importance of preparedness and resilience.

**Importance:** By highlighting risk factors, such as climate change, urbanization, and inequality, the day fosters a culture of prevention rather than reaction.

## **2. Encouraging Global Collaboration**

**Impact:** Governments, organizations, and communities come together to share best practices and knowledge.

**Importance:** Collaboration accelerates the implementation of global frameworks like the Sendai Framework for Disaster Risk Reduction (2015–2030) and aligns efforts with the Sustainable Development Goals (SDGs)

## **3. Empowering Vulnerable Populations**

**Impact:** The day highlights the need to support marginalized groups, including youth, women, and people in disaster-prone areas.

**Importance:** By empowering these communities with knowledge and tools, IDDRR reduces vulnerabilities and builds resilience

## **4. Promoting Education and Innovation**

**Impact:** Events like workshops and summits (e.g., Natural Disaster Youth Summit) focus on disaster education and the use of technology for risk reduction.

**Importance:** Educating younger generations ensures sustainable solutions and encourages innovative approaches for tackling future challenges

## **Conclusion**

The International Day for Disaster Risk Reduction (IDDRR) concludes with a powerful reminder that reducing disaster risks is a shared responsibility and a global necessity. This day emphasizes the importance of proactive measures to protect lives, livelihoods, and the environment from the devastating impacts of disasters. By fostering a culture of prevention and resilience, IDDRR underscores that every effort—big or small—counts toward creating a safer, disaster-resilient world. As we commemorate this day, let it inspire ongoing actions and commitments to mitigate risks and build stronger, more prepared communities for generations to come.

## **Reflection/ Call to Action**

“Let us act now to reduce disaster risks and build a safer, more sustainable future for all.”



**Kavyashree M N**  
**II Year Student Teacher**

## USING ULTRASOUND WAVES TO REMOVE MICROPLASTICS FROM WATER

Microplastics, tiny plastic particles less than 5 millimeters in size, have become a significant environmental concern. Found in oceans, rivers, and even drinking water, these pollutants pose threats to ecosystems and human health. Scientists are exploring innovative ways to tackle this problem, and one promising solution involves the use of ultrasound waves.



### The Challenge of Microplastic Pollution

Microplastics originate from various sources, including degraded plastic waste, synthetic fibers from clothing, and industrial processes. Due to their small size, conventional water treatment methods struggle to remove them effectively. This necessitates advanced solutions to ensure clean and safe water.

### How Ultrasound Waves Work

Ultrasound waves are high-frequency sound waves that can create physical and chemical effects in liquids. When applied to water, they generate a phenomenon known as acoustic cavitation. This process involves the formation, growth, and collapse of microscopic bubbles. These collapses release intense energy, producing localized high temperatures and pressures.

**This energy can disrupt microplastics in two primary ways:**

- 1. Breaking Down Microplastics:** Ultrasound waves can fragment larger microplastics into smaller pieces, potentially making them easier to collect or degrade further.
- 2. Clustering Microplastics:** The acoustic forces caused by ultrasound waves can cause microplastic particles to cluster together. These clusters are larger and easier to filter out of the water.

## **Advantages of Ultrasound in Microplastic Removal**

**Non-Chemical Process:** Ultrasound doesn't rely on harmful chemicals, making it an environmentally friendly method.

**Scalability:** Ultrasound systems can be adapted for use in small-scale applications like household water purifiers or large-scale industrial setups.

**Efficiency:** Acoustic cavitation targets even the smallest microplastic particles that conventional methods miss.

## **Recent Research and Developments**

Recent studies have shown promising results in using ultrasound for microplastic removal. Researchers have experimented with combining ultrasound with other techniques, such as electrocoagulation or filtration, to improve efficiency. For example, in some trials, ultrasound was used alongside magnetic nanoparticles that bind to microplastics, making them easier to extract.

## **Challenges and Future Prospects**

While the potential is immense, there are challenges to overcome:

**Energy Consumption:** Ultrasound systems can be energy-intensive, and researchers are working on optimizing their efficiency.

**Scaling Up:** Developing cost-effective systems for large-scale use remains a challenge.

**Durability of Equipment:** Prolonged use of ultrasound can wear out equipment, increasing maintenance costs.

Despite these challenges, the technology holds promise as part of a broader strategy to combat microplastic pollution. Researchers continue to refine the process, aiming for more energy-efficient and scalable solutions.

## **Conclusion**

Ultrasound technology offers an innovative approach to addressing the pressing issue of microplastic pollution. By leveraging acoustic cavitation, it provides a non-chemical, efficient way to break down or cluster microplastics for removal. As research advances, this method could become a key tool in global efforts to safeguard water resources and protect ecosystems from the growing threat of microplastics.



**Nisha B**  
**II Year Student Teacher**

# TOXIC MERCURY: UNDERSTANDING THE THREAT TO HEALTH AND THE ENVIRONMENT

## Introduction

Mercury is a naturally occurring element that can have severe toxic effects on human health and the environment. It exists in different forms—elemental mercury, inorganic mercury compounds, and organic mercury (especially methylmercury)—all of which pose significant risks when improperly handled or released into ecosystems.



## History

Mercury has been used for thousands of years, dating back to ancient Egypt where it was used in embalming fluids and in medicine. However, over time, the dangers of mercury exposure became apparent. In the 1950s, a notable case of mercury poisoning occurred in Minamata, Japan, where industrial discharge of mercury into the bay led to widespread neurological damage among the local population. This event led to global awareness of mercury's harmful effects.

## Purpose

The purpose of this article is to educate readers on the dangers of mercury exposure, its historical impact, and the importance of proper management to prevent mercury poisoning.

## Theme 2024

Reducing Mercury: Protecting Health, Ecosystems, and Future Generations.

## Highlights

- The Minamata disaster and its global impact on mercury regulation.
- Mercury exposure pathways: air, water, soil, and food (particularly fish).
- International efforts to limit mercury use through the Minamata Convention, signed in 2013.
- Mercury's harmful effects on the nervous, immune, and digestive systems.

## **Impact and Importance**

Mercury poisoning is linked to severe health conditions, including neurological damage, kidney failure, and developmental issues in children. Mercury contamination of water bodies also disrupts ecosystems, affecting biodiversity and the food chain. Its long-term environmental persistence makes it a major global concern, as it can accumulate in the tissues of marine animals and travel up the food chain, affecting humans as well.

## **Quotes/Interesting Facts**

“Mercury is one of the most dangerous toxic metals, affecting both humans and wildlife.” – World Health Organization (WHO)

Fact: Mercury is a neurotoxin that can damage the brain and nervous system, particularly in fetuses and young children.

Fact: The global ban on mercury in many products, like thermometers, has been a significant step forward, though challenges remain with its industrial use.

## **Conclusion**

Mercury contamination is a global environmental and public health issue. While much progress has been made in regulating its use and reducing its release into the environment, more work is needed to mitigate the toxic impact on ecosystems and human health.

## **Reflection/Call to Action**

We must continue to push for stronger regulations on mercury emissions, better industrial practices, and public education about the dangers of mercury. Everyone can contribute by properly disposing of mercury-containing products and supporting policies aimed at reducing mercury pollution worldwide.



**Pavitra Kumari**  
**II Year Student Teacher**

## MATTER SONG



There's matter over here

There's matter over there

Liquid, solid, or a gas,

There's matter everywhere.

A solid keeps its shape

It doesn't separate

What you see is what you get

A solid keeps its shape.

Gas is in the air

You can't see, but it's there

It flows and blows right through your nose

And fits in anywhere.

When you melt a solid down

A liquid can be found

It's wet and moves wherever there's room

And spills and splashes, too.

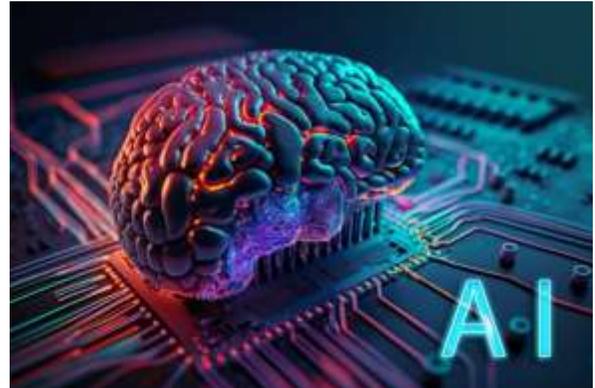


**Preethi M H**  
**II Year Student Teacher**

# ARTIFICIAL INTELLIGENCE: REDEFINING HUMAN POTENTIAL

## Introduction

Artificial Intelligence (AI) is a revolutionary field of technology where machines are designed to mimic human intelligence. AI systems can perform tasks like speech recognition, decision-making, and problem-solving with incredible precision. It combines computer science, mathematics, and data analytics to create solutions that improve



efficiency and accuracy. AI's applications are diverse, spanning industries such as healthcare, education, finance, and entertainment. From virtual assistants like Siri and Alexa to predictive algorithms, AI has become an integral part of our daily lives. Its ability to learn and adapt makes it a transformative technology.

## History

The history of AI dates back to the mid-20<sup>th</sup> century when Alan Turing proposed the idea of a machine that could simulate human intelligence. In 1956, the term “Artificial Intelligence” was coined at the Dartmouth Conference. The 1960s and 1970s saw advancements in machine learning and expert systems. However, progress slowed during the “AI winter” due to limited computational power. The 21<sup>st</sup> century marked a resurgence, driven by big data and powerful processors. Innovations like deep learning, neural networks, and generative AI tools have accelerated AI's evolution, making it indispensable today.

## Purpose

AI's primary purpose is to automate complex processes, enhance decision-making, and improve human life. It helps in diagnosing diseases, optimizing business operations, and creating personalized learning experiences. AI systems reduce human error and save time, enabling professionals to focus on creative and strategic tasks. In research and development, AI speeds up innovation by analyzing vast amounts of data. AI also addresses global challenges like climate change and resource optimization. Its potential extends beyond

efficiency to revolutionizing human experiences and reshaping how we interact with technology.

### **Theme 2024**

The theme for AI in 2024, “Ethical and Inclusive AI for a Sustainable Future,” emphasizes the importance of responsible AI development. It encourages innovators to create systems that benefit everyone while avoiding biases and harm. Ethical AI aims to protect privacy, ensure transparency, and promote fairness in decision-making.

### **Highlights**

AI’s most notable innovations include natural language processing tools like ChatGPT, autonomous vehicles, and healthcare diagnostics powered by machine learning. Generative AI, such as art and content creation tools, has redefined creativity. AI-powered robots and drones are transforming industries like agriculture and logistics. Breakthroughs in AI ethics and regulation are shaping its future use. The integration of AI in smart cities and IoT devices is making urban living more efficient.

### **Impact and Importance**

AI transforms industries, enhances productivity, and improves decision-making but raises ethical concerns and challenges like job displacement.

### **Quotes/Interesting Fact**

Alan Turing: “A computer would deserve to be called intelligent if it could deceive a human into believing that it was human.”

**Fun fact:** AI-powered art and music are gaining global recognition for their creativity.

### **Conclusion**

AI represents a transformative force, offering immense opportunities and challenges, requiring ethical oversight for its optimal use.

### **Reflection**

To ensure AI benefits everyone, society must focus on ethical AI development, prioritizing inclusivity and sustainability.



**Priyadarshini K S**  
**II Year Student Teacher**

## HONEY BEES

### Introduction

Honey bee (also spelled honeybee) is a [eusocial] flying insect within the genus *Apis* of the bee clade, all native to mainland Afro-Eurasia. After bees spread naturally throughout Africa and Eurasia, humans became responsible for the current cosmopolitan distribution of honey bees, introducing multiple subspecies into South America (early 16<sup>th</sup> century), North America (early 17<sup>th</sup> century), and Australia (early 19<sup>th</sup> century).



### Entomological meaning

The genus name *Apis* is Latin for “bee”. Although modern dictionaries may refer to *Apis* as either honey bee or honeybee.

### Life Cycle of Honeybee

The life cycle of honey bees is divided into four stages: the egg, the larval, the pupal and the adult stage.

#### Stage 1 – The Egg Stage:

Queen bee is the only bee in the colony who is capable of laying about 2,000 to 3,000 eggs in one day. The egg is positioned upright and falls on the side by the third day. The queen bee lays both fertilized egg and unfertilized egg. The fertilized egg develops into female bees or queen bees. The unfertilized egg hatches and male bees are born; also known as drone bees.

#### Stage 2 – The Larval Stage:

The difference between a worker and the queen bee is made three days after the egg transforms into larvae and six days after the egg is laid in the beehive. The “royal jelly” is fed to all the larvae, i.e., the female bees, the workers and the drone bees during their initial three days as larvae. The larva sheds skin multiple times throughout this stage. Later, the royal jelly is fed only to the female larvae, which eventually becomes a queen bee. Finally, the worker bees cover the top of the cell with beeswax to protect and facilitate the transformation of the larvae into a pupa.

### **Stage 3 – The Pupal Stage:**

Here the bee has developed parts like wings, eyes, legs and small body hair that physically appears close to an adult bee.

### **Stage 4 – The Adult Stage:**

Once the pupa is matured, the new adult bee chews its way out of the closed-cell. The queen bee takes 16 days from the egg stage to form into an adult. The worker bee takes 18 to 22 days for complete development, and drone bees take 24 days to develop into an adult bee.

### **Uses of honey bees**

#### **Pollination**

Honey bees pollinate a wide variety of crops, including fruits, vegetables, and nuts, which contributes to a diverse human diet and a healthy agricultural economy.

#### **Honey**

Honey is a natural sweetener that can be used in many foods and beverages, and may have some health benefits.

#### **Beeswax**

Beeswax is used in the candle industry, cosmetics, shoe polish, furniture, and more.

#### **Propolis**

Propolis has antibiotic, antiviral, and antifungal properties, and is used to treat toothaches, gum disease, sore throats, and chest infections.

#### **Royal jelly**

Royal jelly is sometimes credited with having aphrodisiac qualities and conferring long life.

#### **Honey bee venom**

In small doses, honey bee venom can be used to treat some ailments, such as rheumatism and arthritis. However, honey bee venom is lethal to humans in high doses.

## **Apitherapy**

Honey bees are used as healing agents in Apitherapy, which is the practice of treating human ailments with honey bees.

Honey bees also influence human culture in many ways, including being the subject of art, music, and song lyrics.

## **Interesting fact**

Honeybees can recognize human faces

It might be surprising to learn that honeybees can recognize individual human faces. They do this by using their compound eyes to identify different patterns, such as the shape of a person's eyes and nose. This skill has been tested in studies where bees were trained to associate specific faces with a reward, such as a sugar solution.

## **Honeybees dance to communicate**

Honeybees have a unique way of communicating with each other. When they find a good source of food, they perform a dance that indicates the direction and distance of the food source. This dance is called the "waggle dance" and it allows other bees in the colony to find the food source quickly.

## **Honeybees can fly up to 15 miles per hour**

Honeybees are incredibly fast for their size. They can fly up to 15 miles per hour, which is much faster than most other insects. This allows them to quickly find food sources and return to their hive.

## **A honeybee colony can contain up to 60,000 bees**

Honeybee colonies are incredibly large, with some colonies containing up to 60,000 individual bees. These bees work together to maintain the hive, gather food, and care for the young bees.

## **Honeybees have five eyes**

Honeybees have two large compound eyes and three smaller simple eyes. The compound eyes are made up of thousands of individual lenses, which allows them to see in

different directions at the same time. The simple eyes are used to detect changes in light and dark, which helps the bees navigate.

### **Honeybees can communicate with other bees using pheromones**

In addition to their dances, honeybees also communicate with each other using pheromones. These chemical signals are used to alert other bees to danger, mark food sources, and regulate the behavior of the colony.

### **Honeybees can see ultraviolet light**

Honeybees can see ultraviolet light, which is invisible to the human eye. This allows them to see patterns on flowers that are used as guides to find nectar and pollen.

Honeybees are the only insect that produces food for humans

Honeybees are the only insect that produces food for humans. In addition to honey, they also produce beeswax, royal jelly, and propolis, which have a variety of uses in medicine and cosmetics.

### **Honeybees can live for several months**

Honeybees have a relatively short lifespan, with worker bees living for only a few weeks. However, the queen bee can live for several years, and drones can live for a few months.

### **Honeybees are essential for agriculture**

Honeybees are critical for agriculture, as they are responsible for pollinating many of the crops that we rely on for food. Without honeybees, our food supply would be severely impacted.

### **Conclusion**

Honey bees are the primary reason for the process of pollination. Honey bees have the ability to travel around 20 miles per hour when gone for pollination and around 17 miles per hour while carrying the nectar back to the beehive. Due to this very reason, the entire process of pollination runs faster and more efficiently. Without honey bees exchanging pollen, we would have to wait a long time for one of the sweetest food substances – honey.



**Rakshitha R**  
**II Year Student Teacher**

# SUSTAINABLE AGRICULTURAL DEVELOPMENT

## Introduction

Sustainable agriculture is farming in sustainable ways meeting society's present food and textile needs, without compromising the ability for current or future generations to meet their needs. It can be based on an understanding of ecosystem service. There are many methods to increase the sustainability of agriculture. When developing agriculture within sustainable food systems, it is important to develop flexible business processes and farming practices. Agriculture has an enormous environmental footprint, playing a significant role in causing climate change (food systems are responsible for one third of the anthropogenic greenhouse gas emissions), water scarcity, water pollution, land degradation, deforestation and other processes, it is simultaneously causing environmental changes and being impacted by these changes



## Definition

The term “sustainable agriculture” was defined in 1977 by the USDA as an integrated system of plant and animal production practices having a site-specific application that will, over the long term:

- Satisfy human food and fibre needs
- Enhance environmental quality and the natural resource base upon which the agriculture economy depends
- Make the most efficient use of non-renewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls
- Sustain the economic viability of farm operations

## History of sustainable Agricultural Development

The history of sustainable agriculture includes the development of sustainable farming practices, the use of the term “sustainable”, and the formation of organizations to promote sustainable agriculture:

- Indus Valley Civilization

This civilization, which thrived between 4300 and 1300 BCE, used sustainable farming practices such as crop rotation, vegetative propagation, and irrigation systems.

- Early 1900s

Sir Albert Howard, F.H. King, and Rudolf Steiner developed the concepts of organic agriculture, which included the use of cover crops, crop rotation, and animal manures.

1980: The concepts of sustainable agriculture and regenerative agriculture emerged.

1987: The term “sustainable” began to be used more frequently to refer to stable agriculture globally.

1988: The Sustainable Agriculture Coalition (SAC) was formed after the farm crisis.

1994: The National Campaign for Sustainable Agriculture (NCSA) was launched to promote federal sustainable agriculture policy.

2009: The National Sustainable Agriculture Coalition (NSAC) was formed after the merger of the SAC and the NCSA

## **Current State of sustainable developmental practice**

Here are some recent updates on the state of sustainable agriculture and development:

- **India** :In 2021, sustainable agriculture was not mainstream in India, with only five sustainable agriculture practices (SAPSs) adopted by more than 5% of the net sown area. Most SAPSs were adopted by less than 4% of all Indian farmers.
- **Cyanobacteria**: Cyanobacteria is a potential biofertilizer that can help with sustainable agriculture. Cyanobacteria can convert solar energy into biomass using carbon dioxide, water, and nutrients.
- **International organizations**: The Food and Agriculture Organization (FAO), the World Bank, and the Consultative Group on International Agricultural Research (CGIAR) have made sustainability a key objective in their agricultural programs

## **Benefits and Challenges**

### **Sustainable agriculture can have many benefits, including:**

**-Food security:** Sustainable agriculture can help create a more efficient and stable food system, which can help meet global demand for food.

**-Environmental protection:** Sustainable agriculture can help protect natural resources, reduce pollution, and mitigate the effects of climate change on crop yields:

**-Soil health:** Sustainable agriculture can help maintain soil quality, reduce soil erosion and degradation, and prevent nutrient depletion.

**-Biodiversity:** Sustainable agriculture can help increase biodiversity by providing healthy environments for a variety of organisms.

**-Water conservation:** Sustainable agriculture can help save water.

Reduced use of chemicals

Sustainable agriculture can help reduce the use of pesticides, herbicides, and fertilizers.

## **Technological approached**

Sustainable agricultural systems are becoming an increasingly important field for AI research and development. By leveraging AI's skills in areas such as resource optimization, crop health monitoring, and yield prediction, farmers might greatly advance toward more environmentally friendly agricultural practices. Artificial intelligence (AI) mobile soil analysis enables farmers to enhance soil fertility while decreasing their ecological footprint. This technology permits on-site, real-time evaluations of soil nutrient levels.

## **Environmental factors**

Practices that can cause long-term damage to soil include excessive tilling of the soil (leading to erosion) and irrigation without adequate drainage (leading to salinization).

The most important factors for a farming site are climate, soil, nutrients and water resources. Of the four, water and soil conservation are the most amenable to human intervention. When farmers grow and harvest crops, they remove some nutrients from the soil. Without replenishment, the land suffers from nutrient depletion and becomes either unusable

or suffers from reduced yields. Sustainable agriculture depends on replenishing the soil while minimizing the use or need of non-renewable resources, such as natural gas or mineral ores.

## **Conclusion**

Sustainable agriculture is the way to maintain a parity between the increasing pressure of food demand and food production in the future. Sustainable agriculture is a key component of sustainable development, and it can help the world's population adapt to climate change and feed a growing population.



**Rekha S**  
**II Year Student Teacher**

## **EARTHWORM**

### **Introduction**

An earthworm is a soil-dwelling terrestrial invertebrate that belongs to the phylum Annelida. Earthworms are commonly found in moist, compost-rich soil, eating a wide variety of organic matters, which include detritus, living protozoa, rotifers, nematodes, bacteria, fungi and other microorganisms. An earthworm's digestive system runs the length of



its body. They are one of nature's most important detritivores and coprophages, and also serve as food for many low-level consumers within the ecosystems.

### ***Morphology of Earthworm***

Earthworms have a tube-like arrangement or cylindrical shaped and reddish-brown segmented body. The body is divided into small segments. The dorsal side is characterized by a dark line of blood vessels and the ventral side is characterized by the genital openings. The mouth and the prostomium (an organ helps in burrowing) distinguish the anterior end.

## **Anatomy of Earthworm**

Externally, a thin non-cellular cuticle covers the body wall of the earthworm. Underneath this cuticle, a layer of the epidermis, followed by two muscle layers and coelomic epithelium (inner layer) is sheathed. The epithelium consists of a single layer of glandular columnar epithelium.

### **Digestive System**

The alimentary canal is a long tube running from first to the last segment of the body. The food of earthworms is the leaves and decaying organic matters which are mixed with soil.

### **Circulatory System**

Earthworms have a closed circulatory system, constituting a heart, blood vessels, and capillaries. The segments 4-6 consist of blood glands that help in the production of blood cells and haemoglobin

### **Respiratory System**

Earthworms lack a well-developed structure for respiration. They respire through their moist skin by diffusion.

### **Excretory System**

Nephridium is coiled tubules that regulate the volume and composition of the body fluids and thus, act as the excretory organ in earthworms. Nephridia are arranged in three segments- septal (15-last segments), integumentary (3-last segments) and pharyngeal nephridia (4-6 segments). A funnel that is connected to nephridia delivers wastes and excess fluid and is excreted out via the digestive tube.

### **Nervous System**

The sensory input and muscular responses are controlled by the ganglia which are arranged segment-wise in the organism. These ganglia, on the paired nerve cord, make up the nervous system of the earthworms.

### **Reproductive System**

Earthworms are bisexual. Hence, each individual carries both male and female reproductive systems in them.

The male reproductive system consists of two pairs of testes (10-11 segments), vasa deferentia (till 18<sup>th</sup> segment), and two pairs of accessory glands (17<sup>th</sup> and 19<sup>th</sup> segments). The prostate and spermatic ducts open by a pair of male genital pores (18<sup>th</sup> segment). The spermatozoa are stored in the four pairs of spermathecae (6-9 segments). The female reproductive system consists of one pair of ovaries and oviduct. Ovaries open into an ovarian funnel running below the ovaries and join the oviduct and open at female genital pore (14<sup>th</sup> segment).

### **Conclusion**

Earthworms are an important part of the soil ecosystem. They help improve soil structure and soil chemical and biological properties. They are especially important in no-till, helping to stimulate air and water movement in soil. Earthworms tend to thrive most without tillage, if sufficient crop residue is left on the soil surface. Crop rotations, cover crops, manure, fertilizer and lime applications all affect earthworm populations.



**Sameena Banu**  
**II Year Student Teacher**

## **ADVANCEMENT IN RENEWABLE ENERGY**

### **Introduction**

In an age defined by growing environmental awareness and the imperative to address climate change, the pursuit of sustainable development has taken centre stage on the global agenda. One of the most promising avenues in this endeavour is the continuous advancement of renewable energy technologies.



### **History**

The history of renewable energy can be traced back to ancient civilizations, who used the power of the sun, wind, and water for a variety of purposes. Ancient Greeks

and Romans used wind-powered water pumps to irrigate their crops, and the ancient Chinese and Persians used water wheels to grind grain.

## **Theme**

The theme for this year's celebration, "Energy Transition Now: Embrace the Future,"

## **Purpose**

The purpose of advancements in renewable energy is to create a more sustainable future by reducing the environmental impact of energy production

## **Impact and importance**

### **Environmental and economic benefits of using renewable energy include:**

Generating energy that produces no greenhouse gas emissions from fossil fuels and reduces some types of air pollution. Diversifying energy supply and reducing dependence on imported fuels.

## **Conclusion**

Renewable energy supplies reduce the emission of greenhouse gases significantly if replaced with fossil fuels. Since renewable energy supplies are obtained naturally from ongoing flows of energy in our surroundings, it should be sustainable.

## **Reflections**

Renewable energy sources have a low or neutral impact on greenhouse gas emissions, but their overall environmental impact depends on their lifecycle emissions. This includes the manufacturing of equipment and materials, installation, and land-use impacts.



**Sangeetha M B**  
**II Year Student Teacher**

# WORLD METEOROLOGICAL DAY 2024

## Introduction

World Meteorological Day is celebrated annually on March 23 to commemorate the establishment of the World Meteorological Organization (WMO). This day highlights the crucial role of meteorology in global climate patterns, weather forecasting, disaster preparedness, and sustainable development.



## History

The WMO was founded on March 23, 1950, as a specialized agency of the United Nations. Its goal is to promote international cooperation in meteorology, climatology, hydrology, and related fields. World Meteorological Day was first observed in 1961 to acknowledge the importance of meteorological science in improving human lives and environmental health.

## Purpose

The day serves to:

1. Raise awareness about weather and climate's impact on society.
2. Promote sustainable practices to mitigate the effects of climate change.
3. Encourage international collaboration to address global meteorological challenges.

## Theme for 2024

The 2024 theme, announced by the WMO, is:

“Weather, Climate, and Water: Innovation for the Future”.

This theme emphasizes the need for innovative solutions and advanced technologies to address the challenges posed by changing weather patterns, water scarcity, and climate extremes.

## Highlights of 2024 Celebrations

1. Global Events: Seminars, exhibitions, and conferences discussing meteorological advancements.

2. Campaigns: Awareness campaigns focusing on water conservation and sustainable resource management.
3. Technological Showcases: Demonstrations of innovative weather prediction models and climate monitoring tools.

### **Impact and Importance**

Disaster Management: Accurate forecasts save lives during extreme weather events.

Climate Adaptation: Enhances understanding of climate patterns for future planning.

Agriculture: Supports farming by providing timely weather data.

Global Cooperation: Encourages nations to unite for sustainable development and climate action.

### **Quotes and Interesting Facts**

#### **Quotes:**

“Climate is what we expect; weather is what we get.” – Mark Twain

“The science of today is the technology of tomorrow.” – Edward Teller

#### **Interesting Facts:**

1. The WMO monitors over 11,000 weather stations globally.
2. The first weather forecast dates back to 650 B.C. in ancient Babylon.
3. Satellites play a vital role in modern meteorology, with over 200 meteorological satellites in orbit.

### **Conclusion**

World Meteorological Day serves as a reminder of the interconnection between humans and the natural world. It encourages everyone to act responsibly toward environmental conservation. Let us pledge to support innovations in meteorology, advocate for climate action, and ensure a sustainable future for generations to come.

### **Reflection/Call to Action**

Stay informed about weather and climate updates.

Reduce carbon footprints by adopting eco-friendly practices.

Advocate for policies that prioritize environmental protection and scientific research.

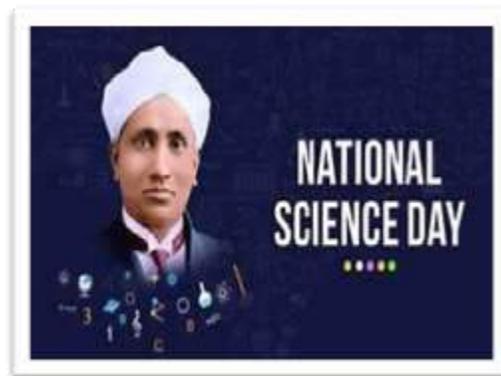


**Shantha K**  
II Year Student Teacher

## **National Science Day: Celebrating India's Scientific Spirit**

### **Introduction**

National Science Day is a momentous annual celebration in India that commemorates scientific achievements and promotes scientific temper among citizens. Observed on February 28th, this day marks a significant milestone in the nation's scientific journey, inspiring current and future generations to embrace scientific inquiry and innovation.



### **History**

The day commemorates the discovery of the Raman Effect by Indian physicist Sir Chandrasekhar Venkata Raman on February 28, 1928. For this groundbreaking work in spectroscopy, Raman was awarded the Nobel Prize in Physics in 1930, becoming the first Indian scientist to receive this prestigious honor. His discovery demonstrated how light changes its wavelength when passing through a transparent material, a phenomenon now known as the Raman Effect.

### **Purpose**

- National Science Day serves multiple crucial objectives:
- Highlighting the importance of scientific research and development
- Encouraging young students to pursue scientific careers
- Promoting scientific literacy and critical thinking
- Showcasing India's scientific achievements and potential

- Fostering a culture of innovation and technological advancement

## **Theme of 2024**

The theme for National Science Day 2024 is "Indigenous Technologies for Viksit Bharat" (Native Technologies for a Developed India). This theme emphasizes the significance of indigenous technological innovations in driving national progress and self-reliance.

## **Highlights**

Key aspects of National Science Day celebrations include:

- Science exhibitions and demonstrations
- Public lectures by renowned scientists
- Interactive workshops for students
- Research paper presentations
- Awards and recognition for scientific contributions
- Special programs in educational institutions and research centers

## **Impact and Importance**

National Science Day plays a transformative role in:

- Inspiring young minds to explore scientific fields
- Bridging the gap between scientific research and public understanding
- Promoting research and development across various disciplines
- Encouraging innovation and technological entrepreneurship
- Supporting India's vision of becoming a global scientific powerhouse

## **Interesting Facts**

- Sir C.V. Raman discovered the Raman Effect using a simple spectrograph and sunlight
- The first National Science Day was celebrated in 1987
- Every year, the Government of India presents National Science and Technology Awards on this day
- Numerous scientific institutions organize public outreach programs
- The day highlights India's rich scientific heritage and potential for future innovations

## Conclusion

National Science Day represents more than a commemorative event; it is a celebration of human curiosity, intellectual pursuit, and the transformative power of scientific knowledge. By honoring scientific achievements and inspiring future researchers, India continues to nurture a robust scientific ecosystem that contributes to global progress.

## Reflection

As we reflect on this day, we are reminded that scientific temper is not just about technological advancement, but about cultivating a mindset of questioning, exploring, and understanding the world around us. It is a testament to human potential and our collective ability to push the boundaries of knowledge.



**Sudeep TC**  
**II Year Student Teacher**

## THE DEAD SEA: A NATURAL WONDER IN PERIL

### Introduction

The Dead Sea, a saltwater lake nestled between Israel, Jordan, and Palestine, is one of the most fascinating and unique natural wonders of the world. With its crystal-clear waters, stunning landscapes, and rich history, the Dead Sea has been a source of fascination for centuries. However, this incredible natural resource is facing numerous environmental challenges that threaten its very existence.



### History and Significance

The Dead Sea has a rich and diverse history that spans thousands of years. The sea has been an important center of trade, commerce, and culture, with numerous ancient civilizations, including the Egyptians, Greeks, and Romans, having left their mark on the region. The Dead

Sea is also a sacred site for Jews, Christians, and Muslims, with numerous biblical references and archaeological sites.

## **Geography and Climate**

The Dead Sea is located in the Jordan Rift Valley, a geographic depression that runs from Lebanon to the Red Sea. The sea is approximately 75 kilometers long and 14 kilometers wide, with a surface elevation of around 429 meters below sea level. The Dead Sea's climate is characterized by hot summers and mild winters, with average temperatures ranging from 15°C in winter to 40°C in summer.

## **Reason for Salinity**

The Dead Sea is famous for its exceptionally high salinity, with a salt concentration of around 33.7% (compared to 3.5% for regular seawater). This unique characteristic is due to the sea's location in a closed basin, with no outlet to the ocean. As a result, water flows into the Dead Sea from surrounding rivers and streams, but it has no way to escape, leading to a buildup of salts and minerals.

## **Environmental Concerns**

The Dead Sea is facing numerous environmental challenges, including a dramatic decline in water levels, increased salinity, and a loss of biodiversity. The main cause of these problems is the over-extraction of water from the Jordan River, which feeds the Dead Sea. Additionally, the construction of dams, canals, and other water diversion projects has reduced the amount of freshwater flowing into the sea.

## **Economic Importance**

Despite its environmental challenges, the Dead Sea remains an important economic resource for the surrounding countries. The sea's mineral-rich waters are used for a variety of industrial purposes, including the production of potash, salt, and other minerals. Additionally, tourism is a significant contributor to the local economy, with visitors drawn to the sea's unique landscapes and therapeutic properties.

## **Conservation Efforts**

In recent years, there have been several conservation efforts aimed at protecting the Dead Sea and its surrounding environment. These initiatives include the establishment of national parks and protected areas, as well as projects aimed at reducing water pollution and promoting sustainable tourism practices.

## **Cultural Significance**

The Dead Sea has significant cultural and spiritual importance for Jews, Christians, and Muslims. The sea is mentioned numerous times in the Bible and is considered a sacred site by many religious groups. Additionally, the Dead Sea's unique landscapes and therapeutic properties have made it a popular destination for spiritual and wellness tourism.

## **Conclusion**

The Dead Sea is a unique and fascinating natural wonder that is facing numerous environmental challenges. Despite these problems, the sea remains an important economic and cultural resource for the surrounding countries. It is essential that we take action to protect the Dead Sea and its environment, not only for the benefit of local communities but also for the preservation of this incredible natural resource for future generations.



**Suma G**  
**II Year Student Teacher**

## **ALBERT EINSTEIN**

### **Introduction**

Albert Einstein (1879–1955) was a theoretical physicist widely regarded as one of the most influential scientists of the 20<sup>th</sup> century. Best known for his theory of relativity, Einstein's ground-breaking contributions to physics transformed our understanding of space, time, and energy. His equation,  $(E=mc^2)$ , is perhaps the most famous in the world.

## Early Life

- Birth: Albert Einstein was born on March 14, 1879, in Ulm, in the Kingdom of Württemberg, German Empire.
- Family: His father, Hermann Einstein, was a salesman and engineer, while his mother, Pauline Koch, was a homemaker.
- Childhood: Einstein showed a deep curiosity for science from a young age. Despite a delayed start in speaking, he excelled in math and physics.
- First Inspiration: At age five, his interest in science was sparked when he was given a magnetic compass.



## Education

- Einstein studied at the Polytechnic Institute in Zurich, Switzerland, where he trained as a teacher in physics and mathematics.
- Though he sometimes clashed with traditional schooling methods, Einstein's intellectual abilities were apparent, and he graduated in 1900.

## Quote

### One of Einstein's most famous quotes is:

“Imagination is more important than knowledge. For knowledge is limited, whereas imagination embraces the entire world, stimulating progress, giving birth to evolution.”

## Inventions and Theories

- Special Theory of Relativity (1905): Introduced the relationship between space and time.
- General Theory of Relativity (1915): Redefined the concept of gravity, proposing that massive objects cause a curvature in spacetime.
- Photoelectric Effect: His explanation of the photoelectric effect earned him the Nobel Prize in Physics in 1921.
- Einstein Refrigerator (1926): Collaborated with Leo Szilard to create an energy-efficient refrigeration system.

## Awards and Honors:

- **Nobel Prize in Physics (1921):** For his discovery of the photoelectric effect.
- **Copley Medal (1925):** Awarded by the Royal Society for outstanding achievements in scientific research.
- **Max Planck Medal (1929):** Recognized his extraordinary contributions to theoretical physics.

## Conclusion

Albert Einstein's legacy extends far beyond his scientific discoveries. A humanitarian, pacifist, and advocate for civil rights, he was also an intellectual visionary who inspired generations of thinkers. His work continues to shape modern science, and his life serves as a testament to the power of curiosity and creativity.

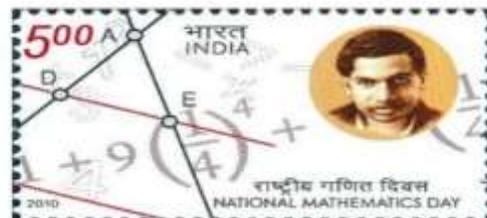


**Vinoda M S**  
**II Year Student Teacher**

## NATIONAL MATHEMATICS DAY

### History

The Indian government declared 22 December to be celebrated as **National Mathematics Day** every year to mark the birth anniversary of the Indian mathematician Srinivasa Ramanujan. It was introduced by Prime Minister Manmohan Singh on 26 December 2011 at Madras University, to mark the 125th birth anniversary of the Indian mathematician Srinivasa Ramanujan. On this occasion Prime minister Manmohan Singh also announced that 2012 would be celebrated as the National Mathematics Year.



An Indian stamp depicting Srinivasa Ramanujan and the Indian National Mathematics Day

India's National Mathematics Day is celebrated on 22 December every year with numerous educational events held at schools and universities throughout the country. In 2017, the day's significance was enhanced by the opening of the Ramanujan Math Park in Kuppam.

in Chittoor, Andhra Pradesh National Mathematics Day is celebrated in all schools and universities throughout the country.

### **Significance**

The main objective behind the celebration is to raise awareness among people about the importance of mathematics for the development of humanity. We can't ignore that several initiatives are taken to motivate, enthuse, and inculcate a positive attitude towards learning mathematics among the younger generation of the country.

On this day, training is also provided to the mathematics teachers and students through camps and highlights the development, production, and dissemination of teaching-learning materials (TLM) for Mathematics and research in related areas. mathematicians, including Aryabhata, Brahmagupta, Mahavira, Bhaskara II, Srinivasa Ramanujan, and others, have made significant contributions to the field since ancient times.

### Ramanujan's Quotes

- An equation for me has no meaning unless it expresses a thought of God.
- To preserve my brains I want food and this is now my first consideration.
- I beg to introduce myself to you as a clerk in the Accounts Department of the Port Trust Office at Madras...After leaving school, I have been employing the spare time at my disposal to work at Mathematics.
- Every positive integer must be of the form  $6n + 1$  or  $6n - 1$ .

The conclusion of National Mathematics Day is to celebrate the contributions of mathematicians and the importance of mathematics in our lives. It also inspires future generations to excel in mathematics



**Uma J**  
**II Year Student Teacher**

## **THE UNIVERSE'S 7 BIGGEST MYSTERIES ( WHY THEY'RE UNSOLVED)**

Dark matter, the nature of time, aliens and supermassive black holes: these seven things will be puzzling astronomers for years to come.

In the last decade, we've taken photos of a black holes, peered into the heart of atoms and looked back at the birth of the Universe. And yet, there are yawning gaps in our understanding of the Universe and the laws that govern it. These are the mysteries that will be troubling physicists and astronomers over the next decade and beyond.



### **Why is there something rather than nothing?**

In the beginning, according to the standard picture of cosmology, was the 'inflationary vacuum'. It had a super-high energy density and repulsive gravity, causing it to expand. The more of it there was, the greater the repulsion and the faster it expanded.

In common with all things 'quantum', this vacuum was unpredictable. At random locations, it decayed into ordinary, everyday vacuum. The tremendous energy of the inflationary vacuum had to go somewhere.

And it went into creating matter and heating it to a blisteringly high-temperature – into creating big bangs. Our Universe is merely one such Big Bang bubble in the ever-expanding inflationary vacuum.

Remarkably, this whole process could have started with a piece of inflationary vacuum with a mass equivalent to a bag of sugar. And, conveniently, the laws of physics – specifically, quantum physics – permit such matter to pop into existence from nothing. Of course, the next obvious question now is:

### **Where did the laws of physics come from?**

In 1918, German mathematician Emmy Noether shed light on this. She found that the great conservation laws are mere consequences of deep symmetries of space and time – things that stay the same if our viewpoint changes. entirely empty Universe. So maybe the transition from nothing to something was not such a big deal. Maybe it was simply a change from nothing to the 'structured' nothing of our A striking property of such symmetries is that they are also symmetries of the void – of an galaxy-filled Universe.

## **Why is there a monster black hole in the heart of every galaxy?**

There are about two trillion galaxies in our Universe and, as far as we know, almost every one contains a central supermassive black hole. They range in size from monsters, weighing almost 50 billion times the mass of the Sun, to the 4.3-million-solar-mass tiddler known as Sagittarius A\* in the core of our Milky Way (one solar mass = mass of our Sun). But how they got there is one of the great unsolved mysteries of cosmology.

We know that a stellar black hole forms in a supernova explosion in which the core of a star implodes. But nobody knows how a supermassive black hole forms.

For most of cosmic history, the centres of galaxies have been where a lot of matter is confined in a small volume. It could be the case that supermassive black holes form in a dense star cluster out of stellar black holes which repeatedly merge with each other.

Tentative evidence for this comes from a merger between two black holes revealed by a detection of gravitational waves. One hole was too big to be a supernova relic and so may have originated in an earlier merger.

An alternative way to form a supermassive black hole is from the direct shrinkage of a dense cloud of gas. It could be that they form from a combination of cloud collapse and black hole mergers.

It is also possible that supermassive black holes formed in the Big Bang. This would provide a novel answer to the cosmic chicken-and-egg question: which came first – galaxies or supermassive black holes? Rather than galaxies forming first and then spawning such monsters, supermassive black holes would form first and provide the seeds about which galaxies of stars formed.

Despite their masses, even the biggest supermassive black holes are hardly bigger than the Solar System. Yet they project their power across millions of light-years by means of oppositely directed super-fast jets of matter. Where such jets are fast – in the inner regions of a galaxy – they drive away gas and snuff out star formation; where they have slowed – in the outer regions – they compress gas and trigger star formation.

In fact, powerful jets from the biggest holes seem to control the masses of stars that form, with a tendency towards smaller, cooler stars like our Sun. So, who knows, it might be

the case that we can thank Sagittarius A\* for our Sun, without which you probably wouldn't be reading this page.



**Abhishek N Jadar**  
**I Year Student Teacher**

## **SCIENCE LITERACY FOR THE NEXT GENERATION**

As we navigate the complexities of the 21st century, science literacy has become an essential skill for the next generation. Science literacy extends beyond mere scientific knowledge; it encompasses critical thinking, problem-solving, and informed decision-making. By prioritizing science literacy, we can empower future generations to address global challenges, drive innovation, and foster a more informed and engaged citizenry.



### **The Importance of Science Literacy**

Science literacy is crucial for navigating the modern world. It enables individuals to make informed decisions about their health, environment, and technology. Science-literate individuals can critically evaluate evidence, identify biases, and recognize pseudoscience. Moreover, science literacy promotes civic engagement, encouraging individuals to participate in science-informed policy discussions.

### **Challenges to Science Literacy**

Despite its importance, science literacy faces significant challenges. Science anxiety and misconceptions persist, fueled by misinformation and disinformation. The rapid pace of scientific advancements can overwhelm students, while inadequate science education resources and outdated teaching methods exacerbate the issue.

### **Strategies for Promoting Science Literacy**

To address these challenges, we must adopt innovative strategies:

1. Inquiry-based learning: Encourage hands-on experimentation and exploration.
2. Interdisciplinary approaches: Integrate science with other subjects, highlighting connections and relevance.
3. Real-world applications: Illustrate science's impact on everyday life.
4. Critical thinking and media literacy: Teach students to evaluate evidence and sources.
5. Collaborations with scientists and industry experts: Provide authentic learning experiences.
6. Community engagement: Foster partnerships between schools, museums, and science organizations.
7. Technology integration: Leverage digital resources and simulations.
8. Professional development: Support educators in science literacy and pedagogy.

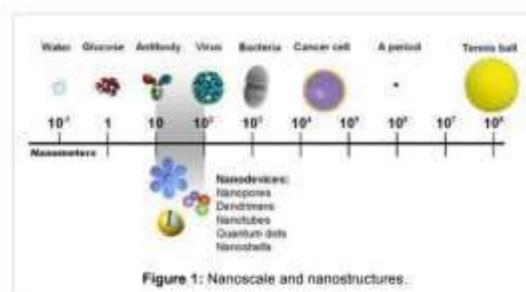
Science literacy is essential for the next generation's success. By prioritizing science education and adopting innovative strategies, we can empower critical thinkers and problem-solvers. As we navigate the complexities of the 21st century, science literacy will illuminate the path forward, fostering future for all.



**Akshatha Balaganooru**  
I Year Student Teacher

## NANOTECHNOLOGY AND ITS APPLICATIONS IN MEDICINE

Advancement in the field of nanotechnology and its applications to the field of medicines and pharmaceuticals has revolutionized the twentieth century. Nanotechnology is the study of extremely small Structures. The prefix “nano” is a Greek word which means “dwarf”.



The word “nano” means very small or miniature size. Nanotechnology Is the treatment of individual atoms, molecules, or compounds into Structures to produce materials and devices with special properties. Nanotechnology involve work from top down i.e. reducing the size of

large structures to smallest structure e.g. photonics applications in nano electronics and nano engineering, top-down or the bottom up, which involves changing individual atoms and molecules into nanostructures and more closely resembles chemistry biology.

Nanotechnology deals with materials in the size of 0.1 to 100 Nm; however it is also inherent that these materials should display different properties such as electrical conductance chemical reactivity, magnetism, optical effects and physical strength, from bulk materials as a result of their small size.

Nanotechnology works on matter at dimensions in the nanometer scale length (1-100 nm), and thus can be used for a broad range of applications and the creation of various types of nano materials and nano devices.

Nano technology in healthcare refers to the application of nanotechnology in medical diagnosis, treatment, and prevention. Nanotechnology involves the manipulation of matter on a nanoscale, typically between 1-100 nanometers.

#### **Applications of Nano technology in Healthcare:**

1. **Cancer Treatment:** Nanoparticles can be designed to target and destroy cancer cells, reducing the harm to healthy cells.
2. **Diagnostic Imaging:** Nanoparticles can be used as contrast agents to enhance imaging techniques such as MRI and CT scans.
3. **Drug Delivery:** Nanoparticles can be used to deliver drugs directly to the site of disease, reducing side effects and improving efficacy.
4. **Wound Healing:** Nanoparticles can be used to promote wound healing by delivering growth factors and other therapeutic agents.
5. **Infectious Disease Treatment:** Nanoparticles can be used to target and kill bacteria, viruses, and other microorganisms.
6. **Tissue Engineering:** Nanoparticles can be used to create scaffolds for tissue engineering, promoting the growth of new tissue.
7. **Gene Therapy:** Nanoparticles can be used to deliver genetic material to cells, allowing for the treatment of genetic disorders.

In conclusion, nanotechnology has the potential to revolutionize healthcare by providing new and innovative solutions for diagnosis, treatment, and prevention. However, challenges and limitations must be addressed to ensure the safe and effective use of nanotechnology in healthcare.



**Amit C Lamani**  
**I Year Student Teacher**

## **CARDIAC ARREST**

Sudden cardiac arrest; SCA;  
Cardiopulmonary arrest; Circulatory arrest;  
Arrhythmia – cardiac arrest; Fibrillation – cardiac  
arrest; Heart block – cardiac arrest



Cardiac arrest occurs when the heart suddenly stops beating. When this happens, blood flow to the brain and the rest of the body also stops. Cardiac arrest is a medical emergency. If it is not treated within a few minutes, cardiac arrest most often causes death.

### **Causes**

While some people refer to a heart attack as a cardiac arrest, they are not the same thing. A heart attack occurs when a blocked artery stops the flow of blood to the heart. The medical term for this is myocardial infarction. A heart attack can damage the heart, but it does not necessarily cause death. However, a heart attack can sometimes trigger a cardiac arrest.

**Cardiac arrest is caused by a problem with the heart's electrical system, such as:**

- **Ventricular fibrillation (VF)** – When VF occurs, the lower chambers in the heart quiver instead of beating regularly. The heart cannot pump blood, which results in cardiac arrest. This can happen without any cause or as a result of another condition.
- **Heart block** – This occurs when the electrical signal is slowed or stopped as it moves through the heart.

**Problems that may lead to cardiac arrest include:**

- **Coronary heart disease (CHD)** – CHD can clog the arteries in your heart, so the blood cannot flow smoothly. Over time, this can put a strain on your heart's muscle and electrical system.
- **Heart attack** – A prior heart attack can create scar tissue that can lead to VF and cardiac arrest.
- Heart problems, such as congenital heart disease, heart valve problems, heart rhythm problems, and an enlarged heart can also lead to cardiac arrest.
- Abnormal levels of potassium or magnesium – These minerals help your heart's electrical system work. Abnormally high or low levels can cause cardiac arrest.
- Severe physical stress – Anything that causes a severe stress on your body can lead to cardiac arrest. This can include trauma, electrical shock, or major blood loss.
- Recreational drugs – Using certain drugs, such as cocaine or amphetamines, also increases your risk for cardiac arrest.
- Medicines – Some medicines can increase the likelihood of abnormal heart rhythms.

### **Symptoms**

Most people do not have any symptoms of cardiac arrest until it happens. Symptoms may include:

- Sudden loss of consciousness; a person will fall to the floor or slump down if sitting
- No pulse
- No breathing

In some cases, you may notice some symptoms about an hour before cardiac arrest. These may include:

- A racing heart
- Dizziness
- Shortness of breath
- Nausea or vomiting

- Chest pain

**Treatment** : Cardiac arrest needs emergency treatment right away to get the heart started again.

**Cardiopulmonary resuscitation (CPR)** – This is often the first type of treatment for cardiac arrest. It can be done by anyone who has been trained in CPR. It can help keep oxygen flowing in the body until emergency care arrives.

**Defibrillation** – This is the most important treatment for cardiac arrest. It is performed using a medical device that gives an electrical shock to the heart. The shock can get the heart beating normally again. Small, portable defibrillators are often available in public areas for emergency use by people trained to use them. This treatment works best when given within a few minutes.

If you survive cardiac arrest, you will be admitted to a hospital for treatment. Depending on what caused your cardiac arrest, you may need other medicines, procedures, or surgery.

### **Prevention**

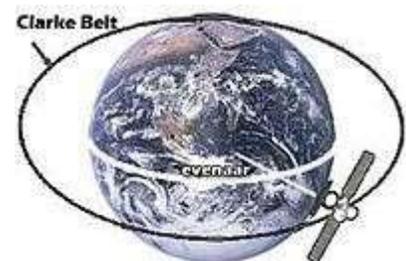
The best way to protect yourself from cardiac arrest is to keep your heart healthy. If you have CHD or another heart condition, ask your provider how to reduce your risk for cardiac arrest.



**Anusha C**  
**I Year Student Teacher**

## **SATELLITE**

Satellite is an object that orbits another object. In space, satellites may be natural, or artificial. The moon is a natural satellite that orbits the Earth. Most artificial satellites also orbit the Earth, but some orbit other planets, or the Sun or Moon. Satellites are used for many purposes. There are weather satellites, communications satellites, navigation satellites, reconnaissance satellites, astronomy satellites.



## Satellite in orbit

The world's first artificial satellite, the Sputnik 1, was launched by the Soviet Union on October 4, 1957. This surprised the world, and the United States quickly worked to launch their own satellite, starting the space race. Sputnik 2 was launched on November 3, 1957 and carried the first living passenger into orbit, a dog named Laika. The United States launched their first satellite, called Explorer 1 on January 31, 1958. The UK launched its first satellite in 1962.

Since then, thousands of satellites have been launched into orbit around the Earth. Some satellites, notably space stations, have been launched in parts and assembled in orbit. A satellite in a geostationary orbit moves around the Earth as fast as the Earth spins, so from the ground it looks like it is stationary (not moving). To move this way, the satellite must be straight above the equator, and 35,786 kilometers (22,236 miles) above the Earth. Artificial satellites have several main uses:

### Scientific Investigation

**Earth observation** – including weather forecasting and tracking storms and pollution

**Communications** – including satellite television and telephone calls

**Navigation** – including the Global Positioning System (GPS)

**Military** – including reconnaissance photography and communications (nuclear weapons are not allowed in space)

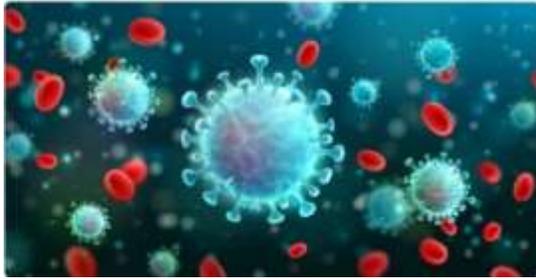


**Arpitha. B**  
**I Year Student Teacher**

## THE WONDERS OF NATURE

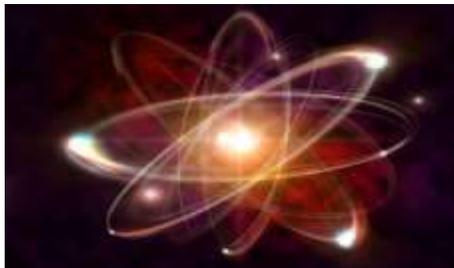
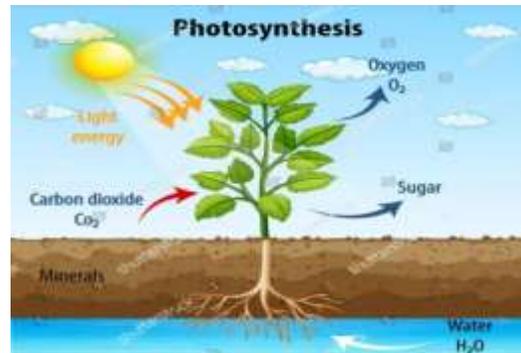
In the vastness where the stardust gleams ,  
Galaxies twirl in a cosmic dance ,  
Nebulae whisper I silken dreams,  
A universe born from a chance romance.





Within a drop, a world unfolds ,  
Cells like cities, bustling and bright,  
Molecules weaving their stories untold,  
Life's intricate tapestry, a wondrous sight.

The rhythm seasons, a delicate flow,  
Photosynthesis sings in the sun's warm embrace,  
Roots digging deep where the soft shadows grow,  
Nature's heartbeat, a harmonious grace.



In the realm where the tiny things play,  
Particles dance with a curious glee,  
Uncertainty reigns, come what may,  
A world where the strange is the key to the free.

labyrinth woven of thoughts and dreams,  
Neurons sparking in a dazzling spree,  
The mysteries hidden in consciousness beams,  
Endless potential in the depths of our sea.



With every discovery, we reach for the stars,  
Harnessing forces, both known and unknown,  
Building our future, erasing the scars,  
In sciences embrace, together we've grown.



**Bindu M A**  
**I Year Student Teacher**

## PHYSICS IN OUR DAILY LIFE

Physics is a field of study that examines matter, including its composition, nature, and properties. It also examines heat, mechanics, light, electricity, magnetism, the structure of atoms, and sound. We live in an era in which science and technology has become a part of our



everyday life. Even in the pre-scientific era, human's everyday life was governed by several principles of physics in our daily life. They were just not aware of the concept. Simplest functions like walking, cutting, and cooking can only be explained through concepts of physics. Physics is a significant aspect of modern culture and human history. Its advancement has aided numerous other human endeavors, including economic development, space exploration, and telecommunications.

### Example of Physics in Everyday Life with Explanation

- 1) Have you ever wondered how you could see the image of anything in the water? The clear water surface acts like a smooth reflecting top; it reflects light when the image strikes the surface. However, we can see our image in the water.
- 2) It must have caught your attention that pushing against the hinges of a swinging door makes it difficult to open, while pushing away from the hinges makes it simple. Torque's physical applicability is evident in this situation. The force that propels rotation is known as torque.
- 3) The gravitational force is common in many aspects of daily life. For instance, gravity is necessary for playing, sliding, jumping, and running. A person will only fall downward if they jump off a building. In zero-gravity space, it would be impossible for someone to jump using the same technique.

### Advantages of Physics in Everyday Life

**Alarm Clock:** When an alarm clock rings, the molecules present nearby vibrate. The vibration causes the other molecules to vibrate as well. An alarm clock releases a wave of energy that triggers the human brain.

**Steam Iron:** The concept of the electric iron is based upon the principle of the heating effect of current. Due to the resistance present in it, an electric current passing through a conductor generates heat. A steam iron uses superheated water to eliminate creases in clothing and fabrics. Along with this, iron weight forces them to adopt a new shape.

**Ball Pen:** Gravity is the fundamental factor in the ball pen concept. The ink is transferred to the paper as your pen glides over the page. It rotates the ball, and gravity pulls the ink down onto its top. So, if physics had not been there, you would not have been able to write with a ballpoint pen on paper.

**Doppler radar:** To check for over speeding vehicles, police often use Doppler Radar. It works on the principle of the Doppler Effect. Whenever the source of the sound moves concerning the listener, the sound's pitch changes. The reason for this is that as the sound source travels nearer or farther away from the listener, the frequency of the sound wave changes.

Physics explains how the world functions around us. Every action we perform in daily life has a direct or indirect connection to the concepts of physics in daily life, such as walking, drinking, jumping, etc. Electronic devices such as phones, computers, bluetooth speakers, alarm clocks, air conditioners, etc., follow the laws of physics. These kinds of devices help humans to make their work easier and more efficient.



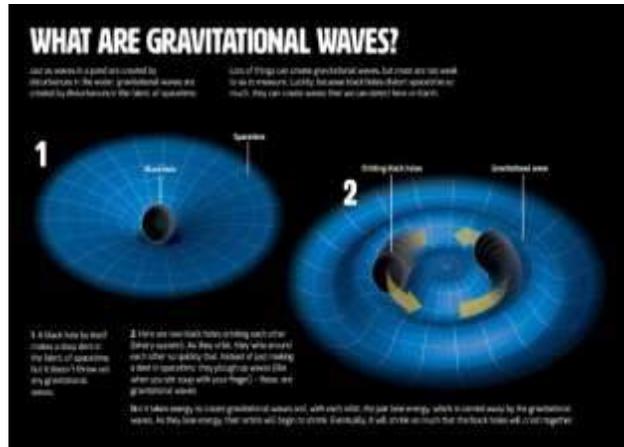
**Gulafshan**

**I Year Student Teacher**

## **DISCOVERY OF GRAVITATIONAL WAVES-THE INDIAN CONTRIBUTIONS**

One of the landmark discoveries of the twentieth and twenty-first centuries so far is the discovery of Gravitational Waves (GW). The existence of GW was predicted exactly 100 years ago by Albert Einstein based on his General Theory of Relativity. It is interesting to know that he did not believe that the GW will be discovered in the laboratory. Why? It is because the amplitude of the GW will be so small (10-21m) that no experiments will be able to measure this small displacement, corresponding to about 1 millionth of the diameter of proton.

The beauty of the theory made the experimentalists design appropriate experiments to detect such a small displacement. For the last 25 years, about 1000 scientists from more than 25 countries are actively involved in this task. In this team, there are 37 Indian scientists working in various academic and research institutions in India. On 14



September, 2015, scientists were able to detect the arrival of a GW that originated about 1.3 billion years ago. They were able to observe GW using the facilities at two Laser Interferometer Gravitational Observatories (LIGO) in the US. They got the wave pattern exactly as predicted by Albert Einstein using his General Theory of Relativity. Einstein showed that the space time surrounding a massive object is curved. And any particle moving in the vicinity of this object will trace a curved path instead of a straight line. The curved path taken up by the particle will appear as though it is being attracted by a force from the massive object. This generates what is called gravitational field. The curvature of the space surrounding a massive object will depend on the mass of the object. Any significant event in the universe will generate disturbances in the gravitational field and will produce GW. There are 37 Indian scientists from IISER Thiruvananthapuram and Kolkata, IIT Ahmedabad, TIFR, Institute of Mathematical Sciences, Chennai, Inter University Consortium for Astronomy and Astrophysics ( IUCAA) Pune , Raman Research Institute , Bangalore and Indian Institute of Science, Bangalore, who are active participants in this global initiative of LIGO. The machines that gave scientist their first-ever glimpse at GW are the most advanced detectors ever built for sensing tiny vibrations in the universe. The two US-based underground detectors are known as the Laser Interferometer Gravitational-wave Observatory or LIGO for short. India is aiming to get the world's third LIGO at an estimated cost of 1,000 crore. As part of the ongoing Indo-US cooperation in science and technology, America will provide India with nearly \$140 million worth of equipment. Professor C. S. Unnikrishnan from TIFR is the leader of Indian LIGO experiment. He is one of the 137 authors of the research paper published in physical Review Letters in February 2016. It is hoped that the Indian LIGO will be functional within a couple of years. The GW opens up another window for astronomy. The observatory will be operated jointly by IndIGO and LIGO and would form a single network along with the LIGO

detectors in the USA and Virgo in Italy. The design of the detector will be identical to that of the Advanced LIGO detectors in the USA.



**Lavanya Annappa Naik**  
**I Year Student Teacher**

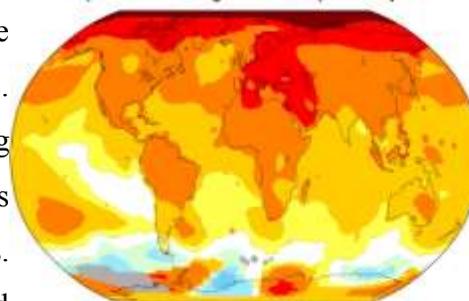
## GLOBAL WARMING

Global warming is the rise in temperature of the air and oceans globally. It is happening mainly because humans burn coal, oil, natural gas, and cut down forests. Global warming is a significant and rapidly accelerating issue caused by human activities, such as greenhouse gas emissions, deforestation, and the burning of fossil fuels.

It is having a profound impact on the environment and our planet. The present global warming is mostly because of people burning things, like gasoline for cars

and natural gas to keep houses warm. But the heat from the burning itself only makes the world a tiny bit warmer: it is the carbon dioxide from the burning which is the biggest part of the problem. Among greenhouse gases, the increase of carbon dioxide in the atmosphere is the main cause of global warming. People can change how they live because of the effect of climate change. For example, they can go to places where the weather is better, or build walls around cities to keep flood water out. This cost money, and rich people and rich countries will be able to change more easily than the poor. Global warming can make dangerous heatwaves. Seeing nowadays in modern period of 2024 the most dangerous climatic changes in many countries. Heat can cause serious damages like burning of forests and diseases that can lead to undernutrition, malaria, diarrhoea and heat stress alone. Generally increasing of global warming leading to high pressure of heat in coming years.

Temperature change over the past 50 years



Trend from 1973 to 2023 (°C)

-1.0° -0.5° -0.2° +0.2° +0.5° +1.0° +2.0° +4.0°



**Monika B**  
**I Year Student Teacher**

## THUNDERSTORMS CHURN UP A BOILING POT OF HIGH ENERGY GAMMA RAYS

Views from a NASA plane have just shed new light on these invisible bursts of radiation

A thunderstorm, viewed from an airplane soaring above the clouds, glows in gamma rays. They're purple in this illustration, but invisible to the human eye.



Above the cloud tops, thunderstorms throb with a complex, frenzied light show. But these bright flashes cannot be seen with the eye. They give off a type of invisible, high-energy light known as gamma rays.

NASA's ER-2 aircraft has now offered new views of this radiation shimmering above thunderstorms. During 10 flights, the plane captured gamma-ray outbursts with different durations and intensities. And the results have scientists feeling electrified.

For one thing, it appears that two known types of storm-powered gamma rays are more complex — and common — than scientists had thought. The new data also have unveiled a never-before-seen type of blast. It's called a flickering gamma-ray flash.

"I'm absolutely awestruck," says David Smith. He's a physicist at the University of California, Santa Cruz, who was not involved with the research. The new findings are the most important data in this field in more than a decade, he says.

### **Spying on storms**

The ER-2 plane soared over storms in the Caribbean and Central America in July 2023. It cruised at an altitude of about 20 kilometers (12.4 miles). That's roughly twice as high as commercial flights. Up there, the aircraft had a front-row seat to storm clouds' gamma-ray fireworks. The plane was also rigged to send data to the ground in real time. That allowed researchers to send the pilot back to regions found to be hopping with gamma rays. Before this study, scientists knew about two main types of storm-made gamma rays. One type are terrestrial gamma-ray flashes. These short, intense blasts are so bright that they can be seen from space. Each one lasts less than a thousandth of a second. The other known type are called

gamma-ray glows. These emissions are dimmer but last longer. The ER-2 plane made new discoveries about both types.

Here, a thunderstorm crackles with lightning near Santa Marta, Colombia. In the new study, a NASA aircraft flew above such thunderstorms in the Caribbean and Central America.

Gamma-ray glows turned out to be surprisingly long-lived and common. Storms could glow for hours. And the glow could span thousands of square kilometers (hundreds or thousands of Square miles). The plane measured this type of emission on nine of its 10 flights. Nikolai Østgaard and his colleagues described these findings October 3 in *Nature*.

“It’s astonishing,” says Ningyu Liu. This physicist at the University of New Hampshire in Durham did not take part in the new work. What’s more, gamma-ray glows weren’t as stable as scientists had thought. Instead, these lights repeatedly brightened and dimmed over the course of seconds. “Large storms are bubbling. It’s like a boiling pot,” says Østgaard. He’s a physicist at the University of Bergen in Norway. The flights also found many terrestrial gamma-ray flashes too dim to be seen from space. This hints that past satellite data missed many of these flashes — which would appear to make them more common than scientists had thought. Østgaard and others shared that discovery September 7 in *Geophysical Research Letters*.

Storms are known to produce gamma rays when electrons get accelerated in strong electric fields that build up inside clouds. These electrons produce more electrons, and so on. When electrons in this avalanche smash into air molecules, they throw off gamma rays. But it’s still unknown what makes a cloud emit a terrestrial gamma-ray flash, versus a gamma-ray glow.

Discovering a middle ground between those two extremes — those flickering gamma-ray flashes — could help answer that question.

The flickering ones may help explain how lightning forms, too. Many of the flickering gamma-ray flashes seen by ER-2 were followed by lightning. This could mean that the flickering gamma-ray flashes help kickstart those bolts.

Gamma rays might help limit how strong electric fields can get in thunderclouds, too, says Steven Cummer. He’s an electrical engineer at Duke University in Durham, N.C., who worked with Østgaard. “This whole gamma ray-generating process [seemed] interesting and

uncommon before,” he says. But it “now actually appears to be quite central in all of atmospheric electricity.”



**Pavithralakshmi T M**  
**I Year Student Teacher**

## **GALAXY**

### **What is a Galaxy?**

A galaxy is a sprawling space system which is composed of stars, dust, interstellar gas, stellar remnants, and dark matter and all held together by gravity. The word ‘Galaxy’ is termed from the Greek word ‘*galaxies*’. It is tough to tell how big the universe is! The universe has many galaxies, and each carries millions of stars which are bounded by a



unique force known as gravitational force. There are approximately 70,000 million stars in the universe. The solar system where our earth exists is in the Milky Way Galaxy.

Galaxies differ from each other in shape, size, colour and composition. There are three types of galaxies that we find in the universe.

### **Elliptical Galaxies**

These type of galaxies are like flattened balls of old stars and contain very little gas. It also includes the most massive galaxies containing a trillion stars.

### **Spiral Galaxies**

Spiral galaxies have a flattened shape. They have a bulge in the centre composed of old stars surrounded by a disk of young stars and are arranged in spiral arms.

### **Irregular Galaxies**

As its name suggests, Irregular Galaxies have no particular shape. There are billions of galaxies in the universe, the centre of the galaxy releases a huge amount of heat, radiation, radio waves and x-rays.

Galaxies are too far from us, that is, a spacecraft that moves with a speed of 60,000 km/hr reaches Alpha Centauri Galaxy which is 4.2 light-years after 80,000 years. The Milky

Way Galaxy includes the sun, earth, and our solar system. It contains dust particles, huge clouds, and gases that lie throughout it and depths of interstellar space. The term Milky Way refers to the large portion of the Milky Way galaxy that can be seen from earth as well.

### **Our Milky Way**

Our home galaxy is called the Milky Way. It's a spiral galaxy with a disk of stars spanning more than 100,000 light-years. Earth is located along one of the galaxy's spiral arms, about halfway from the center. Our solar system takes about 240 million years to orbit the Milky Way just once.

### **NASA/JPL-Caltech**

From our perspective on Earth, the Milky Way looks like a faint, milky band of light arcing across the entire sky, which is how it got its name. This feature marks the central disk of our home galaxy seen edge on.

The Milky Way sits in a neighbourhood with over 50 other galaxies called the Local Group. Its members range in size from dwarf galaxies (smaller galaxies with up to a few billion stars) to Andromeda, our nearest large galactic neighbour. The Local Group sits just off the edge of the Virgo cluster and is part of the Laniakea supercluster.

### **The problem of the magellanic clouds**

Large magellanic clouds Large Magellanic Cloud in an optical image taken by the Blanco Telescope at the Cerro Tololo Inter-American Observatory in Chile. The bright nebula at the top of the image is 30 Doradus, also known as the Tarantula Nebula.(more)

It is now known that the nearest external galaxies are the magellanic clouds, two patchy irregular objects visible in the skies of the Southern Hemisphere. For years, most experts who regarded the Magellanic Clouds as portions of the Milky Way Galaxy system separated from the main stream could not study them because of their position. (Both Magellanic Clouds are too far south to be seen from most northern latitudes.) Moreover, the irregular shapes of the objects and their numerous hot blue stars, star clusters, and gas clouds did indeed make them resemble the southern Milky Way Galaxy.



**Saniya Parveen**  
**I Year Student Teacher**

## HOME FOR MICROBES

But not all microbes live in the same place. Based on the habitat they're most suited for, different species of bacteria live in different parts of the tract. Your digestive tract contains several different organs. Each organ has its own function and its own microbes.

Our bodies are home to trillions of microbes, including bacteria, fungi, and viruses that live in harmony with us and perform vital functions:

**Digestion:** Bacteria in the gut release enzymes that aid digestion.

**Vitamin production:** Some microbes, like lactic acid bacteria, produce vitamins like vitamin B12.

**Protection from infection:** Microbes prevent the invasion of foreign bodies and other microbes. For example, bacteria on the skin compete with the fungus that causes athlete's foot.

**Reproductive health:** Microbes play a role in reproductive health.

The collection of all microorganisms living in the human body is called the human micro biome. The micro biome is so important that it's like another organ, serving a necessary function for the body.

**Here are some other things to know about the human micro biome:**

**Diversity:** Different species of microbes live in different places in the body, like the skin of the knee or the inside of the mouth.

**Interactions:** Microbes interact with each other, competing for space and resources.

**Balance:** A diverse and balanced micro biome is necessary for a strong immune system.

**Changes:** The micro biome grows and changes throughout life, reflecting what we eat, where we go, and what we do.

**Health research:** The human micro biome is an important area of health research. Disturbed micro biomes have been linked to hundreds of ailments, including cancers, autoimmune diseases, and cardiovascular diseases.

Microbes live in almost every part of the body, including the skin, gut, and nose. Different species of microbes live in different places, such as the cool, dry skin of the knee or the warm, wet darkness inside the mouth.



**Sharvari A M**  
**I Year Student Teacher**

# AIDS

## AIDS – Causes and Spread

The cause of AIDS is primarily HIV or the Human Immunodeficiency Virus. This virus replicates itself into the human body by inserting a copy of its DNA into the human host cells. Due to such property and capability of the virus, it is also known as a retrovirus. The host cells in which the HIV resides are the WBCs (White Blood Cells) that are the part of the Human Immune system.



HIV destroys the WBCs and weakens the human immune system. The weakening of the immune system affects an individual's ability to fight diseases in time. For example, a cut or a wound takes much more time to heal or the blood to clot. In some cases, the wound never heals.

HIV majorly transmits in one of the three ways – Blood, Pre-natal and Sexual transmission. Transfusion of HIV through blood has been very common during the initial time of its spread. But nowadays all the developed and developing countries have stringent measures to check the blood for infection before transfusing. Usage of shared needles also transmits HIV from an infected person to a healthy individual.

As part of sexual transmission, HIV transfers through body fluids while performing sexual activity. HIV can easily be spread from an infected person to a healthy person if they perform unprotective sexual intercourse through oral, genital or rectal parts.

Pre-natal transmission implies that an HIV infected mother can easily pass the virus to her child during pregnancy, breastfeeding or even during delivery of the baby.

## AIDS – Symptoms

Since HIV attacks and infects the WBCs of the human body, it lowers the overall immune system of the human body and resulting in the infected individual, vulnerable to any other disease or minor infection. The incubation period for AIDS is much longer as compared to other diseases. It takes around 0-12 years for the symptoms to appear promptly.

Few of the common symptoms of AIDS include fever, fatigue, loss of weight, dysentery, swollen nodes, yeast infection, and herpes zoster. Due to weakened immunity, the infectious person falls prey to some of the uncommon infections namely persistent fever, night sweating, skin rashes, lesions in mouth and more.

## **AIDS – Treatment, and Prevention**

Till date, no treatment or cure is available for curing AIDS, and as a result, it is a lifethreatening disease. As a practice by medical practitioners, the best way to curb its spread is antiretroviral therapy or ART. It is a drug therapy which prevents HIV from replicating and hence slows down its progress. It is always advisable to start the treatment at the earliest to minimize the damage to the immune system. But again, it is just a measure and doesn't guarantee the cure of AIDS.

AIDS prevention lies in the process of curbing its spread. One should regularly and routinely get tested for HIV. It is important for an individual to know his/her own and partner's HIV status, before performing any sexual intercourse activity. One should always practice safe sex. Use of condoms by males during sexual intercourse is a must and also one should restrict oneself on the number of partners he/she is having sex with.

One should not addict himself/herself to banned substances and drugs. One should keep away from the non-sterilized needles or razors. Multiple awareness drives by the UN, local government bodies and various nonprofit organizations have reduced the risk of spread by making the people aware of the AIDS – spread and prevention.

## **Conclusion**

Life for an individual becomes hell after being tested positive for AIDS. It is not only the disease but also the social stigma and discrimination, felling of being not loved and being hated acts as a slow poison. We need to instill the belief among them, through our love and care, that the HIV positive patients can still lead a long and healthy life.

Though AIDS is a disease, which cannot be cured or eradicated from society, the only solution to AIDS lies in its prevention and awareness. We must have our regular and periodical health checkup so that we don't fall prey to such deadly diseases. We must also encourage and educate others to do the same. With the widespread awareness about the disease, much fewer adults and children are dying of AIDS. The only way to fight the AIDS disease is through creating awareness.



**Priyanka R**  
**I Year Student Teacher**

## PRESERVING THE OZONE LAYER WITH MODERN SOLUTIONS

The ozone layer is a crucial shield that protects Our planet from the sun's harmful ultraviolet Radiation .as Modern society has evolved, new Technologies have emerged to help mitigate the Threats to this delicate layer of our atmosphere.



### **Atmospheric shield**

The ozone layer acts as a protective filter ,absorbing and reflecting harmful UV rays from the sun.

### **Vital for life**

Without the ozone layer, excessive UV radiation would damage dna, increase skin cancer risk, and disrupt essential biological processes.

### **Delicate balance**

The ozone layer is A fragile part of our atmosphere that Must be carefully maintained.

### **Causes of ozone depletion**

- Chemical pollutants
- Climate change
- Human activities

### **Conventional methods for ozone layer Protection**

**Phasing out ozone depleting substances:** International agreements like the Montreal protocol have mandated the gradual elimination of harmful chemicals

**Promoting alternatives:** The development and adoption of ozone friendly substitute for industrial and commercial applications

**Regulatory oversight:** Governments implementing strict laws and policies to monitor and control the use of ozone depleting substances

**Public awareness:** Educational campaigns inform citizens about the important of the ozone layer and how to contribute to its protection

## Emerging technology for ozone layer preservation

**Renewable energy:** Transitioning to clean, ozone friendly energy sources like solar ,wind and geothermal power

**Recycling and waste management:** Improving collection and disposal of ozone depleting substance to prevent their release into the atmosphere

**Carbon capture and storage:** Developing technologies to capture and safely store greenhouse gases that contribute to ozone depletion

**Ozone friendly chemicals:** Innovative molecular engineering to create new substances that do not harm the ozone layer.

## Conclusion

By embracing modern, sustainable solutions, we can safeguard the ozone layer and ensure a healthy, thriving planet for all. Together, we can make a lasting difference in the fight against ozone depletion.

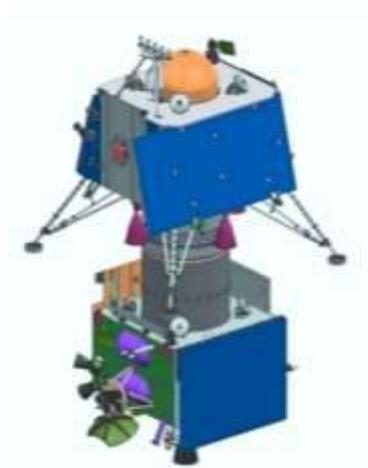


**Siddharaju Pujar**  
I Year Student Teacher

## CHANDRAYANA- 3

### Chandrayana -3 integrated module

Chandrayaan-3 is India's third lunar mission, which was launched from Satish Dhawan Space Centre on 14 July 2023. The spacecraft entered lunar orbit on 5 August, and became the first lander to touch down near the lunar south pole on 23 August at 18:03 IST (12:33 UTC), making India the fourth country to successfully land on the Moon, and at 69°S, the southernmost lunar landing, until IM-1 landed further southwards in Malapert A crater on 22 February 2024. The lander was not built to withstand the cold temperatures of the lunar night, and sunset over the landing site ended the surface mission twelve days after landing. The propulsion module, still operational, transited back to a high Earth orbit from lunar



orbit on 22 November 2023 for continued scientific observations of Earth. It operated until 22 August 2024.

**ISRO's mission objectives for the Chandrayaan-3 mission are:**

- Engineering and implementing a lander to land safely and softly on the surface of the Moon.
- Observing and demonstrating the rover's driving capabilities on the Moon.
- Conducting and observing experiments on the materials available on the lunar surface to better understand the composition of the Moon.

**The spacecraft of Chandrayaan-3 includes the following components:**

- Lander module: Soft-lands on the Moon and deploys the rover
- Propulsion module: Carries the lander and rover from launch vehicle injection to the lunar orbit, and separates them.
- Rover: A six-wheeled vehicle that analyzes the lunar surface
- Spectro-polarimetry of Habitable Planetary Earth (SHAPE) payload: Studies Earth from the lunar orbit.

**Chandrayana - 3 Integrated components**

**The mission profile of Chandrayaan-3, India's lunar exploration mission, includes the following objectives:**

1. Soft landing: Chandrayaan-3's primary objective is to safely land on the moon's surface.
2. Exploration: The mission will explore the lunar surface and collect scientific data.
3. Technology demonstration: The mission will demonstrate the technologies required for inter-planetary missions.

**Team**

1. ISRO chairman: S. Somanath.
2. Mission director: S. Mohanakumar.
3. Associate mission director: G. Narayanan.
4. Project director: P. Veeramuthuvel.
5. Associate project director: Kalpana Kalahasthi.

6. Vehicle director: Biju C. Thomas.

## Result

The spacecraft entered lunar orbit on 5 August, and India became the first country to touch down near the lunar south pole, at 69°S, the southernmost lunar landing on 23 August 2023 at 18:04 IST (12:33 UTC), ISRO became the first agency to land on the south pole of the moon in its first attempt & overall the fourth .

## Awards

The Chandrayaan-3 mission has received multiple awards, including the International Astronautical Federation's (IAF) World Space Award and the Vigyan Ratna:

- 1. IAF World Space Award:** The IAF's World Space Award was given to Dr. S. Somanath, the Chairman of the Indian Space Research Organisation (ISRO), for the success of the Chandrayaan-3 mission. The award ceremony took place in Milan, Italy. The IAF recognized the mission for its scientific curiosity, cost-effective engineering, and India's commitment to space exploration
- 2. Vigyan Ratna:** Padmanabhan, a former director of the Indian Institute of Science (IISc), was awarded the Vigyan Ratna.
- 3. Vigyan Shree:** Thirteen scientists were awarded the Vigyan Shree for their work in a variety of fields, including physics, chemistry, mathematics, and more.

Finally, On 23 August, the Chandrayaan-3 lander module successfully landed on the moon's South pole, making it the first country to have achieved the historic feat. The country became the fourth– after the US, China, and Russia – to have successfully landed on the moon's surface.



**Shruthi R**  
**I Year Student Teacher**

## SCIENCE TEACHING METHODS AND ACTIVITIES

### Some teaching methods and activities for science classes:

#### Teaching method:

Teaching methods are the techniques and strategies used to help students learn and develop skills. They include the principles, pedagogy, and management strategies used in the classroom.



Teaching methods can help students: Understand and remember what they've learned, Apply the content in different contexts, Develop social and emotional skills, and Prepare for standardized testing.

#### Project-based learning:

Student's research, evaluates information, and present their findings to the class. This method is useful for teaching science.

#### Differentiated instruction:

This approach tailors teaching methods to the needs of individual students, taking into account their learning styles, abilities, and interests.

#### Inquiry -based learning:

Students learn science by using methods, adopting attitudes, and applying skills as scientists do.

#### Classroom technology:

Technology can help keep students engaged and increase their participation in activities.

#### Student-centered approach:

This approach encourages students to take an active role in their learning, which can help them develop a deeper understanding of the material.

**Collaborative learning:**

Students work together in groups to achieve shared learning goals. This method promotes communication, teamwork, and the exchange of ideas.

**Activity learning:**

This technique engages students in the learning process, involving them in solving problems and generating knowledge.

**Experiential learning:**

Students apply skills in actual situations, which can give them a deeper understanding of the subject.

**Scientific activities** means those activities leading to the systematic knowledge of the physical or material world, largely consisting of observation and experimentation. It also includes the supervision, utilization, and communication of these activities

- Testing the bouncing ability of different balls at different temperatures.
- Building a compass to explore magnetic fields.
- Studying the relationship between the speed of a rolling object and the angle of a ramp.
- Investigating the conductivity of different materials .
- Building an earthquake-resistant structure and testing its stability .
- Exploring the relationship between air pressure and the flight distance of a paper airplane.
- Investigating the factors affecting the strength of an electromagnet .
- Creating a solar-powered oven and testing its efficiency .



**Yashodha**  
**I Year Student Teacher**

## SCIENCE PUZZLE

### TOPIC : ENVIRONMENT

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### CLUES

#### Across

- Clean and safe to drink(5)
- Protecting and preserving natural resources and the environment (10)
- Cutting down trees in large area(11)
- The waste material thrown away(7)

#### Down

4. A gas in the atmosphere that absorbs ultraviolet radiation(5)
5. A place where plants and animals live(7)
6. The natural world , including plants and animals (11)
7. An energy source from the sun (5)
8. The main gas that plants use for photosynthesis (11)
9. To use something again instead of throwing it away (7)

## ANSWERS

### Across

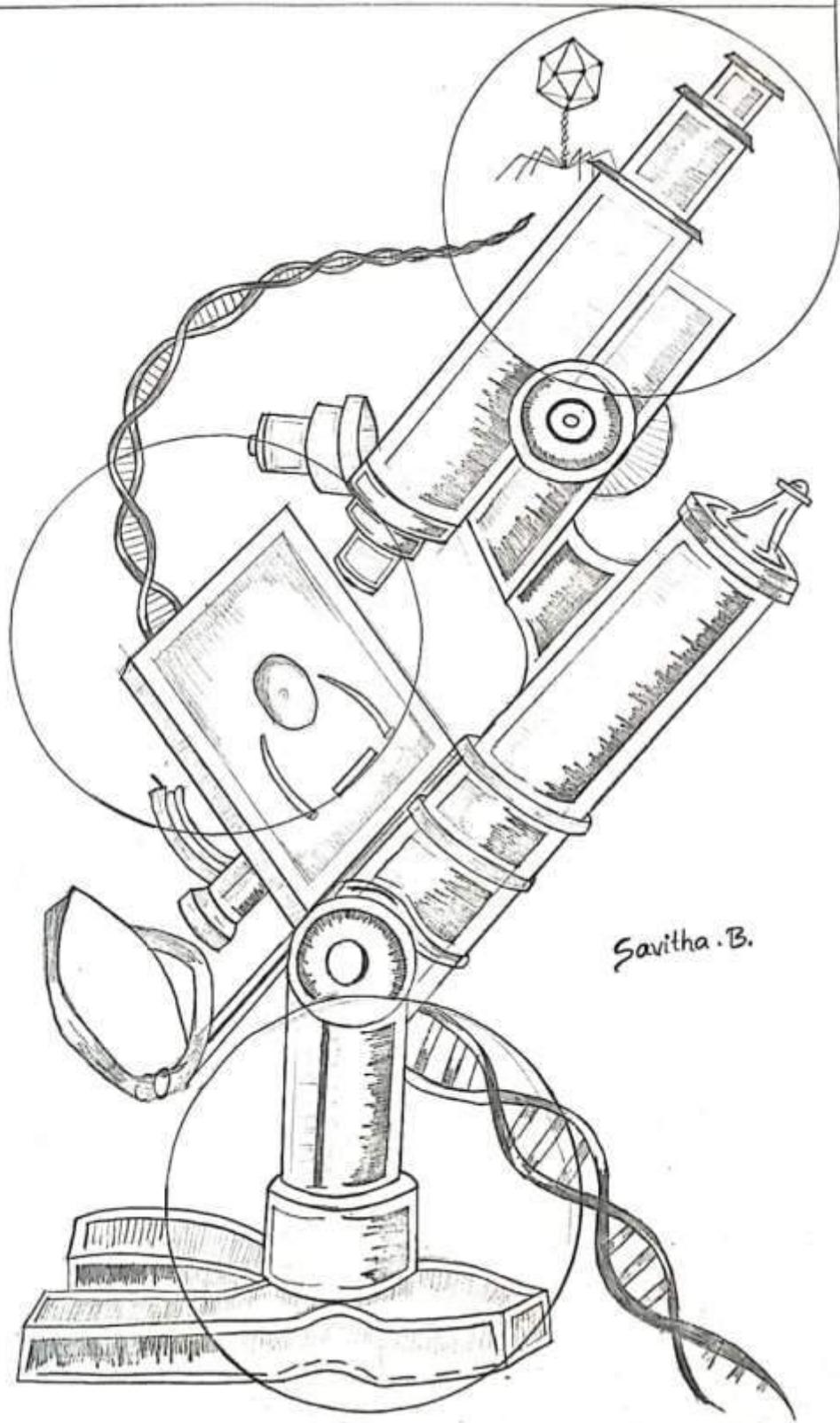
- Fresh
- Conservation
- Deforestation
- Garbage

### Down

- Ozone
- Habitat
- Environment
- Solar
- Carbondioxide
- Garbage



**Gowri . B**  
**II Year Student Teacher**



**Savitha B**  
**I Year Student Teacher**



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Swamy Vivekananda Vidya Samsthe (R)  
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**ಕುಮದ್ವತಿ ಶಿಕ್ಷಣ ಮಹಾವಿದ್ಯಾಲಯ**

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ಹಾಗೂ ಯು.ಜಿ.ಸಿ, ಅಧಿನಿಯಮ 2(f), ಸೆಕ್ಷನ್ 12(B) ಮನ್ನಣೆ ಪಡೆದಿದೆ &

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