Issue 5: Session 2024-25
Zoology Department | Maitreyi College

IRIDESCENCE

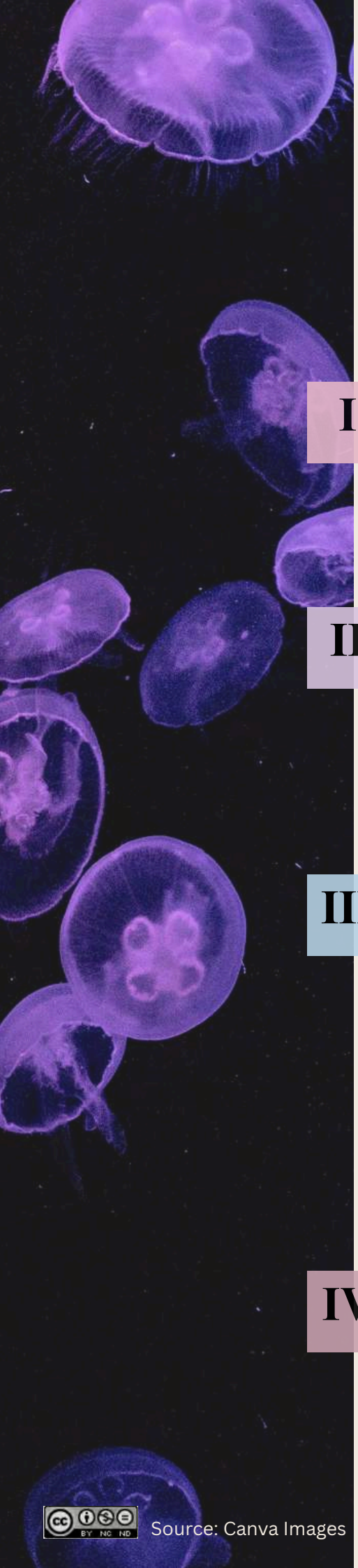


Table of Contents

FROM THE PRINCIPAL'S DESK

Prof. Haritma Chopra

Dear Readers,

I am immensely delighted to present the fifth issue of Iridescence, the annual e-magazine of Zoology Department, to all its readers.

Iridescence has yet again kept its promise of being 'iridescent' with all its dazzling and creative contributions from the students of Zoology and Life Sciences departments; the magazine continues to bring out the diverse talents of these students. This year's issue focuses on the theme Bio-verse, and includes a collection of articles, poems, travelogues, photographs, book and movie recommendations, interviews with a scientist and our alumnae—all of which are eloquently written, are artistic and original at the same time.

I would like to extend my appreciation to the editorial team, advisory board and all the contributing students involved in the production of this magazine. And, I encourage future contributors to keep up with the spirit of the magazine.

Happy reading!

THE ADVISORY BOARD

And just like that we are ready to bring out the fifth issue of our annual e-magazine, Iridescence! Writing this section for our magazine has always been a moment of honour and pride for all of us. With the theme, BioVerse: The Tale of Life, this issue of our magazine presents yet another vibrant collection of articles, poetry, artworks, photographs, book reviews, interviews with scientists and our alumnae.

With each issue, we are amazed with the immense talents of our students. The magazine which you are viewing today is the result of hard work and efforts of our editorial board and content curators, who worked tirelessly to bring out this issue. For the first time, we had a team of content curators as the enthusiasm with which they wanted to be part of this magazine didn't let us exclude them in anyway!

The genesis of this magazine, right from selection of editorial board members to conceptualisation of themes and subthemes, followed by editing of invited submissions from students is a learning experience in itself, not only for students but for us as well. Each new issue adds a new dimension to our learning graph, igniting curiosity and interest. Our students have added a new section of book and movie/ documentary reviews in this issue, which shall guide the readers to not only pick their new read off the library shelf but also help them what to watch next on OTT! The issue also features an interview with a scientist to encourage our readers about the latest research in science as well as to learn from their road to success. The photographs captured by the camera lenses evidence the genuine interest of our students in biological sciences.

The happiness of viewing this year's issue is priceless. It portrays a beautiful collection of creativity, insightful pieces of scientific ideas and news, scientific poetries, travel diaries, and artistic expressions. The task of designing themes and fitting the diverse submissions in cohesive sections was indeed daunting for our editorial board members. Maintaining the scientific integrity while keeping the contents engaging and captivating was challenging and equally interesting for all of us. Each page stands as a testament to their perseverance, patience and countless hours of dedication. This issue has also set a new benchmark for our future creative teams in terms of designing a magazine that flaunts coherence, diversity and originality, all at the same time.

We have always believed in Iridescence and shall continue to uphold its spirit in the next issues of the magazine. So, witnessing the vivid colours of this issue is a moment of both gratification and glory for all of us. We hope our readers shall enjoy reading this issue as much as we did while compiling it for them. And our journey to strive for excellence, with each issue as a learning step, wouldn't be complete without feedback form our readers. Do connect with us if you have any questions, suggestions, or concerns, at zoomagazine2020@gmail.com.

Dr. Anshu Arora Anand
Lt. (Dr.) Archana Aggarwal
Dr. Jaspreet Kaur

MEET THE EDITORIAL BOARD

SIDDHI GUPTA

EDITORIAL HEAD

"Success is best when it's shared" — Howard Schultz
Being part of the editorial team has been an incredible journey of learning and teamwork. Leading as Head of the Editorial Board has further honed my skills, allowing me to grow both creatively and collaboratively. This experience has truly helped me develop personally and professionally. A heartfelt thank you to the Advisory Board members for their unwavering support and guidance. A special thanks to our amazing team, whose dedication and hard work made this possible. I am grateful for the opportunity to contribute and learn, and I look forward to continuing this exciting journey.

WAFA JAFRI

EDITORIAL HEAD

"Be proud human, you're the most complex speck of dust in existence." I somehow always go through this quote when I'm having an imposter syndrome, lol! Well, It has been an amazing journey of being the Editorial Head, leading a team full of creative enthusiasts. Moreover the very hardworking individuals who have put their firm dedication into the making of this magazine, it was an honour being a part of this incredible team where I got the opportunity to brush my skills, learn and grow with each passing moment we worked together. I'm grateful to the advisory board for their guidance and support throughout, pushing us every step of the way. Looking forward to a great response from our readers. Cheers!

JASMINE SHARMA

"A story is not just words on a page, it is a milestone in the journey of knowledge" — Margaret Atwood.
I'm truly grateful to be part of the Iridescence Editorial Board—our zoology magazine has been an amazing mix of science, creativity, and teamwork. Writing an article for the magazine sparked a deeper interest in the mysteries of the ocean and marine life. This experience also helped me improve my editing and design skills and grow my love for writing and science communication. Thankful to everyone who made this possible!

B.SC. (H) ZOOLOGY
II YEAR

LYRA SINGH

Working on Iridescence is something I've been looking forward to ever since my first year. It's not just a magazine, but a product of our hard work and passion, and a space for all science enthusiasts to learn and grow. Being able to work on this is something I will cherish for a long time. Whether you are a nature lover, art connoisseur or someone who loves to indulge in science-related media, our fifth edition of Iridescence has something to offer everyone. I hope this magazine makes you fall as deeply in love with science as we are, and that it inspires and entertains you in all the best possible ways.

MANYA SHARMA

Success with honesty and pride with purity— this has been my motto in life, and this journey with Iridescence has only strengthened my belief in it. Being a part of the Editorial Board has been an incredible experience, filled with learning, challenges, and cherished moments.
As I look back at this journey, I leave behind a small piece of my heart in the form of these words:

"Rise and Shine"
The road is tough, the climb is steep,
But dreams are built when you dare to leap.
With courage bright and passion high,
You'll touch the stars, you'll kiss the sky.
So rise, my friend, and let light guide—
With honest steps and heart full of pride.

B.SC. (H) ZOOLOGY
II YEAR

B.SC. (H) ZOOLOGY
II YEAR

SHREYANSHEE VAIDYA

Be it the 4th edition or the current one, Iridescence has always pushed me to dive deeper into the undiscovered aspects of science and embrace nature's true creativity. Every edition feels like an opportunity to explore and uncover the mind-blowing beauty hidden in the intricate details of the natural world.
For me, Iridescence is more than just a magazine—it's a space to learn, share, and marvel at the wonders of zoology. I hope this issue fills you with the same excitement and curiosity that it brought me while working on it. May it inspire you to keep exploring, questioning, and discovering more about the world around us.

KHUSHI WALIA

"Science and art belong to the whole world, and before them vanish the barriers of nationality." — Goethe
Being part of this magazine has been an incredible journey—an opportunity to explore the intersection of zoology with creativity and storytelling. It was truly a privilege to work alongside such passionate and talented individuals who brought this vision to life. A heartfelt thank you to the advisory board for their invaluable guidance and support, and to my fellow team members for making this experience so fulfilling. This magazine is a testament to our collective curiosity and dedication, and I couldn't be more grateful to have been a part of it!

NOUREIN SHAILESH

Science is beautiful and so absolutely enjoyable. Being a part of the editorial board at Iridescence gave me a golden opportunity to display my affections for scientific research through art, colours, words, creativity and an amazing sense of team-hood. The highlights for me were the hours I put in crafting the perfect cover for this edition, being able to craft and create various graphics throughout the pages of this magazine, and of course, whipping through scientific literature and getting to write about those discoveries and inventions that have always had me in awe. Forever grateful for Iridescence 2024-25, the team, the professors and the college.

PREYASI

Being on the editorial board was honestly such a fun and refreshing experience! Whether it was drafting poems—which you'll definitely enjoy in the further sections—or just playing around with different ideas, it really made me tap into a more creative side. I got to explore a new way of thinking, putting thoughts into words in a way I hadn't before. And the best part? Watching my friends put in so much effort and seeing everything slowly come together—it made the whole thing even more special. It was a mix of creativity, teamwork, and a lot of learning, and I'm so glad I got to be a part of it!

B.SC. LIFE SCIENCES
I YEAR

AKANKSHA KHARE

“Science and everyday life cannot and should not be separated” - Rosalind Franklin
My ability to express through art has always been my superpower, something that brings me immense satisfaction and pleasure and as we, as a team bring forward this year’s edition of Iridescence, it gives me a sense of pride looking at what we have created as a team and how all our efforts have resulted into something that would outlast our presence in the campus. Since childhood, science as a subject has always been close to my heart and contributing even a little in my own way to this magazine has taught me a lot. I hope you would all love the magazine as much as we’ve loved creating it.

JANVI

“I am among those who think that science has great beauty.” — Marie Curie
Being part of the editorial board has been an unforgettable journey. This experience opened my eyes to the power of storytelling in science—from microscopic wonders to nature’s grandest creatures. Each piece deepened my curiosity and strengthened my connection to the vibrant world of zoology. I’m truly grateful for the chance to learn, grow, and collaborate with such passionate minds. A heartfelt thank you to the advisory board for their constant support and guidance in bringing this magazine to life.

B.SC. LIFE SCIENCES
I YEAR

B.SC. LIFE SCIENCES
I YEAR

PRAGYA JHA

I am truly grateful for the opportunity to be part of the editorial board for our zoological magazine - Iridiscence. This experience has been both enriching and inspiring, allowing me to deepen my understanding of wildlife, refine my writing and editing skills, and collaborate with a team of passionate individuals. It has been a privilege to contribute to a publication that showcases the wonders of the natural world. A heartfelt thank you to everyone who made this journey so memorable.

Content Curators

KHUSHI KUMARI

B.SC. (H) ZOOLOGY
III YEAR

It is my esteemed pleasure again being a part of our Iridescence team. New editions and a new role in the content curators' team have given me the opportunity to explore creativity with enthusiasm. Working with the editorial board members along with the other members of content curators has been a mesmerizing journey. Learning from each other and appreciating our efforts has kept us going through thick and thin. The fifth edition of Iridescence captures the ecstatic beauty of nature while diving into the ocean of knowledge weaved with creativity of the poetries, articles, crosswords etc. It will be a matter of joy for us when the readers get allured with this edition and enjoy going through each and every page of it. I also want to thank the Advisory board for giving me this opportunity. Cheers to my Iridescence family for the successful release of our 5th edition.

HIMANSHI YADAV

I am honoured to have worked as a content curator for the zoology magazine - Iridescence. Working with the fellow enthusiasts made the experience more enjoyable to me. It helped me learn new skills and brush up those I already had. During this journey, I was able to learn more about the marvels of the natural realm, as well as the ever-advancing research and new discoveries. I'm glad for the knowledge, progress, and contacts I made along the journey. This experience has been both inspirational and invaluable, and I'll carry these lessons with me.

B. SC. LIFE SCIENCES
III YEAR

ANJALI SINGH

B. SC. LIFE SCIENCES
III YEAR

Ever since childhood, I've been fascinated by the world around me. My curiosity led me to read about distant species, observe insects in my garden, and study human anatomy. Becoming a content curator for the Zoology magazine marked an exciting chapter in my journey. Albert Einstein's quote, "The important thing is not to stop questioning," has always inspired me. My experience with Iridescence allowed me to explore new ideas and express creativity. I'm extremely grateful to the professors for the opportunity and to the incredible team I worked with. It was an inspiring and enriching experience I'll always be thankful for.

DIKSHA PATHAK

Being a part of the Editorial Board has been an incredible journey in every way. When I first joined the team as a content curator, I had no idea how much I would learn through this experience. From brainstorming new ideas to meeting last-minute deadlines, every step has been truly rewarding. Working together with my team members, I learned how different perspectives come together to create something meaningful. And with this edition of Iridescence, we have aimed to capture the beauty and brilliance of science, and we hope you enjoy reading it as much as we enjoyed creating it.

B. SC. (H) ZOOLOGY
II YEAR

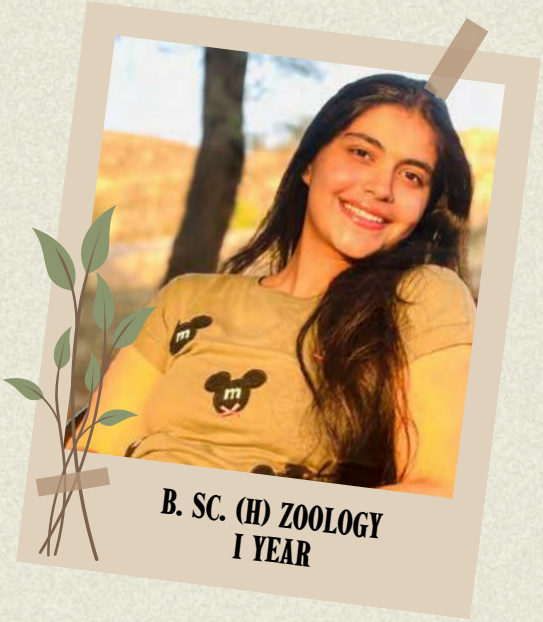
B. SC. LIFE SCIENCES
I YEAR

APURVA GUPTA

I'm really grateful for being a part of the editorial team. Being a content curator I learned teamwork, mutual understanding and many more things. Thank you for giving me this opportunity and having me in your team. Looking forward for working together more often with such sweet team members.

BENI PUNIA

Putting together this magazine has been a whirlwind of creativity, chaos and caffeine! From last minute edits to proud final drafts, every moment was worth it. So grateful for this team and the time which we spent together. The things learnt during this time will stay with me throughout the years. Hope you enjoy flipping through these pages as well as we loved making them!



B. SC. (H) ZOOLOGY
I YEAR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PROFESSIONALS' PERSPECTIVES: INTERVIEWS

INTERVIEW 1
Dr. Jayant Asthana

INTERVIEW 2
Ms. Shubhangi

INTERVIEW 3
Ms. Shreyanshi

Professional's Interview

> **The important thing is to never stop questioning. Curiosity has its own reason for existing.**
>
> *~Albert Einstein*

*QnA with **Dr. Jayant Asthana**, Research Scientist, Memorial Sloan Kettering Cancer Centre, New York, United States*

Q Can you walk us through your academic and research journey—from IIT Bombay to Memorial Sloan Kettering Cancer Center?

I started my scientific journey at IIT Bombay, one of the leading institutions in India. During my time there, I worked on identifying novel roles of microtubule-associated proteins and also explored new microtubule-targeted chemical molecules with potential clinical significance. As part of my Ph.D. research, we successfully secured one U.S. and one European patent. The Ph.D. work was published in peer-reviewed international journals.

After completing my Ph.D., I moved to the Francis Crick Institute in London, one of the world's largest biomedical research institutions, to pursue my postdoctoral studies as a postdoctoral training fellow. The Francis Crick Institute is home to many Nobel laureates, fostering a world-class research environment that has contributed to groundbreaking discoveries in biomedical science. I worked with CRISPR/Cas9 gene-editing technology and identified novel functions of several mitotic proteins. While working at the Crick Institute, I developed a strong interest in cancer research and became eager to apply my skills in this field.

This interest led me to accept a position as a senior research scientist at Memorial Sloan Kettering Cancer Center (MSKCC) in New York City, where I currently work.

My scientific journey would not have been possible without the unwavering support of my wife, Dr. Shikha Srivastava and our lovely daughter Saatvika.

Q What inspired you to pursue a Ph.D. in Cellular Toxicology and Molecular Biology?

My inspiration to pursue a Ph.D. in Cellular Toxicology and Molecular Biology stems from my deep curiosity about how cellular processes are influenced by structure-based specific inhibitors and how molecular mechanisms govern cellular responses. This passion, combined with my commitment to advancing scientific knowledge, motivated me to pursue a Ph.D. in this field.

Q What are some of the most exciting research projects you have worked on?

I have worked on several research projects:

a) Tracking Mitotic Proteins with CRISPR/Cas9 – Used CRISPR/Cas9 to introduce fluorescent tags (GFP/mCherry) at endogenous loci of mitotic protein genes, enabling high-resolution live-cell imaging at physiological expression levels.

b) R-loops in Ewing's Sarcoma – Studying RNA:DNA hybrids that accumulate in cancer cells, causing genomic instability, and exploring their potential as therapeutic targets.

c) Macrophage Infiltration in Tumors – Investigating how macrophages are attracted to tumor organoids, identifying chemoattractants using proteomics and metabolomics to advance CAR-macrophage therapy.

Q How do you see your research contributing to advancements in cancer treatment?

My research focuses on uncovering cellular vulnerabilities in cancer to develop targeted therapies. I have explored R-loops in Ewing's sarcoma, identifying RNA:DNA hybrids as potential therapeutic targets due to their role in genomic instability. Our findings show that knocking out RNAse H1 and H2, which resolve R-loops, is synthetically lethal, offering a new strategy for cancer treatment.

Additionally, my work on macrophage infiltration in tumor tissues using organoids and proteomics has identified key chemoattractants involved in immune cell recruitment, with implications for improving immunotherapy. My expertise in CRISPR/Cas9 gene editing and live-cell imaging has also helped uncover novel regulatory mechanisms in mitotic protein function, which could serve as anti-cancer targets.

Overall, my research bridges molecular biology with translational applications, providing new insights into cancer progression and potential treatment strategies.

Q Your profile highlights expertise in statistics, cell culture, and data analysis. How do these skills complement your work in molecular biology?

My expertise in statistics, cell culture, and data analysis enhances my molecular biology research by enabling precise experimental design and robust data interpretation. Statistical analysis is crucial for identifying significant trends in CRISPR screens, live-cell imaging, and sequencing data. My experience in cell culture supports my work with tumor organoids and immune cell co-cultures, essential for studying immune cell infiltration. Data analysis helps process high-content imaging and proteomics datasets, revealing key molecular interactions. These skills together allow me to investigate cell migration, DNA repair, and tumor microenvironments effectively. By integrating quantitative approaches, I ensure rigorous and reproducible insights into complex biological systems.

Q What were some of the biggest challenges you faced while transitioning from India to an international research institute?

Transitioning from India to an international research institute comes with challenges like adapting to a different research culture. Researchers often face high expectations for independence and productivity while adjusting to new technologies and social norms. Building a support network and staying open to new learning experiences help ease the transition.

Q What advice would you give to students aspiring to build a career in biomedical research?

To succeed in biomedical research, students should focus on mastering key biological concepts and regularly read scientific papers to sharpen critical thinking. Engaging with researchers offers insights into current challenges and innovations. Hands-on lab experience is vital for developing technical and problem-solving skills. Exploring interdisciplinary fields like bioinformatics and data analysis broadens opportunities. Above all, stay curious, persistent, and open to learning from failures.

Alumna's Interview

> **“The future belongs to those who believe in the beauty of their own dreams.”**
>
> *~Eleanor Roosevelt*

*QnA with **Ms. Shubhangi**, B.Sc.(H) Zoology, Batch of 2018-2021*

Q **Please brief us about your academic and professional background and what inspired you to pursue a Ph.D. in Biochemistry after studying Zoology in your undergraduate studies?**

During my undergraduate and master's studies in Zoology, I had the opportunity to explore a diverse range of subjects, including genetics, computational biology, and biochemistry. This broad exposure allowed me to understand the interconnectedness of various fields within biological sciences. As I progressed in my studies, I became particularly drawn to biochemistry and genetics, developing a strong interest in understanding the molecular mechanisms behind biological processes. This fascination fuelled my passion for research, and over time, I grew more confident in applying the methodologies and techniques of both fields to solve complex problems. I recognized the growing importance of biochemistry in fields such as medicine, biotechnology, and environmental science, which made it an ideal field for further specialization. With this in mind, I decided to pursue a Ph.D. in biochemistry, believing it to be the perfect avenue to develop my research skills and contribute meaningfully to scientific advancements.

Q **How has your research focus evolved over the years, and what excites you the most about your current work?**

I have gained experience in several research areas, including biochemistry, computational biology, immunology, and endocrinology. As I am still in the early stages of my Ph.D., I am exploring various fields to identify a specific research focus that aligns with my interests and goals. What excites me the most is the opportunity to work in intellectually stimulating and supportive environments, where I can continue to learn, grow, and develop as a researcher.

Q **Biochemistry is a field with immense potential, combining multiple disciplines. How did you know that biochemistry was your true calling, and what do you think is its future scope?**

I have had the opportunity to work across a range of research areas, including biochemistry, computational biology, immunology, and endocrinology. Currently, as I am in the early stages of my Ph.D., I am exploring various fields to identify a specific area of research that aligns with my interests and long-term goals. What excites me most about this phase is the chance to engage in intellectually stimulating and collaborative environments that foster both personal and professional growth. I am eager to continue learning, refine my research skills, and contribute meaningfully to my field.

Q What are your long-term career aspirations, and how do you hope to contribute to the field of life sciences?

At this stage, I haven't fully defined my long-term career goals. Instead, I am focused on embracing the research journey and exploring the various areas that pique my interest. I believe that by immersing myself in diverse research opportunities, I can better understand my strengths and passions, which will ultimately guide me toward a clearer career direction. For now, I'm open to where this exploration leads, trusting that the experiences I gain along the way will help shape my future goals..

Q As an Indian student living abroad, what challenges have you faced? Academically, what was the most difficult part of the process, and what advice would you give to young students considering studying abroad?

One of the major challenges I faced was the coursework, which was more chemistry-focused than what I had encountered during my bachelor's and master's studies. This shift required me to put in extra effort to catch up and adjust to the more advanced material. However, in terms of adapting as an international student, I didn't face any significant obstacles. Most universities today have a diverse international student community, which made it easier for me to acclimate and feel supported throughout the transition.

For students considering studying abroad, I would advise being well-prepared for both the academic and cultural transitions. While studying abroad can be an incredibly rewarding experience, it's crucial to choose a career path that aligns with your personal interests and long-term professional goals. Being clear about your objectives will help you make the most of the opportunities available and ensure a more fulfilling experience both academically and personally.

Q How did your undergraduate experience at Maitreyi College shape your interest in research?

My time at Maitreyi College was a truly enriching experience, filled with both challenges and rewarding moments. I was fortunate to have professors who believed in me, even when I didn't believe in myself. Their unwavering support played a key role in helping me build confidence in my abilities. Additionally, I made lasting friendships, and the intellectually stimulating environment further contributed to my personal and academic growth.

Q What advice would you give to students aspiring to build a career in biomedical research?

Going out and exploring can make a big difference, even if you don't have friends available. Simply stepping outside and breaking the routine can be incredibly refreshing. In an academic journey, especially during a Ph.D., work can easily begin to consume your life, leading to burnout. That's why it's so important to maintain a balance between work, personal time, and fun activities. Taking care of your mental health is just as essential as conducting groundbreaking research. Finding time for yourself helps ensure long-term productivity and well-being.

Alumna's Interview

> **The success isn't just about where you start but how you adapt, learn and grow along the way.**
>
> *~Sam Altman*

*QnA with **Ms. Shreyanshi**, B.Sc. Life Sciences, Batch of 2017-2020*

Q What is it that inspired you to be a research scientist?

My inspiration to become a research scientist stems from my deep curiosity about the internal systems of living organisms. The complexity of human and animal biology, especially at the cellular level, has always fascinated me. I find immense joy and focus when working in a lab—it's my happy place, where I can witness scientific processes unfold in real time through research and experiments.

Q The vastness of life science as a course and its scope is not unknown, how did you find out your true course of interest out of it?

The vastness of life sciences allowed me to explore various fields before discovering my true interests. Over three years, I studied chemistry, botany, and zoology, which helped me identify the subjects that intrigued me the most—Animal Biotechnology and Immunology. The structured nature of the course provided a solid foundation, gradually introducing me to different disciplines. With so many options available, I was able to determine what didn't interest me, which, in turn, guided me toward what I truly enjoyed.

Q What are some common myths surrounding neurobiology that are not absolutely true?

As someone who has worked on the therapeutic effects of low-sulfate heparan sulfate mimetics in central nervous system repair, I have come across several misconceptions about neurobiology. One important thing to note is that in science, we rarely deal in absolutes—what we understand today may evolve with new discoveries. For instance, a common myth is that nerve damage in the central nervous system is completely irreversible. While CNS repair is challenging, research—including work on heparan sulfate mimetics—suggests that targeted therapeutic strategies can promote regeneration and functional recovery. Another widely held misconception is that we only use 10% of our brains. Neuroimaging studies have consistently shown that nearly all regions of the brain serve functions and are active, even at rest. Similarly, the outdated belief that brain cells cannot regenerate has been debunked—neurogenesis does occur, particularly in the hippocampus, offering potential for therapeutic applications. In science, we approach knowledge with an open mind. Many so-called 'absolutes' and 'myths' can shift with new evidence, and that is what makes research in neurobiology both exciting and full of possibilities.

Q What challenges did you face while transitioning from a master's program to an industry role, and how did you overcome them?

Transitioning from a master's program to an industry role came with its own set of challenges. One of the biggest hurdles was the supply and demand gap—there were more students looking for jobs than available opportunities. On top of that, adapting to a new work culture and navigating the job market as an international student added another layer of complexity, as not all companies are open to hiring candidates from abroad. The key to overcoming these challenges was strategic networking. Connecting with professionals in my field, attending industry events, and engaging in meaningful conversations helped me understand the job landscape and uncover hidden opportunities. Additionally, focusing on developing adaptable skill sets—both technical and soft skills—allowed me to align myself with industry demands and be better prepared for different roles. Ultimately, persistence and adaptability played a huge role. By continuously learning, networking, and refining my approach, I was able to navigate the transition successfully and secure a position that aligned with my expertise and aspirations.

Q Some practices you think that helped you get where you are now?

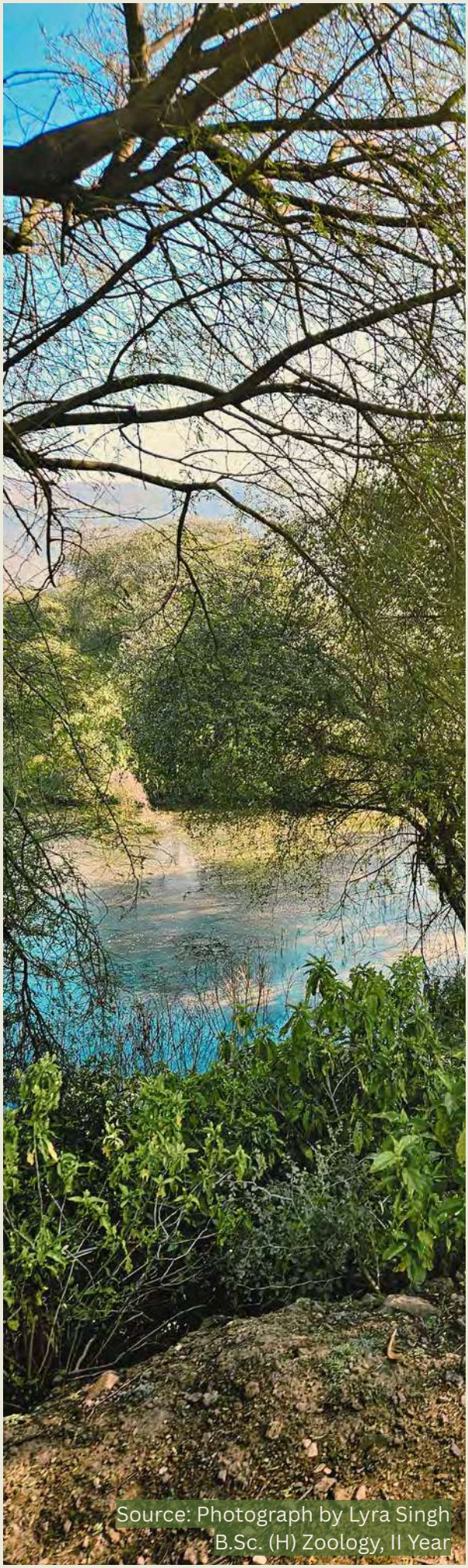
There are a few key practices that have helped me get to where I am today. First and foremost, constantly pushing myself out of my comfort zone has been crucial. Growth happens when you embrace challenges, take risks, and step into unfamiliar territory. Staying up to date with what's relevant in my field has also played a significant role. Science is always evolving, and keeping pace with new research, technologies, and methodologies ensures that I remain adaptable and informed. Lastly, developing strong critical thinking skills has been essential. Research demands curiosity, scepticism, and the ability to analyse problems from multiple angles. Questioning assumptions, exploring different perspectives, and learning from both successes and failures have all shaped my journey. Ultimately, progress comes from persistence, continuous learning, and the willingness to challenge oneself every day.

Q What are the struggles as a student trying to settle in a foreign land while also having a hectic schedule?

Moving to Scotland from Odisha as a student felt like starting life anew—new culture, unfamiliar faces, and the challenge of managing everything alone. The cold, rainy weather was a stark contrast to the heat back home and took a toll on my mood and productivity at first. But with time, I adapted. Despite the hurdles—homesickness, finances, and navigating a new system—my research journey made it worthwhile. I gained hands-on experience, grew both personally and professionally, and built a community that became my second family. Every challenge became a lesson in resilience, independence, and self-growth.

Q What advice would you give to students who want to pursue research abroad? Any tips for securing master's opportunities or research assistant positions?

Aspiring to research abroad? Plan smart. Talk to seniors, choose universities aligned with your interests, and connect with professors early. Use LinkedIn to network—many roles aren't advertised. Stay proactive with scholarships, experience, and refining your proposal. Strategy and persistence are key.



Source: Photograph by Lyra Singh
B.Sc. (H) Zoology, II Year

BIOFRAMES: PHOTOGRAPHY

Siddhi Gupta
B.Sc. (H) Zoology
III Year

Jasmine Sharma
B.Sc. Life Science
III Year

Khushi Kumari
B.Sc. (H) Zoology
III Year

Jasmine Sharma
B.Sc. Life Science
III Year

Anjali Singh
B.Sc. Life Science
III Year

Jasmine Sharma
B.Sc. Life Science
III Year

Anjali Singh
B.Sc. Life Science
III Year

Swati Kumari
B.Sc. Life Science
III Year

Khushi Kumari
B.Sc. (H) Zoology
III Year

Siddhi Gupta
B.Sc. (H) Zoology
III Year

Khushi Kumari
B.Sc. (H) Zoology
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Khushi Kumari
B.Sc. (H) Zoology
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Lyra Singh
B.Sc. (H) Zoology
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Lyra Singh
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Lyra Singh
B.Sc. (H) Zoology
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Lyra Singh
B.Sc. (H) Zoology
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Medhavi Kaushik
B.Sc. (H) Zoology
III Year

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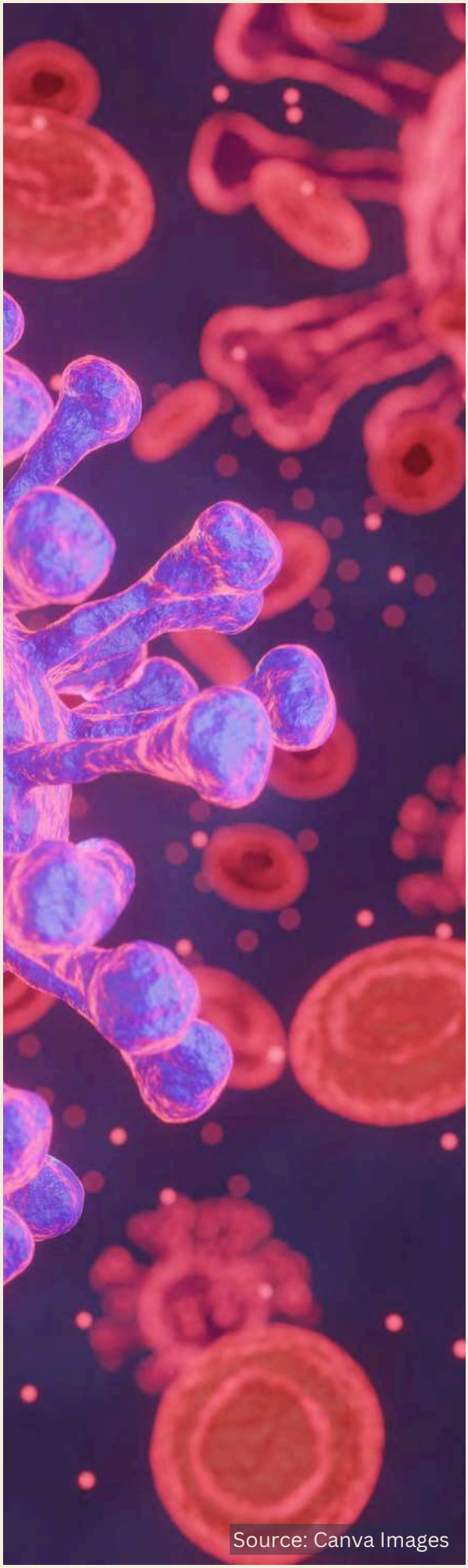

Source: Canva Images

INK & IMPACT

Source: Ghose, T. (2022, April 28). Crows and ravens took over the world because they're spookily smart (and brawny, too). Live Science. https://www.livescience.com/crow-smarts-help-them-spread

ARE YOU SMARTER THAN A CROW?

The Unseen Intelligence of Crows

As intriguing and oblivious as it may sound, this question is both sincere and rhetorical. The sly crow on your balcony is actually smarter than you realise. If you have ever observed these cunning winged creatures you may easily see certain patterns that make you wonder how well can crows interpret and understand their surroundings. Crows exhibit great intelligence and are considered quite intelligent and smart creatures in the Animal Kingdom. As discoveries suggest crows are masterfully capable of guided decisions and creating tools. These tools assist them in sheltering, protecting and nurturing their own selves while maintaining their populations. Remember the childhood folklore of a thirsty crow and a pitcher with water at the bottom? The crow masterfully with the help of stones made the water level rise and satiated its thirst. Similar to that it is observed that crows can create and use tools to ease their actions like we humans do. Surprising isn't it! Well these patterns made us wonder about the depth of a crow's cognitive abilities.

Breaking the myths one at a time:

Until very recently we humans believed that we have a monopoly over intelligence. We thought ourselves to be 'smart' as 'intelligent'. How ignorant of us to believe that, right? Crows, macaques, dolphins, primates and many more animals showed varied degrees of intelligence. This further led scientists to discover and venture beyond our understanding. To their great surprise many animals stood out from their expectations and displayed a remarkable sense of surrounding and understanding. Their behavioural traits were very much comparable to human responses to particular situations.

Study that redefines intelligence:

A very recent study on cognitive neuroscience among crows was conducted by Diana A. Liao and team which was published in the November, 2022 edition of Science Advances. The article is entirely dedicated specifically on the recursive intelligence of crows. To better understand this we'll first try to understand what recursion is. To define recursion we may say that it is a process of defining a problem or the solution to the said problem in a simpler version. Recursion basically is an act or process of solving a problem in a sequential manner. Like finishing a series of steps very similar to how we approach a problem in multiple steps to finally obtain the result. Coming back to our topic, recursion was said to be a specific and unique feature of human intelligence. It established the human capability of understanding as superior to other nonhuman beings. But this very specific research concludes that adoption of behavioural protocols is present in both human and non human beings.

What this study suggests is that humans alone are not necessarily the only animals that can solve a certain problem via tools which they create for their ease of development. The most outstanding and surprising aspect of this study is the recursive sequence adoption by crows. When compared to children, crows outsmarted the children around the age of five or older in learning the patterns and arranging the sequence. In conclusion, crows continued to produce recursive sequences and perform on par with children and even outperform macaques.

Crows, ravens and jays belong to the Corvidae family of birds. Their intelligence has marvelled people throughout history. Though their presence is not always welcomed and are considered inauspicious. Many cultures consider crows to be a bad omen and perceive them as harbingers of death. But that's not our point of discussion.

The Corvid Brain- a small toolbox with masterful design:

Moving ahead with our discussion, let's try to understand the brain of a crow. A crow's brain is only about the size of a human thumb. Then how these sly creatures have evolved to be so smart and intelligent? Well their brain size does not matter in relation to comparison with the human brain. Both the primate brain and crow brain are comparable. Professor John Marzluff at the University of Washington says that crows are essentially the flying monkeys reflecting upon

the comparison between the primate intelligence and the intelligence of the crow. This establishes the fact that crows can grasp the demand of the problem and act accordingly towards the task like how monkeys or other primates might do.

Communication and memory:

Crows are exceptional at remembering. Moreover, the communication pattern between crows is poorly understood and documented. They show a remarkable intensity, rhythm and duration of their caws as if almost conversing, hinting at an underlying possibility of a language. As a famous belief goes, crows can most definitely pass on grudges to their subsequent generations. You know what it means, the crow you shooed away yesterday may seek revenge from you any day now! This fact is both disturbing and intriguing. They have exhibited great memory which is evident in their migration patterns.

The mastermind- A master strategist:

Crows also have been observed to exhibit secrecy and awareness about their surroundings. Specifically while hunting and stealing from other animals. They've been known to steal from food stashes of squirrels. While they steal they are extremely cautious and aware about the dangers of being caught and attacked. Then they store their new treasure at an appropriate location away from the original place. There's something called bait-and-switch where the crow carefully observes another crow hiding their food and follows the crow to discover its new hoard. So the crows can be called Mr. Smartypants children, just kidding!

Thriving in a human-dominated world:

Crows have also shown great adaptive behaviour towards human dominated environments. They understand the abstract concept of analogies. This means crows can identify objects with similar or same relationships to one another. It will be an understatement to say that crows can easily outsmart our pets. With such extensive memory, awareness and problem solving capabilities crows thrive fairly well within the human surroundings.

A thought provoking experience:

In conclusion, it's not wrong to say that a crow is actually smarter than an average 5 year old. Their cognitive abilities specially help them in abstract reasoning. Crows can solve complex problems and depict recursion. Their food habits indicate their cognitive development and awareness. So next time you see a crow you'll definitely think what that sly little birdie is plotting in its almost thumb sized brain. Keep running your imagination wild until next time.

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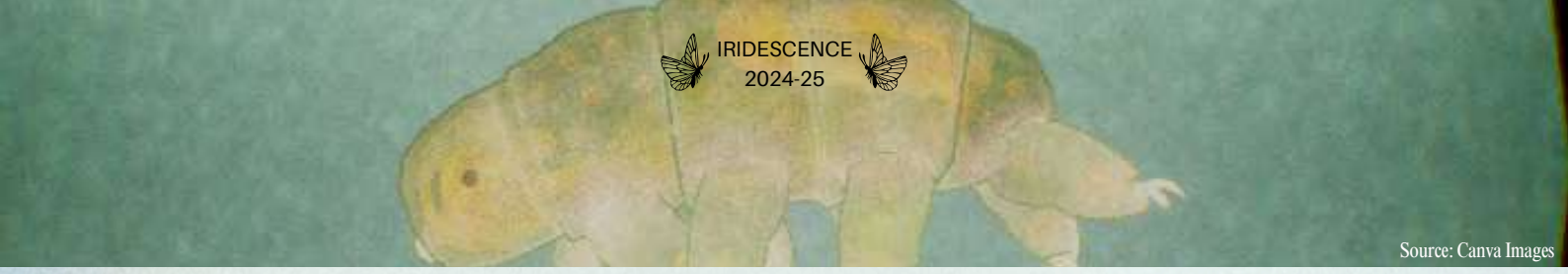
I Year

Not a gene, but when I alter,
I can be the cause of a biological
faulter. What am I?

Answer on page 77



Source: Canva Images

TARDIGRADES:

The Tiny Astronauts of the Universe

If there was an award for the ultimate survivor of life, Tardigrade would undoubtedly be the winner of it! Tardigrades are microscopic, eight-legged, water-dwelling invertebrates affectionately known as water bear and also moss piglet —are some of the toughest beings on Earth. Organisms of phylum Tardigrada are barely visible to the naked eye but boast incredible survival mechanisms; first discovered by German Zoologist Johann August Ephraim Goeze in 1773.

Deep-sea trenches and the peaks of the Himalayas to your backyard moss, no matter where you go these tiny bear-like creatures thrive in all diverse habitats —EVEN OUTER SPACE!

Image of Water Bear alongside a nematode taken by Students during SIP 2024-25 'To explore Abundance of Soil Nematodes in Campus of Maitreyi College, University of Delhi' under mentorship of Dr. Shilpa Bharti and Dr. Jaspreet Kaur.

Tardigrades in Space: The True Tiny Astronauts

During the 2007 FOTON-M3 mission by European Space Agency (ESA), Tardigrades made history by becoming the first known organisms to survive the direct brutality of outer space where most life forms would instantly succumb to death due to extreme vacuum and elevated temperature caused by cosmic radiation.

Their resilience was tested further again in 2019 when they were sent along with the Beresheet lunar lander, which shored up the idea of them surviving beyond Earth. Their outstanding survival has ignited a debate among astrobiologists and renewed interest of scientists in the idea that life might travel between stars on asteroids and meteoroids, possibly colonizing other planets as well.

What Makes Tardigrades So Indestructible?

True strength of these tiny little creatures lies in their mind blowing ability to enter a cryptobiotic state, which means that they suspend all their metabolic activities, effectively halting time until conditions become favourable for survival again. Their extraordinary survival mechanisms involve:

1. Tun State: Under unbearable conditions they retract their legs and shrivel into a dehydrated form called tun while halting their metabolism which helps them survive decades without any nutrient uptake.
2. Sugar Shield: Replace water in their cells with trehalose sugar preventing internal damage from dehydration.
3. DNA Repair System: They are resistant to mutagenic threats as they can repair DNA damage.
4. Protective Proteins: Groundbreaking discovery that Tardigrades can produce Damage Suppressor (Dsup) which protect DNA from radiation and oxidative stress, has led scientists into investigating its potential applications for radiation therapy and space travel.

Fun Facts About Tardigrades!

- They can survive temperatures ranging from -272°C (just above absolute zero) to over 150°C.
- Tardigrades withstand pressures six times greater than those at the bottom of the Mariana Trench.
- They have survived being boiled, frozen, irradiated, and even blasted into space.
- Some species of this Phylum can live over 30 years without food or water!
- They have existed for over 500 million years, surviving all five mass extinctions.

Conclusion: The Ultimate Survivors of Life

Tardigrades are not just fascinating organisms; they provide valuable insights into various scientific fields while redefining our understanding of life boundaries and opening a gateway of rethinking the scope of life beyond Earth, creating more possibilities of discovery in space exploration, human survival research and the

existence of extraterrestrial life.

As students, future scientists and educators the Water Bear sets a perfect example that there is so much more to discover and live through. Maybe life beyond Earth isn't the classic green alien but a tiny, indestructible Tardigrade happily waving at us from another planet!

Personal note :

Discovering a fuzzy looking microscopic creature during a Research Project on Nematode left me intrigued and inclined towards finding more and more about it, for all the fellow students out there, do not limit your scope of research there is so much to explore & so much to learn more about. Curiosity could be the best motivator for your inner researcher.

Link to video of Water Bear found during the Project : https://drive.google.com/file/d/1EPxROP_vVyZP0crdWU6ABSZxJ_wQp8FI/view?usp=drivesdk

Water Bear Image taken using Cilika BT-E(2021), upright brightfield, benchtop tablet microscope during SIP 2024-25 under mentorship of Dr. Shilpa Bharti & Dr. Jaspreet Kaur, Department of Zoology, Maitreyi College.

Water bear (Tardigrade), *Hypsibius exemplaris*, scanning electron micrograph by Bob Goldstein and Vicky Madden. Creative common photo link: https://commons.wikimedia.org/wiki/File:Waterbear.jpg

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Riddle me this!

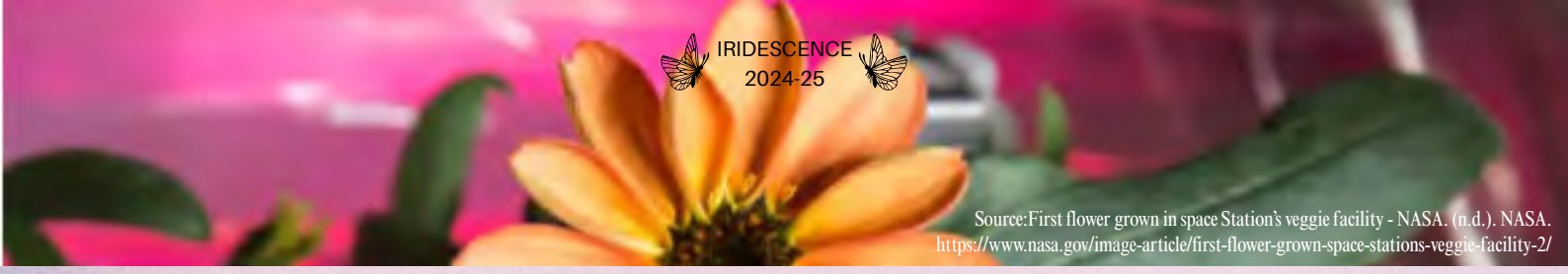
I'm not a place but within me, life's energy I set free, with cristae that fold, a story of ATP told. What am I?

Answer on page 77

I can live on land and in water, with a life cycle two-fold. What am I?

Riddle me this!

Answer on page 77



Source:First flower grown in space Station's veggie facility - NASA. (n.d.). NASA. https://www.nasa.gov/image-article/first-flower-grown-space-stations-veggie-facility-2/

ZINNIA

A Life Story

Hello there! you must be wondering what is this article about? The title suggests, "Zinnia: A Life Story" what you are actually imagining it to be? Someone's life journey? Yes! that's right my friend, it is indeed a life story- more of a "fairy tale" for the geeks like us.

Here it's not 'someone's' journey, it is rather a journey of a flower called as Zinnia elegans from earth to 250 miles above sea level, aboard International Space Station (a large spacecraft with an orbital inclination of 51.6 °, serving as a unique science laboratory and a home away from mother Earth, where crews of astronauts and cosmonauts live).

Zinnia is the very first flower that bloomed in outer space as a part of the veggie facility aboard ISS under the experiment started in 2015 by NASA astronaut Kjell Lindgren. Then on Jan. 16, 2016 Commander Scott Kelly shared photographs of a blooming orange Zinnia flower writing, "Yes there are other life forms in space" giving humanity a visionary that "if we want, we can" .

That's right, our scientists are conducting research and studying plants in space since the 1970s, giving us a perspective to understand how plants develop in orbit, how to grow crops off the Earth, how laboratories are set up in order to create an ideal environment for crops to grow in order to accomplish the idea of space vegetation so that the food supplies to astronauts become easy for long space flights to various missions beyond our Planet. What if Alyssa Carson (an American space enthusiast) and her crew are able to grow their own crops when they land on Mars, becoming the first ever crew to do so!? Well of course! in the light of NASA's upcoming mission to spaceflight humans to Mars, set to run in 2033. This may sound surreal as of now, but may soon turn into reality with the ongoing efforts of researchers. The Zinnia has given a ray of hope for the space research studies.

It was for 60 days that Zinnia was grown with a focus on seedling growth and development in space, as well as for the make up of microbial flora aboard ISS, providing scientists an exceptional opportunity on Earth to understand how plants grow in microgravity (a condition in outer space in which people or objects appear to be weightless. Such experiments are carried out in simulated environments to understand the space conditions effectively.

During his experiment, late in December, Kelly found out

Source: Lewin, S. (2016, January 19). A garden grows in space: first Zinnias bloom, to astronaut's delight. Space. https://www.space.com/31658-zinnia-flowers-bloom-in-space-photo.html

that Zinnias "weren't looking too good" and mentioned to his ground team that, "You know, I think if we are going to Mars, and we were growing stuff, we would be responsible for deciding when the stuff needed water. Kind of like in my backyard, I look at it and say 'oh, maybe I should water the grass today', I think this is how this should be handled".

Then unlike most of the science operations follow ups who prepare pages and pages of detailed procedure guide, the veggie team here on earth prepared just a basic one-page guide what was called "The Zinnia care guide for the On-Orbit gardener" for Kelly to support him as an autonomous gardener while putting judgment capabilities into the hands of the astronaut who has the plant in front of him.

Luckily, the guide worked, Zinnia got all the love and care it deserved despite being grown in the condition not very suitable, unlike its natural habit. The flower then on January 12th showed the first peek of petals beginning to sprout on a few buds.Soon after, in January 2016, NASA via astronaut Scott Kelly shared it's instagram post showing an image of a brilliant orange Zinnia growing aboard the international Space Station, marking a milestone in space gardening.

Read the Image description given by NASA, it truly captures the beauty of a living form found in the empty 'space': "A close-up of a zinnia flower in space, with its light-orange petals in full bloom. Its tangled leaves extend up into the top-left corner of the photo. Behind the flower, the Earth can be seen out-of-focus, with the

blackness of space taking up most of the image's bottom half."

You might be wondering How is Zinnia doing right now? How did it make it in space? Does it require similar nutrients as the plants on earth? Is Zinnia an answer or a question to space research? Well, all these questions need to be asked.

We need to explore. Our curious mind is eager to ask questions, even the dumbest of questions, the only thing we need to find relevant answers for them using experimental theoretical studies I guess so, just go ahead and just ASK and do whatever it takes until you find what is meant to be found, and viola EUREKAAAAA!! And just like that you'll be living your Archimedes moment.

BYEE!!

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III Year

Thirty white horses on a red hill,
First they champ,
Then they stamp,
Then they stand still.

Answer on page 77

I signal change as you grow and learn, my chemicals help your body turn. From child to adult, I guide your way. What am I, making things sway?

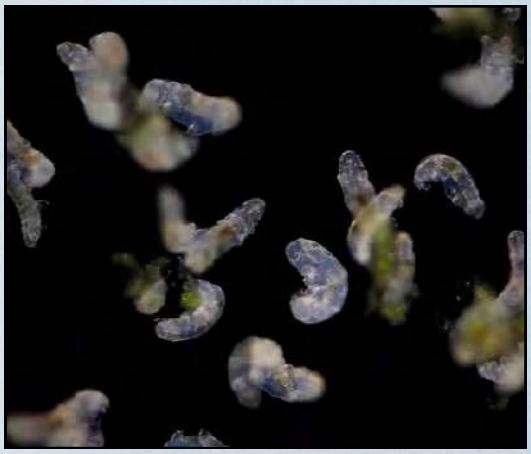
Answer on page 77

Source: Canva Images

SURVIVAL AGAINST THE ODDS

Intense heat, freezing cold, radioactivity our conditions that are not hospitable for life but some organisms not only survive but thrive in such conditions.

They are called extremophiles; extreme lovers. They have unique adaptations that allow them to survive in such harsh habitats. These organisms live in exceptionally harsh environments like in hot hyperthermal vents buried in rocks and beneath the Earth's surface. Extremophiles occur in all three domains of life which is bacteria, Archae and eukaryotes. They range from extreme heat loving organisms called thermophiles which feed off of inorganic chemicals and survive in up to 180°F waters to extreme cold loving psychrophiles. Psychrophiles live in all permanently cold habitats on earth and can survive in waters as low as -12°F, they have evolved antifreeze protein to survive in such conditions. But the most extreme living things on earth are tardigrades. Tardigrades also called as water bears are water dwelling microorganisms are polyextremophiles which means they are capable of surviving in multiple harsh conditions. They have even survived in outer space. Tardigrades have unique adaptation where they curl up into dry, seamless lifeless ball to reduce the metabolism rate and survive.



Source: Extremophiles 101. (n.d.). https://education.nationalgeographic.org/resource/extremophiles-101/

Studying the adaptations of extreme of fies and health to solve many earth's problems. This can help in creating new type of biofuels, genetically based medications and protecting people against radiation exposure etc. The study of extremophiles opens human minds about possibilities of life and the environment.

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Riddle me this!

I transmit signals so you can understand the world around you. Who am I?

Answer on page 77

Source: Canva Images

ALCANIVORAX BORKUMENSIS

Hi! people, let's explore something cool together! Picture this: a microscopic superhero, fighting pollution and protecting the planet. Imagine a microbe that can thrive in harsh conditions of the ocean floor, feeding on oil and toxic chemicals. Fascinating right? Welcome to the incredible world of Alcanivorax borkumensis, a microbial marvel that's redefining our understanding of life on Earth."

Alcanivorax borkumensis is a non-motile, rod-shaped bacterium that belongs to the order Oceanospirillales within the class Gammaproteobacteria and lives in salty environments like ocean water. It lacks flagella and primarily derives its energy from consuming alkanes, a type of hydrocarbon. This bacterium needs oxygen to survive (aerobic) and has a thin cell wall.

Discovered near the island of Borkum, Alcanivorax borkumensis was identified by researchers from the Helmholtz Centre for Infection Research and the Technical University of Braunschweig. In 2006, they, along with the University of Bielefield, determined the base sequence of the bacterium's genome.

Alcanivorax borkumensis plays a crucial role in bioremediation efforts to clean up oil spills.

This discovery has helped scientists understand how Alcanivorax borkumensis thrives in oil contaminated waters, playing a crucial role in bioremediation. Now, let's explore the bioremediation techniques that make this possible.

Bioremediation is an eco-friendly approach that utilizes microorganisms to break down complex oil spills into harmless compounds. It effectively degrades hydrocarbons found in crude oil, especially when provided with sufficient nitrogen and phosphorous, allowing it to thrive in oil-contaminated seawater. Bioremediation techniques, such as biostimulation and bioaugmentation, have proven effective in mitigating oil contamination particularly, in marine ecosystems. Both methods play a crucial role in enhancing the bioremediation of hydrocarbons in the marine environment.

Biostimulation is a technique that enhances the activity of naturally occurring microorganisms in the environment. This is achieved by adding various forms of essential nutrients and electron acceptor or other substances that limit microbial growth. The goal is to stimulate existing microbial population to degrade contaminants more effectively. It is advantageous because it utilizes native microorganisms that are well adapted to the specific environment and are evenly distributed throughout the area. While biostimulation enhances microbial populations, bioaugmentation involves introducing additional microbes to further accelerate the degradation process.

Bioaugmentation involves introducing microorganisms into a contaminated site to enhance the degradation of pollutants, such as petroleum hydrocarbons. These microorganisms can be sourced from the site itself, a similar historical site, or be genetically modified. For augmentation to be successful, the inocula must consist of microbial strains or communities well adapted to the contaminated site. While foreign microorganisms can be effective, their success depends on their ability to compete with indigenous microorganisms, predators, and various abiotic factors. Microbial proliferation is influenced by chemical structure and concentration of pollutants, as well as environmental conditions.

Due to its efficiency and environmental benefits, bioremediation is widely regarded as the most viable and scalable approach for cleaning up major oil spills in the ocean.

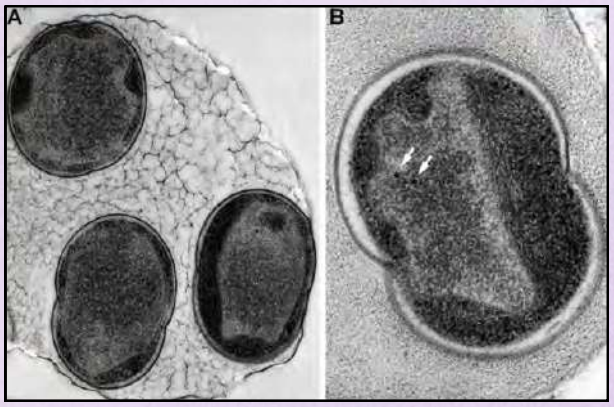
One of the most fascinating abilities of A. borkumensis is its production of biosurfactant, a special oily substance that help in breakdown of oil in seawater. They play a vital role in breaking down oil because they lower the surface tension of the water and function as natural emulsifiers, helping to release oil from water so that they can be biodegraded. The bacteria creates a biofilm around the oil and use these biosurfactants to convert the oil into water soluble substances that can help in cleanup process.

Currently researchers are exploring ways to enhance the growth of A. borkumensis by adding phosphorous and nitrogen fertilizers. However, this approach carries the risk of further polluting the water.

They are also investigating the possibility of isolating

and transferring the genes of A. borkumensis into other other organisms for oil spill remediation. This genetic engineering technique, while promising, also carries the risk of creating unintended consequences, such as rapid DNA evolution or release of harmful, dominant bacterial stains that could lead to disruption of natural balance of ecosystem. As research in microbial biotechnology advances A.borkumensis continues to unlock new possibilities for sustainable environmental restoration. With every discovery, we move one step closer to harness nature's original solution for a cleaner, healthier environment.

"So, stay curious people, and let's keep exploring the incredible wonders of science together!"



Source: File: Alcanivoraxbork.jpg-microbewiki.(n.d.). https://microbewiki.kenyon.edu/index.php/File:Alcanivorax_bork.jpg

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III Year

Riddle me this!

Across the ages, I'm life's changing face; the reason you're different, from the rest of the human race. What am I?

Answer on page 77

Riddle me this!

I start with plants, then come to the prey, passing energy in a vital relay. From sun to you, through every bite, what am I, connecting life's light?

Answer on page 77

Source: Canva Images

DREAMY COSMOS

Life Beyond Earth: What the Search for Extraterrestrial Life Tells Us About Our Own Bioverse

For an entirety of humanity, we have always been curious about the "other species", the other entities that may or may not exist in an antiparallel world. The inner urge to discover extraterrestrial life is not only one of the most exciting and intriguing parts of science but also the one that stretches our understanding of life beyond our limit. The search for alien life, whether in the form of microbial organisms on Mars or intelligent beings on distant exoplanets provides deep insights not just into the universe but into the essence of our very own life on Earth. Our question often shifts from "Is there any life out there?" to "What does the possibility of having life beyond Earth teach us about life within our own bioverse?"

The Cosmic Question: Is Anyone Out There?

Since ancient times, astronomy has been one of the most intriguing parts of science that has kept people on toes to explore the after world or life on other distant exoplanets. Whether it's Greek philosophers who speculated about the other world or modern scientists like Carl Sagan that revolved their life around search of life. Well, obviously, it's not only scientists who are very eager to know about the cosmic world, but the possibility of extraterrestrial life has picked interest in every being of humanity's imagination. Now, only having a dreamy picture about the cosmic world is not going to solve the issue of searching for life; thus with the advent of powerful telescopes, space exploration missions and AI driven data analysis tools is what made today's search for aliens a little possible.

Various organisations, whether private or government funded, are in a race of who is going to find the "unknown entities" first. Currently, NASA's Perseverance rover roams the surface of Mars, searching for life that may have existed when the Red Planet had water flowing on its surface. The discovery of thousands of planets orbiting stars outside our solar system, famously known as exoplanets, has opened up entirely new frontiers in the search for life. Many scientists have speculated about the planets in a "habitable zone", where conditions are just right for life to thrive. The very thought of the cosmic world, that life could exist beyond our blue planet, is not only humbling but thrilling too.

The Redefinition of Life: Expanding Our Definition of Biology

Now as we go deep and deep into the cosmic world, as our search for life expands, one thing becomes clear; our definition of life is too narrow. Well in order to find other forms of life, it is essential to broaden our very own definition of what constitutes a living organism because from our understanding, on Earth life is based on carbon, water, and DNA; thus there is a gap in our understanding as well. There is a possibility that alien life forms could have been built entirely on different biochemical structures, maybe by silicon instead of carbon and liquid methane instead of water. Such questions probe us to think out of the box and ask what life really is? NASA's search for extraterrestrial life is about redefining biology itself and does not limit to just finding an alien species. This encourages us to explore extreme environments on Earth; be it places like deep-sea vents, acidic lakes, and deserts, where life thrives in conditions beyond humans' imagination. These organisms, famously referred to as extremophiles, show that life can adapt in ways we never thought possible. In a similar way, alien life, if it exists, might have features and biochemical structures, adaptability that we can barely imagine.

The Search for Life as a Mirror to Our Own Bioverse

From the little bacteria that are not even visible to the naked eye to the largest mammals, life on Earth is not only abundant but also amazingly varied. This race of finding life beyond earth also invites us to ponder on the incredible diversity that our very own planet offers - the Bioverse, as we often call it. Now, when we talk about diversity, it's not limited to one genre or as we often link it with nature and greenery etc, but diversity from planets communicating through chemical signals, animals that migrate continents, to fungi that forms vast underground network that connects the entire forest, now this is truly fascinating and something that our humanity take very lightly. Thus, this immense biodiversity on Earth makes us wonder that maybe this

similar type of biodiversity might echo in the wild. Now, though life on Earth is resilient, the ecosystem it depends on is not immune to change, but it also makes us realize how fragile life on Earth is. The search for extraterrestrial life is not just an academic achievement or some credits to scientists -it also raises important questions about the future of life on Earth. There are a number of questions that this particular insight en-routes in us like whether alien life provides new insights into how to preserve our very own planet's biodiversity?

A Unified Vision: The Implications for Earth's Future

Finding life outside of Earth would be one of the most breakthrough discoveries in human history, but as we frequently believe in our daily lives, the trip changes us, so whether or not we find life, the quest teaches us a lot about our existence. It reveals that all kinds of life are part of a much larger cosmic story involving galaxies, stars, planets, and moons. As we stare high into the sky, contemplating other galaxies and planets, we are also encouraged to look closer to home, acknowledging the beauty and fragility of life on our own valuable and precious Earth.

Conclusion: Embracing the Infinite Possibilities

The entire article does not ponder on how scientists are extensively researching not only on life beyond Earth, but it is a journey that will bring us closer to understanding our place in the universe. The more we learn about life beyond Earth, the more we will understand the simplicity, complexity, and vulnerability of our very own planet. As we continue our exploration into this dreamy world of cosmos, it's very important to not forget our roots and take every step possible to protect the gift of the universe we are blessed with- the Bioverse. There should be a sense of commitment to protect what nurtures us and sustains life on Earth.

The search for the cosmos will continue in this grand tale of what we call life, but it is just one chapter-a chapter that promises the revelations of new dimensions of biology and pushes the limit of our understanding.

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II Year

I'm folded and twisted, but don't be distraught-
I carry the codes that your body has taught. What am I?

Answer on page 77

How many tickles does it take to make a squid laugh?

Answer on page 77

Source: Canva Images

SPADEX:

Sparking India's next space Odyssey

ISRO has launched the Spadex mission on 30th December 2024, from Satish Dhawan Space Centre By a PLSV rocket. Two satellites SDX01 (SpaDex -A) and SDX02 (SpaDex-02) each weigh around 220 kg injected into two different orbits. SPAdex technology or commonly known as space docking technology, is a process of connecting two free-flying aircraft in space join each other to transfer people to one to another. These satellites possess the unique capability to unite or separate into two distinct pieces in space. These two components, referred to as the chaser and the target, will subsequently rendezvous and dock together, effectively combining to create a unified satellite. This pioneering technology, involving the separation and reunification of satellite components, marks a novel advancement in India's space exploration endeavors.

After docking and undocking both satellites SDX01 (SpaDex -A) and SDX02 (SpaDex-02) will separate and work independently with different objectives. SDX01 has a high Resolution Camera (HRC) with a 4.5 meter Instantaneous Geometric Field of View from a 450 km altitude. This will act as a surveillance camera from Space. Whereas SDX02 has miniature multi-Spectral Payload (MMX) and Radiation Monitor (RadMon) payload.

With this new space venture, ISRO hopes to pave the way for new innovative satellite machines and functions.

SPAdex for Bhartiya Antariksha Station

This technology serves as the initial building block for the Indian Space Station, also referred to as the 'Bhartiya Antariksha Station.' The first module of the station is planned for launch in 2028, utilizing the LVM3 rocket.

Every space station is constructed through the assembly of smaller units that are docked together to form a larger structure, a process observed in the construction of the International Space Station (ISS). With the application of this technology, ISRO aims to finalize the construction of the 'Bhartiya Antariksha Station' by the year 2035. This involves integrating all modules dispatched by ISRO from Earth between 2028 and 2035.

SPAdex for CHANDRAYAAN-4

A crucial component of this mission involves the application of SPADEX technology, which facilitates the docking process. This technology is instrumental in coordinating the rendezvous between a spacecraft, launched from the lunar surface post-sample collection, and the sample return module orbiting in space, ensuring the successful transfer of lunar samples.

SPAdex for GAGANYAAN-2

Gaganyaan 2 is planned to send Indian astronauts to the Bhartiya Antariksha Station after its expected completion in 2035. The mission also includes the ambitious goal of landing humans on the moon in collaboration with NASA's Artemis moon base, with a targeted timeline set for the year 2040. Here, SPADEX technology will be utilized for docking spacecraft with both the Indian space station and the Artemis moon base.

The budget for SPAdex mission is 124.68 crores. This budget covers the cost of developing and launching a spacecraft as well as cost and operations for ground work. SPAdex will open new paths for space expeditions. It will be able to transfer humans from one spaceship to another in space, refuel a spaceship in air and replace a part of an existing spaceship in orbit to name a few. This split-up and united technology has the potential to revolutionize the way satellites are launched and operated. In the past, satellites have been launched as single, monolithic units. This has made them difficult and expensive to repair or upgrade. With the split-up and united technology, satellites can be launched in smaller pieces, which are easier and cheaper to transport. If a satellite needs to be repaired or upgraded, only the affected piece needs to be replaced.

This can save a significant amount of time and money.

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Source: Canva Images

NEURALINK

Workings of Brain-Computer Interfaces And The Ethics of Trials

In 2019, the Elon Musk company, Neuralink released their first ever design for a brain-computer interface- a wired, battery powered electrode which could be implanted in the brain and would measure action potentials or 'spike' in the neurons. In 2020, a wireless version was released and was found capable of recording up to 1024 spikes in real time. This was tested on a pig named, "Gertrude" whose sensitive snout when touched would send up sensory cues in the neurons which could be readily transmitted to a screen as the synapses in the brain occur recorded as "beeps and dots".

Gertrude is a female pig and was chosen particularly for this trial due to the highly sensitive olfactory systems in pigs, especially female pigs after mating. Pigs possess olfactory bulbs at the front of their brains which contain axons that cross the lamina cribrosa from the olfactory mucosa layer of their brains which is possibly where the neuralink was implanted in order to test for spikes.

Soon after that the N1 Link chip was implanted in the motor cortex region of a macaque monkey, named Pager's brain. The motor cortex is responsible for the conduction of synapses that would enable voluntary movement. Macaque's possess motor cortices that are very similar to that of humans and this allowed for accurate testing before human trials. In a motor cortex, the thought, plan and initiation of such a movement is recorded. Mortar cortex neurons are largely directional, that is when a movement is being made, it's direction is already decided in the electrical impulses of the neurons which is what allowed neuralink to track the monkey's movements in the game. Pager was made to play the game MindPong paddle using a cursor. As the monkey moved the cursor upwards, strong peaks in graphs were observed showing that the neurons responsible for shooting upwards fired more synapses and vice versa for downward movements of the cursor.

The latest Link tested was under the PRIME study, conducted so far on 2 patients, victims of quadriplegia- a condition of partial or complete paralysis from the neck down. After successful surgeries of implanting the N1 Link in the precentral gyrus of the brain- the part responsible for voluntary movements, the subjects were able to control their laptop, applications like CAD for designing, play chess and other video games just as well as a non-quadrapleigic person.

In an axon of the neuron, ionic movement is observed in a mexican-wave sort of pattern. The cell membrane of a neuron is permeable to various ionic channels like Na^+, K^+, Ca^{2+} and Cl^-. these ions move in and out of the membrane thus fluctuating the cell voltage or it's potential. When no ions are being transferred, ideally, the outside of the membrane is more positive than the inside creating a negative gradient of -70mV on the inside of the axon and this is called the cell's resting potential. the sodium-potassium pump, or the Na^+/K^+ ATPase is responsible for opening sodium or potassium channels, increasing the influx of the respective ion in the following process:

The ion, Na^+ moves from the outside into one part of the axon which creates a positive gradient within the cell causing more Na^+ ions to move into the next part of the axon and so on until the ions travel all the way down to the dendrite- this is called depolarization. Alongside this, repolarization occurs when K^+ channels open and K^+ ions enter into the axon and move down the neuron in the same pattern. This gradient of charges will lead to a sudden surge in voltage momentarily producing a 'spike' or an action potential. As soon as the action potential reaches the terminal of the neuron, a Ca^{2+} channel is opened and a surge of calcium ions allows the release of different neurotransmitters (ions) into the synaptic cleft, which is the empty region between two neurons measuring about 20-30 nm. This signaling continues throughout the neurons eventually sending signals to other parts of the body. In the case of neuralink trials, motor neurons send signals to muscle cells and nerves in order to provoke a voluntary movement even in case of quadriplegic persons.

The neuralink L1 chip was embedded in the primary motor cortex on the frontal lobe of the brain. The motor homunculus part contains a map of the motor control with specific neurons in the precentral gyrus controlling different parts of the body like, upper region has neurons that have motor control of the foot, leg, and thigh, and the lower region contains the motor control for the gluteal area, trunk, upper extremity, hand, digits, and head. Damage to this region causes paralysis but with the help of the neuralink chip, neural signaling in this region is read through the action potentials,

electrical signals are converted to digital ones and transmitted to an external device like a computer or a mouthstick etc. to help with daily movements or controlling devices.

All these examples of trials and testings, beg the question- is it ethical to test neural devices such as Link chips on animals as well as humans?

Neuralink has tested its technology on pigs and macaque monkeys, raising significant ethical concerns about animal welfare and research transparency. Biomedical research often relies on animal testing, and neuralink argues that they are not unique in this aspect. However the risks of implanting neural chips through robotic surgeries do raise the questions of risks involved. Post-surgery stress or damage to an animal's lifestyle could be valid arguments. Even though the chips are made of physiologically compatible materials relative to human and animal brain environment they still raise concerns since the company has not been fully transparent about trials.

The primary reason for choosing pigs was their superior olfactory systems and the macaques for their highly similar motor cortices as compared to humans but the idea of animal testing simply based on their similarities to humans outweigh their possible suffering?

Arguments could state that the use of 3-D brain organoids or AI- and LLM Models could provide more accurate results without the damage to animal health and care.

While the BCI industry holds promising plans on advancing medicine, helping patients with dementia, detecting cancer, curing motor-sensory diseases, it also raises ethical concerns on animal testing, human trials and wether all this advancement would eventually prove to be worth it all?

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I may seem like a traveler's balance, but in cells, I'm the process ensuring substance. What am I?

Answer on page 77

I carry oxygen and ride your flow, Without me your strength would go. Who am I?

Answer on page 77

Source: Canva Images

A JOURNEY INTO NATURE'S HIDDEN MELODY

A Journey into Nature's Hidden Melody

Long ago, on a chilly spring morning, the woods came alive with the unmistakable sounds of birds singing. Melodious sounds were played in the air to generate a mesmerizing music that spirited the forest environment. For ages, humans have been mesmerized by these songs, but behind every note lies a fascinating story- a hidden world where Science and art come together.

The Hidden Science Behind Birdsong

The story begins not in the trees, but deep inside the bird's body, where a tiny structure named the syrinx exists as the first point from which a bird's biological processes become integrated into the story. So come with me to learn about intelligent sound creation. Among human's single voice box named the larynx is present, but birds possess double voice organs. Located beneath the trachea, the syrinx stands as an extraordinary organ that no human could create. A passing airflow through the organ makes the thin membranes inside the syrinx start vibrating. The bird controls its sound waves through exact control of the membrane vibrations that produce sound waves. Changes in the pressure of the syrinx membranes enable birds to regulate pitch, whereas volume control originates from forceful exhalations.

The complicated system of song transmission still leaves some unexplained aspects. The process can be fully understood when we dive into the brain structure of the bird.

The High-Level Control nucleus (HVC) inside the brain stores the song sequence data that determines the vocalisations of birds. This part of the central nervous system functions as a musical composer that outlines each musical piece. The song composer oversees the melody creation but fails to perform the song itself. The brain part that holds the song's blueprint transfers it to the Nucleus RA. The real miraculous process takes place here. The RA neurons transform the processed song sequence through motor commands to control the bird's vocal muscles. Short but powerful RA neuron activations lead to smooth sound production similar to how a conductor maintains symphonic balance. After the HVC-RA connection, the brain maintains its control over bird song generation.

Source: Canva Images

Neural patterns display a degenerative property that enables multiple distinct firing patterns to result in identical final outputs. The spare system functions as a successful system that maximises song learning effectiveness for young birds despite early belief in malfunctions. The capability of a bird's brain to make the same sound using different sequences creates more opportunities for exploration during learning. Song learning demonstrates adaptability because birds develop the ability to improve their songs through time.

Learning to Sing- A Bird's Developmental Journey

Birds need to discover their singing abilities during a specific developmental timeframe. Young birds cannot start their species' melodies from birth, so they must learn everything from their older peers. At such times, their brains function like sponges while processing the ambient sounds. Beyond the boundaries of their species, the birds occasionally receive education. Throughout its travel between Europe and Africa, the marsh warbler learns songs from up to 70 different bird species.

The Purpose of Birdsong

Bird songs primarily serve to attract mates and defend their territories.. That is why we can hear birds singing loudest during spring and mostly in the morning when there is less background noise. The male bird sings to demonstrate his good health status by showing his superiority to female birds searching for mates. Through his singing, he both attracts possible partners and defends his territory from other males in the area. When birds use calls, they signal about the locations of food as well as alert about predators and direct group coordination during daily activities.

Regional flavours- Discovering dialects and patterns

Birdsong is not universal. White-crowned sparrow birds develop unique song types based on their geographical location because their song patterns are linked to specific regional areas of their habitat. The distinct bird songs across different regions serve as evidence of how birds share the same nature of human accents.

When we hear bird songs, we observe more than audibly pleasant transmissions. The environment holds remarkable mysteries regarding birds' capacity to manage both pitch and volume while also producing multiple sounds at the same time.

The musical expressions reach beyond their basic purpose as pleasant tunes. Research on birdsongs particularly, zebra finches give scientists the ability to discover brain patterns which create those captivating songs.

Birdsong represents a natural wonder that keeps drawing attention from humans worldwide. The birds use each note to disclose about their complex environment, which combines sounds with biological functions. Every time you hear a bird sing, take a moment to listen to it more intently. Beyond the song's auditory layer, the songs tell stories of societal progress and informational growth.

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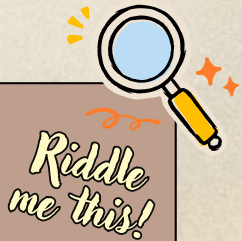
I can be animal, plant, or even a blob; look close enough, I can do quite the job. What am I?

Answer on page 77

I'm a green machine that makes food from light, I'm inside the plant, out of sight. What am I?



Answer on page 77

Source:Search.(n.d.).WellcomeCollection.
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A TALE OF TWO HEARTS!

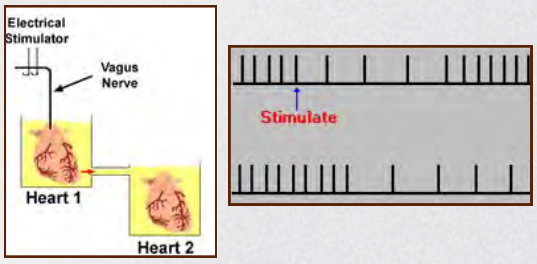
There is immense potential with our subconscious mind and it has been beautifully explained in the best seller 'The Power of Your Subconscious Mind', by Dr. Joseph Murphy. But, did you know that the subconscious mind is also credited with some of the major breakthroughs in science?

Let's find out about one of these fascinating discoveries. I call them fascinating not simply because they proved to be significant in the development of science but because the way they were conceptualised, that is in the dreams of their discoverers with their subconscious mind at work.

The discovery of chemical messengers which transmit nerve impulses across the nerve junctions by a German physiologist and pharmacologist- Otto Loewi (1873—1961) is quite interesting. On a saturday night of 1921, Otto dreamt of an experiment which provided fundamental understanding in neuroscience and also bagged him a Nobel Prize. As he awoke in the middle of Saturday night, he hurriedly started scribbling his notes about the outline of the experiment he had dreamt about. But, sadly, he was not able to picture it to the perfect clarity from his scribbles. He desperately spent his entire Sunday reconstructing his 'dream experiment' but to no avail.

Finally, as he fell asleep on Sunday night, he again dreamt of the same experiment. This time, as he awoke, he could neatly write down the elegant experiment set up. Then he immediately rushed to his laboratory at 3 AM to conduct the entire experiment which he completed by 5 AM, Monday, 1921. The visionary experiment consisted of isolating two frog hearts, one with its nerves (vagus nerve) attached (heart#1) and the other one without nerves (heart#2).

A cannula was inserted in each heart which was filled with a saline solution (Ringer solution). This solution maintains the normal activity of the heart for a few hours. Then, the electrical stimulation of vagus nerve attached to first heart (heart#1 or the donor heart) caused it to slow down but heart#2 (recipient heart) started beating.



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So, he hypothesized that since the two hearts were not connected through nerves, it was not the direct contact of nerves which made the second heart start beating; instead, some chemical must have travelled through the Ringer solution (secreted by nerves) which stimulated the heart beat of the second heart (Figure 1). Otto named the chemical as "vagusstoff," which was later chemically deciphered acetylcholine.

Dr. Loewi has penned about his discovery in From the Workshop of Discoveries, Lawrence: University of Kansas Press, 1953 as:

"In the night of Easter Saturday, 1921, I awoke, turned on the light, and jotted down a few notes on a tiny slip of paper. Then I fell asleep again. It occurred to me at six o'clock in the morning that during the night I had written down something most important, but I was unable to decipher the scrawl. That Sunday was the most desperate day in my whole scientific life. During the next night, however, I awoke again, at three o'clock, and I remembered what it was. This time I did not take any risk; I got up immediately, went to the laboratory, made the experiment on the frog's heart, described above, and at five o' clock the chemical transmission of nervous impulse was conclusively proved."

This tale of two hearts emphasizes the power of our subconscious mind. So, next time, if you find it difficult finding a solution to a problem or a thought which is bothering you, just 'sleep over it' and let the magic of the subconscious mind happen.

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Source: Canva Images

BLUEBOTS: UNVEILING OCEANIC MYSTERIES

The ocean, covering over 70% of our planet, holds mysteries that have fascinated humans for centuries. Yet, over 80% of its depths remain uncharted, hidden beneath crushing pressure, freezing temperatures, and perpetual darkness. For decades, these extreme conditions made deep-ocean exploration nearly impossible for humans. But today, a new generation of underwater robots is diving into the abyss, revealing secrets we once thought were beyond our reach. From remote-controlled explorers to autonomous gliders, these machines are tools and pioneers reshaping our understanding of the ocean's role in climate, biodiversity, and even human history.

At the forefront are Remotely Operated Vehicles (ROVs). These robots are tethered to vessels by thick cables that transmit power and commands from the surface. Equipped with high-definition cameras, robotic arms, and sensors, ROVs act as extensions of human operators, who can "touch" the deep ocean from the safety of a boat. These robots have explored iconic sites like the Titanic wreck, delicately assessing its decay without disturbing the fragile ecosystem around it. They're also workhorses in industries like oil and gas, inspecting pipelines for cracks or installing equipment miles below the surface. Meanwhile, Autonomous Underwater Vehicles (AUVs) take exploration a step further. Programmed with missions in advance, these untethered robots glide through the water on their own, mapping vast stretches of the seafloor, tracking mysterious ocean currents, and even discovering bizarre new species in the pitch-black trenches of the deep.

One of the most ingenious designs is the underwater glider. Unlike propeller-driven robots, gliders move by shifting their buoyancy, sinking and rising through the water like a mechanical penguin. This slow, graceful movement uses minimal energy, allowing them to patrol the ocean for months. These silent observers collect critical data on rising ocean temperatures, shifting salinity levels, and the spread of micro-plastics, offering scientists a clearer picture of how climate change is reshaping marine ecosystems. Another advance comes from nature itself: bio-inspired robots. Engineers have created robotic fish that flutter through coral reefs, blending in with real marine life. These lifelike machines study species such as groupers or schools of tuna without causing fear or disruption, providing insights into animal behaviour that was impossible to capture otherwise.

The impacts of these robots go far beyond exploration. They track the health of endangered species, monitor illegal fishing activity, and document the slow recovery or collapse of coral reefs in marine conservation. After an oil spill, robots equipped with chemical sensors map the spread of pollution, guiding remediation efforts in real-time. Archaeologists use them to scan ancient shipwrecks, creating 3D models of sunken treasures without risking damage from human divers.

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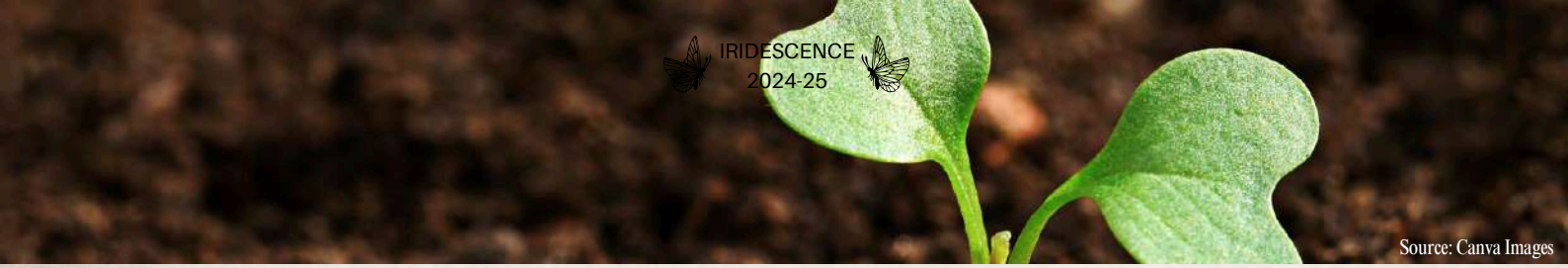

Source: Canva Images

MICROCOSM

The Hidden World of Soil Microbes

Soil contains an incredible number of microbes. The seed of a healthy soil may harbour billions of microorganisms, each with a specific functional contribution.

Soil microbes are composed of a great variety of species, each with specific roles. Bacteria, for example, are very good at decomposing organic material, whereas fungi are very good at establishing symbiotic partnerships with plants. Soil microbes are ecosystem engineers that modify their physical and chemical environment. They alter soil structure, nutrient availability, and water retention.

Soil microbes are natural recyclers that break down dead plants and animals into the nutrients that are considered most important- carbon, nitrogen, and phosphorus- available for plant uptake. Certain soil bacteria can convert atmospheric nitrogen into forms available to the plant, which raises the levels of that key nutrient in the soil. Certain soil microbes can release phosphorus from minerals, making it accessible for plants and playing a crucial role in their growth.

Mycorrhizal fungi develop mutualistic associations with plants, expanding the plant's root system and facilitating the uptake of nutrients. In return, the plants provide fungi with carbohydrates. Legumes (e.g., beans, clover) are characterized by root nodules into which nitrogen-fixing bacteria grow. These bacteria use atmospheric nitrogen and convert it into a usable, plant form for both the plant and microbes.

Soil microbes play a very crucial role in carbon sequestration. They sequester carbon in the soil organic matter, which aids in climate change mitigation by getting carbon out of the air in the form of carbon dioxide. Methane-consuming soil microbes attenuate methane emissions, a very potent greenhouse gas.

Description

Microbial diversity and biomass of the soil are a proxy measure for soil health and a signal for general ecosystem vigour. Disturbed or degraded soils have less diverse microbial populations. Healthy soils ensure trophic diversity of both plant and animal kingdoms by delivering all the nutrients, cover, and stability at an ecosystem scale. Such activities that can alter a soil ecosystem involve deforestation and intensification in agriculture and urbanisation, all of which make the microbial diversity and functionality decrease. Pollutants from pesticides and heavy metal may degrade soil microorganism and deter their functions as well.

Techniques like rotation of crops, reduced tillage, and covering crops enhance soil microbiological diversity that reduces soil loss. Reducing the use of synthetic fertilizer and/or chemical pesticides reduces the damage to soil microbiota. Establishment of forest as well as wildlife habitats promotes the building of a healthy micro-ecology in the soil. It also serves to promote all life diversity in general.

This underground ecology of microorganisms in the soil is an example of complexity and the integrated nature of ecosystems on Earth. These tiny microorganisms, not visible to the naked eye, play a proportionally oversized role in maintaining the health of our planet. Being custodians of ecosystem health, soil microbes hold the key to the cycle of nutrients, carbon sequestration, and biodiversity conservation.

When we are presently faced with such urgent environmental problems as climate change and biodiversity loss, we need to understand and appreciate the role of soil microbes. It is through sustainable agriculture practices that can mitigate pollution and enhance soil health that we can unlock the potential of these tiny marvels to safeguard the Earth and drive a healthy and robust future for generations to come. This isn't just some unsung heroes of our world in nature, but they are a partner to be assisting us in our urgent endeavours in saving the natural environment.

Science is now focusing on the exploration of using microbes in soil cleanup, providing friendly solutions to soil pollution problems. Recent breakthroughs in DNA sequencing and metagenomics have fundamentally altered our ability to learn about soil microbiomes, showing the enormity of the diversity of microbes and the valuable contributions they provide for soil health. Soil microbes offer a range of novel enzymes, antibiotics, and other bioactive molecules that may have industrial applications in the biotechnology and pharmaceutical industries. International collaborative efforts, including the Global Soil Partnership under the United Nations, are working to promote soil conservation and sustainable land management practices. Policies and

regulations across the globe are protecting soil health through payments for sustainable agriculture. Education programs to increase awareness of the importance of soil microbes can encourage a higher understanding of soil conservation and sustainable land management. Citizen science activities can be mobilized in soil health and microbial diversity monitoring to provide useful data to scientific research.

Conclusion

The future of our societies and the health and survival of our ecosystems rest in the solution found in the unseen world of soil microbes. The ongoing struggle with global problems such as climate change, loss of biodiversity, and food insecurity means that the significance of soil microbes is rapidly surfacing. By adopting sustainable land use practices, reducing pollution, nurturing scientific investigations, and campaigning for soil health policies, we can use the potential of soil microbes to our advantage, both to safeguard our planet and to live in a more sustainable and harmonious way with nature. Soil microbes can be more than caretakers at the tapestry of ecosystem health; they should be important cooperators in our task to protect and preserve the loveliness and range of liveness on our Earth.

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I Year

Riddle me this!

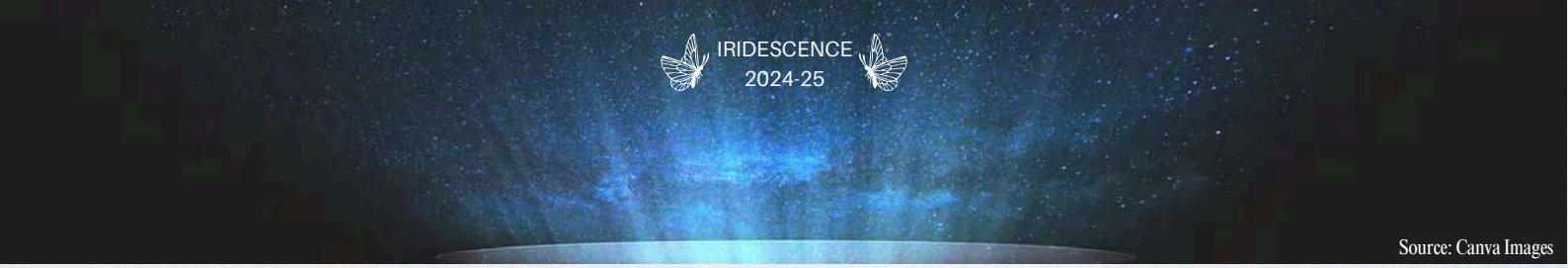
I hold your thoughts, your dreams, your plans, in a wrinkled structure as big as your hands. What organ am I, guiding your quest, in your skull, at the top of your chest?

Answer on page 77

Riddle me this!

I am a nocturnal animal who sleeps upside down.
What am I?

Answer on page 77



Source: Canva Images

BIOVERSE: THE TALE OF LIFE

Fragile Frontiers: Life in Extreme Habitats and the Challenges of Survival

Scientists have been fascinated by the amazing creatures that live in harsh conditions for the past few decades. These creatures, referred to as extremophiles, flourish in environments that are unbearably unfriendly or even fatal to other terrestrial life forms. They flourish in a variety of environments that were once thought to be unsuitable for life, including extremely hot niches, ice, salt solutions, acidic and alkaline environments, and toxic waste, organic solvents, heavy metals, and several other environments. At pressures of up to 110 MPa, extremeophiles have been discovered from extreme acid (pH 0) to extreme basic conditions (pH 12.8), from hydrothermal vents at 122 °C to freezing sea water at -20 °C, and from depths of 6.7 km inside the Earth's crust and over 10 km deep within the ocean.

Life in extreme habitats is challenging and demands extreme conditions for survival, such as sub-zero temperatures, high pH levels, or even scarce resources. Marine animals, microbes, and extremophiles are a few examples of organisms that have withstand these extreme living conditions.

With this new space venture, ISRO hopes to pave the way for new innovative satellite machines and functions.

In this age of severe climate change, the tough conditions in arid regions pose significant challenges to microbial life.

- Rocks as refuge- The endolithic habitat within rocks provides microbial life with crucial benefits such as thermal buffering, physical stability, protection from harmful UV radiation, and moisture absorption essential for their survival.
- Fungal communities in extreme environments- Fungi interact intricately with bacteria and other microorganisms, benefiting both themselves and others, as seen in lichens that support bacterial survival in nutrient-poor conditions. The diverse fungal communities, including black fungi and yeast,
- enhance ecological stability and bolster the resilience of microbial communities in extreme environments.

Survival Strategies of Marine Mammals in Extreme Environments

Despite the sub-zero temperatures, limited sunlight, and scarce resources, marine mammals have remarkably adapted to thrive in these extreme environments, exhibiting exceptional tolerance to cold and stress.

Adaptations enhancing cold tolerance in marine mammals are :

- Thick layer of fat- Blubber, which acts as insulation for seals, helps keep their body temperature stable by preventing excessive heat loss.
- Physiological Adaptation- Changes in blood flow and metabolic processes help to conserve heat during exposure to an extreme cold environment.
- Morphological changes- Changes in body shape and also in size help to minimise heat loss.
- Behavioral changes- Cetaceans especially engage in social activities such as huddling together for food or holding their breath for longer periods in extreme temperatures. Whales often collaborate to find food during times of resource scarcity.

Life Under Snow

Antarctic environmental conditions are very harsh, making it extremely difficult for survival. Mosses play a vital role in the ecosystem. Sanionia uncinata is a dominating Antarctic moss that is able to survive under such harsh conditions because of its perennial life cycles, involving growth and dormancy alternation. Winter saw high expression of genes associated with cellular stress and abscisic acid signaling, which help to cope with the extreme temperature of Antarctic.

Extremophilic organisms- These organisms thrive in extreme environments like deep sea and caves, having adapted features such as eye and pigment loss in cavefishes to attract anglerfishes.

- Unique survival strategies have been devised by organisms that flourish in harsh conditions. Because of these modifications, they can tolerate adverse environments like pressure, salinity, and extremely high or low temperatures. The study highlights how important it is to comprehend these processes in order to recognize how resilient life is in a variety of environments.
- Function of Bioactive Molecules: emphasizes how important the bioactive compounds made by extremophiles are. These chemicals, which include metabolites and enzymes, help the organisms adapt. Extremophiles may use a variety of substrates thanks to their varied metabolic pathways, which are crucial for survival in harsh conditions.
- Industrial Uses: The bioactive compounds obtained from extremophiles are useful in a number of different sectors. The use of these enzymes and metabolites to create sustainable and clean industrial processes is covered in the study. Their application in biotechnology is part of this.
- Research Contributions: The goal of the editorial effort is to offer the academic and research community insightful information and contributions. The Book functions as a resource for individuals who are interested in the interactions of these creatures in severe environments by assembling several chapters on adaptations of extremophiles. The editor is certain that the information will be helpful to field researchers.

Source: Canva Images

- Future Research Directions: According to the report, more investigation is required to fully understand the potential of extremophiles and the bioactive substances they contain. New scientific and industrial breakthroughs can result from an understanding of their adaptive mechanisms and ecological role.

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Pragya Singh
B.Sc. Life Science
III Year

Riddle me this!

I break things down, but I'm not mean, I help make nutrients quick and clean. From food to fuel, I do my task. What helper am I that you might ask?

Answer on page 77

Riddle me this!

Buried deep, I tell a tale, of ancient life now cold and pale. Preserved in stone, I last through time. What am I, revealing nature's climb?

Answer on page 77


Source: Canva Images

VERSETONE

The Symphony of the Wild

In the forest's embrace, the whispers reside,
Each species has a note in nature's tide.
The whispering winds weave melodies through the trees,
A melody carried by the gentle breeze.

The river hums as it carves through the land,
Polished by time, shaped by its hand.
Birds in the canopy join in the refrain,
They call a chorus, wild and untamed.

Beneath the soil, where the roots intertwine,
Life's smallest wonders quietly shine.
Ants in their march, the earthworms at play,
Weaving the threads of life each day.

The prowling tiger, with its regal stride,
Marks its path where shadows hide.
While fireflies blink in the velvet night,
Tiny lanterns casting flickering light.

Every creature, a verse in the song,
Bound by a rhythm, ancient and strong.
The symphony plays, unbroken, untamed,
A hymn to the wild, forever proclaimed.

In the forest's embrace, let us confide,
To cherish each note in nature's tide.
For when one fades, the harmony breaks,
And silence is all the wilderness takes.

Siddhi Gupta
B.Sc. (H) Zoology
III Year

BioVerse: The Symphony of Life

Beneath the lens, a world unseen,
Microcosms thrive where life convenes.
Bacteria build, archaea endure,
Life's smallest architects, steadfast and pure.
At fragile edges, life persists,
In Arctic chills and desert twists.
Extremophiles defy the odds,
Surviving where no life ever trods.
Through time's vast sweep, the past is told,
An odyssey of life, both young and old.
From fossils deep to present day,
Evolution carves its endless way.
But echoes linger where life once grew,
Extinction's shadow dims the view.
The vanished cry a mournful plea,
To guard the world's diversity.
Beyond the Earth, the cosmos calls,
We search for life in starlit halls.
Born of dust, we gaze in awe,
At galaxies bound by nature's law.
The BioVerse hums, a tale profound,
Of life and wonder all around.
From micro to stars, we stand in thrall,
To the symphony that connects us all.

Manya Sharma
B.Sc. (H) Zoology
II Year

From Flask to Gel!

The emotions like fear, surprise, and anger are associated with humans. But, it may be interesting to find out what happens if the cells and DNA experience such emotions. So, here's an attempt to depict a scene of DNA isolation in which the cells, like bacterial cells are first cultured in a growth medium with all nutrients and grown at optimal conditions (temperature, pH, and orbital shaking). The cells are then collected by centrifugation and then treated with a lysis mix or solutions that lyse and break open the cells. The contents of cells, including proteins, RNA, and DNA are released outside the cells. Then, the DNA is precipitated using alcohol and made soluble again. The DNA solution is then mixed with tracking dye, i.e., bromophenol blue and the DNA fragments are separated using agarose gel electrophoresis. These are then separated based on differences in their size as they move towards the positive (red) electrode as DNA carries a negative charge due to the presence of phosphate groups. Finally, the DNA is visualized using ethidium bromide under UV light and then the image captured can be used as part of a study in a published report. So, the journey of a cell and DNA from a conical flask to an orange band on gel has been visualized and expressed in this poem.

Life is fun, rich medium everywhere
Swimming all over, rock n roll
Shaking in a glass flask, looking at each other
What a splendid life it is, moving here and there
Plenty of food around, with air
Happy cells all growing here
As we flow along the yellow medium
Spinning along exponentially, we grow
A sudden thunderstorm breaks the calm
spinning faster, causing alarm
Oh my God! My medium has all gone
Life is doomed! How will I swim now?
All my food is gone; how will I grow now?
Packed tightly close to my friends
No space to move; will this ever end?
Thinking of the glorious days spent swimming in the past
Life is not as smooth as it was
As I was coping with the fearful plight
Another tsunami surges in sight
A gush of liquid tears me apart
My integrity shattered with a broken heart
Hey! That's my RNA, DNA floating around
My proteins are all roaming around
The protective membrane is all gone
All my contents are scattered around
Others are also surprised by the fear
I am separated from my peers
Our contents once inside
Some may have also died
Amongst the hue and cry, I sit alone
Weeping softly and praying for hope
Then came another gushing flow
Gave me another blow
Proteins trapped as a white mass
Saw pieces of RNA falling apart
Terrible sight to watch them go
O God! Tell me what I did wrong

Finally, our DNA is also gone
A smelly liquid captured it tight
Poor DNA with no choice
Had to go along as its plight
Shattered membranes, remnants of life
Discarded, stripped, and torn by strife
Discarded somewhere away from our soul
As if being pushed hard down from the knoll
Ah! The air is fresh and sweet
As our new freedom greets
A new world with new friends awaits
Maybe this is our fate
Embracing the new, sharing stories of the past
Enjoying the moments as they last
Once trapped but now swimming free
I have reached where I was meant to be
Then came a blue day, our medium turning dark
Viscous blue and kept its mark
As I move across the gel
Hey! I am stuck near the well
Sitting near well, I wave goodbye
Some sprint fast, I wonder why
Some race ahead while others go slow
All are getting separated as they flow
All moving toward the red electrode
Why am I running this marathon? God knows!
Under the light, I glow and sparkle bright
Glowing orange, a surreal sight
Someone smiles at my glowing bands
Then captures my image with gentle hands
Just 4 letters define my fate
Decide which proteins will I make
They will go to Golgi or the cell gate
As protein sorting awaits
From *flask to gel*, I have come so far
Just two strands make this twisted tale
Just two strands make this twisted tale

Dr. Jaspreet Kaur
Associate Professor
Department of Zoology

We are Stardust

They call it dust, a trivial name,
Yet born of stars, it fuels the flame.
The very stars we wished upon,
Are the ashes of worlds long gone?

Dust so profound, it whispers life,
From cosmic chaos to earthly strife.
It shapes, it forms, memories of the days long gone.

Why do I gaze at the stars above,
When all around is built of their love?
Perhaps the past clings, won't let us go,
Gazing at them is an escape from the earthly matter.

The cosmos breathes within our chest,
A universe shared, a life shared.
Bound by atoms that once did burn,
In fiery cores, to earth they return.

We are fragments of the great expanse,
A fleeting step in the cosmic dance.
The dust of stars made mountains rise,
Wove oceans deep and lit the skies.

So, as we wander beneath the night,
Let the stars remind us of our light.
We are not separate; we are not far.
We are stardust, born of a star.

Preyasi
B.Sc. (H) Zoology
I Year

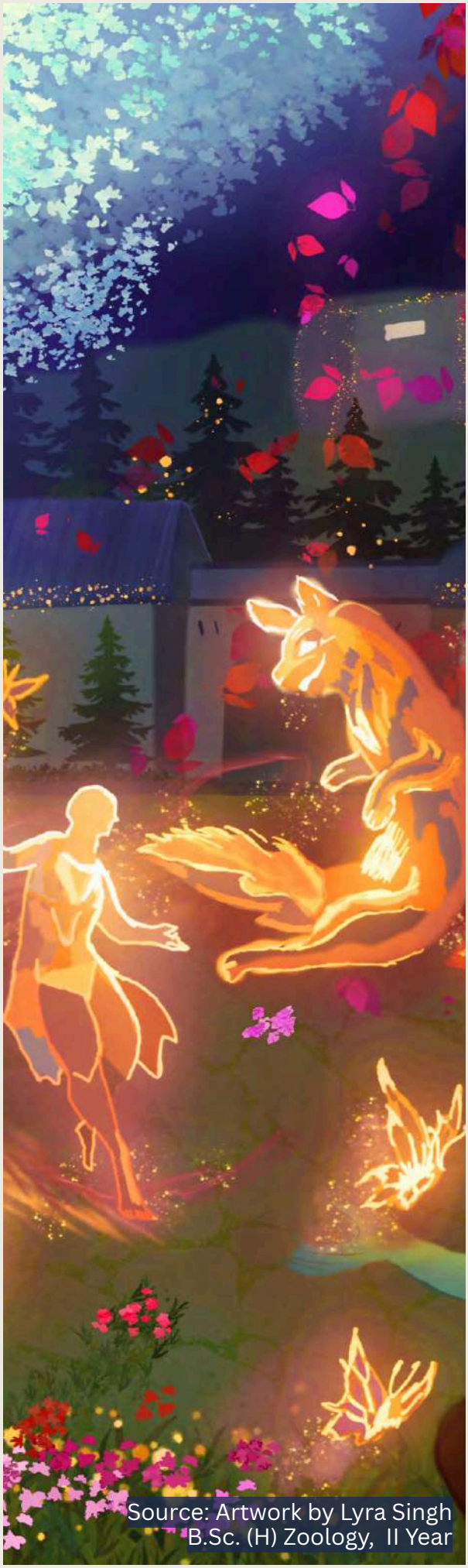
Stardust- A Cosmic Expedition

There's a world beyond the earthly sight,
Beyond the blue sky, vast and infinite,
In the dark where shadows seem to hide,
Where silence and light gracefully collide.
In that void, they say, no space is hollow,
Yet no shadow dares to follow.
A realm so bright, with all the lights,
That one may glimpse in countless nights.

A place where time and matter intertwine
Where clouds of stardust birth new life divine
Not even in dreams one will see
Something as beautiful as the nebula's sea
Sailing through the radiant ring and cosmic trails
Moving towards the frozen tales
Each spark is a whispered lore,
Of what was, is, and will be more.

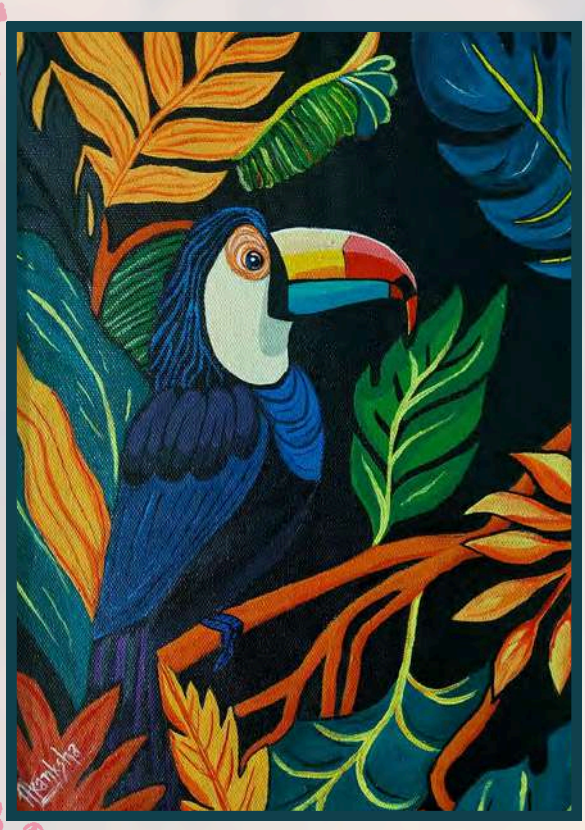
This stardust is a serenade,
To the silhouette of grace, beautifully made.
Nothing seems real here, and nothing will make sense,
For this is the only truth, in the chasm of infinity and you.
The golden, gilded lights are a paradox to many,
But all that is ethereal remains serenely uncanny.

Bhumi Negi
B.Sc. Life Sciences
I Year



Source: Artwork by Lyra Singh
B.Sc. (H) Zoology, II Year

STROKES OF IMAGINATION



Akanksha Khare
B.Sc. Life Sciences
I Year

Akanksha Khare
B.Sc. Life Sciences
I Year

Akanksha Khare
B.Sc. Life Sciences
I Year

Akanksha Khare
B.Sc. Life Sciences
I Year

Akanksha Khare
B.Sc. Life Sciences
I Year

Shruti Mishra
B.Sc. Life Sciences
I Year

Apurva Gupta
B.Sc. Life Sciences
I Year

Akanksha Khare
B.Sc. Life Sciences
I Year

Source: Photograph by Medhavi Kaushik
B.Sc. (H) Zoology, III Year

ODYSSEY

INTO THE WORLD OF JAMMU

The mountains of Jammu rise like guardians, their rugged peaks etched with stories of life's endurance. As I travelled through this lesser-explored region, I was struck by the harmony between the towering ranges and the vibrant life they cradle. The journey began with the rhythmic murmur of the Tawi River, its waters teeming with unseen life-microcosms that sustain the ecosystem. The forests were alive with the rustle of leaves, where langurs leapt with agile grace, their watchful eyes a reminder of nature's quiet intelligence.

The mountains here are more than rock and earth; they are a sanctuary for resilient creatures. Amidst the craggy cliffs, I glimpsed the elusive Himalayan goral, its sure-footed leaps a testament to survival in harsh terrains. High above, the majestic bearded vulture circled, its wings slicing through the cold, thin air- a symbol of strength and adaptation. Every step revealed a new layer of life's interconnected web. Tiny alpine flowers bloomed defiantly in the harsh soil, feeding insects and birds. I learned of endangered species like the cheer pheasant, whose fragile existence underscores the delicate balance of this ecosystem.

As night fell, the clear skies unveiled a galaxy of stars. In that serene moment, the mountains of Jammu whispered their timeless tale- a story of resilience, adaptation, and coexistence. These mountains are a living Bio-Verse, a microcosm of life's enduring spirit, reminding us of the wonder that surrounds us and our role in preserving it.

Manya Sharma
B.Sc.(H) Zoology
II Year

PANGONG TSO: A SURREAL PARADISE

The stunning blue waters of Pangong Tso/Lake are incredibly inviting, making it a dream destination for many. I was determined to experience the breathtaking beauty of this 160 km long lake nestled in Ladakh. A casual conversation with an acquaintance sparked the confidence I needed to venture into solo travel. Fortunately, a friend decided to join me, and I was filled with excitement to check off this ultimate destination from my bucket list.

Reaching Pangong Lake was not an easy feat; it involved navigating some of the toughest terrains, with significant changes in altitude and temperature that posed breathing challenges. Daily medication was a necessity, but the company of great friends made every hard mile worthwhile. While the paths were rugged, the serene landscapes we encountered along the road trip were absolutely rewarding. After five days of travel, we finally arrived at Pangong Lake, crossing through Leh (11,000 feet), Khardung La Pass (around 18,000 feet), Nubra Valley (approximately 8,000 feet), and enduring plenty of bumpy roads. Pangong Lake itself sits at an altitude of around 15,000 feet, and the first glimpse of its crystal-clear waters, showcasing various shades of blue, was enough to make me forget all the fatigue.

With its mesmerizing beauty, photography became a must, and I snapped countless pictures to capture the lake's stunning beauty. The water here is extremely brackish, making it inhospitable for many aquatic species; however, one can occasionally spot small crustaceans, ducks, and gulls floating on the surface.

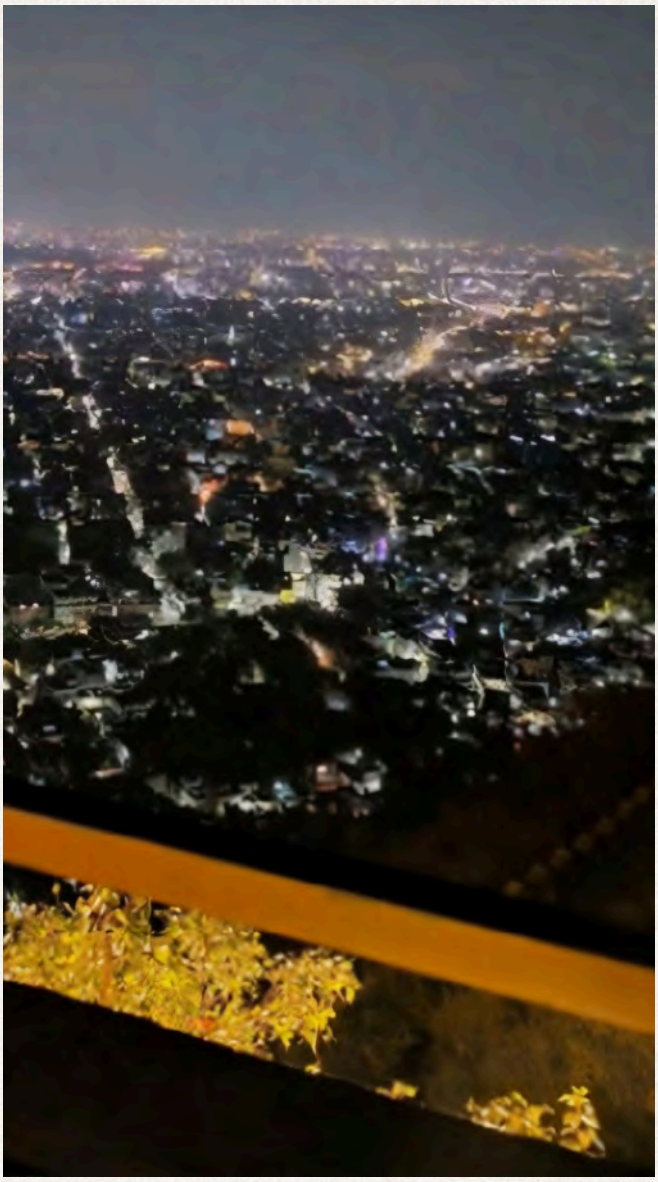
Lt. (Dr.) Archana Aggarwal
Associate Professor
Department of Zoology
Maitreyi College

JAIPUR: SERENE AND WILD

From a young age I was drawn to forts, places of rich culture and ethnicity and maybe that's why I feel a strong connection to The Pink City- Jaipur. So, after my first semester ended, I was given a chance to vacation to any place of my choice and I thought of exploring Jaipur's sprawling monuments, bustling bazaars, enchanting forts and serene wildlife. Nestled in the heart of Rajasthan, Jaipur is a splendid blend of royal heritage and natural harmony. Often called The Pink City, Jaipur is around 250 km from New Delhi, which makes it a 5-hour car ride from my home in Delhi.

With an area of 342 square kilometres, it is a place where tradition meets modernity, and urban life coexists seamlessly with nature. Stepping into Jaipur feels like walking into a history book. Through my travels, I came across many such historical facts, like, the iconic pink colour was actually introduced in 1876 when the entire city was painted pink to welcome the Prince of Wales, and to this day, its colour symbolises hospitality. Another one says that, in Hawa Mahal, 953 intricate windows were designed to allow the royal women of the palace a view of the bustling streets below without being seen. Its delicate artistry and historical significance make it a symbol of the city's regal charm.

Beyond its architectural wonders, Jaipur pulsates with culture. The colourful bazaars like Johari Bazaar and Bapu Bazaar are treasure troves for lehengas, suits, salwars, jhumkas, kadaas, poshaaks, kambals, handicrafts, artifacts n' all- you name it, and you'll find it in this vibrant city. But beware of the heatwave, because in January end here, I was sizzling like a furnace. Although, the natives seemed totally unbothered by the heat-stroked climate. The weather here can definitely be compensated with mouth-watering Rajasthani dishes and mithais. My current obsession? Malai Ghevar!



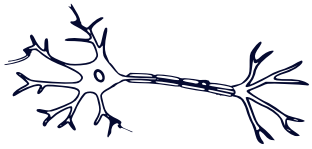
What sets Jaipur apart is how it harmonises urban life with wildlife . Just a few kilometres from the heart of Jaipur, lies the beautiful haven of flora and fauna- The Nahargarh Biological Park. This sanctuary is home to leopards, Bengal tigers, and deers. Plus this park is located amidst India's oldest mountain range, The Aravallis, providing an enchanting night view of whole city from atop the fort. Another gem is The Jhalana Leopard Reserve, where the majestic creatures can roam freely. The pink city also embraces a diverse population of migratory birds at The Mansarovar Lake. Jal Mahal located in the middle of the lake , makes a common room for humans and birds.

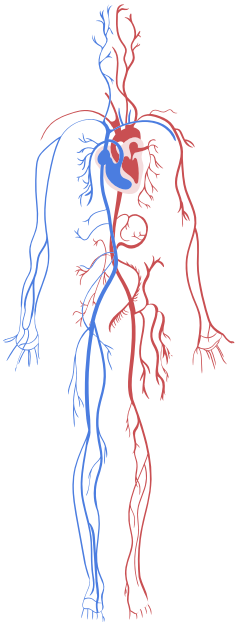
The beautiful capital of Rajasthan, the land of kings- Jaipur has always enthralled me! The pink city holds the ethnic heritage of India. Its uniqueness in harnessing our royal grandeurs with urban technologies makes it a favoured tourist spot. Its not just a fun destination for one's vacation but a place to witness stories unfold, every part of Jaipur will remind you something special, will give an experience to tell your children, will teach you that life could be enjoyed in simple things all the while aspiring you for a harmonious relationship of humans with the natural world. For anyone seeking a journey that combines history, culture, and wildlife, Jaipur is a destination that will leave an enduring mark on the heart!

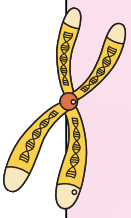
Beni Punia
B.Sc.(H) Zoology
I Year

COGNITIVE INSPECTION

THINK, LINK & SOLVE



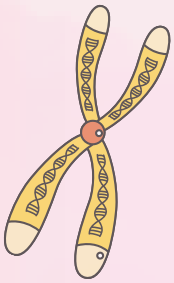




Answers on Page 77

ACROSS:

4. I am a hormone that regulates blood sugar levels.
6. I am a metabolic pathway that also goes by the name TCA cycle. I occur in the mitochondria and produce ATP.
8. We are the building blocks of proteins and are considered as zwitterions.
9. This type of relationship occurs when one organism benefits and the other is unaffected.
11. We are the organisms that make their own food through photosynthesis.
13. These are the molecules composed of a sugar, phosphate, and nitrogenous base.
15. I am an enzyme that breaks down starch into sugar.

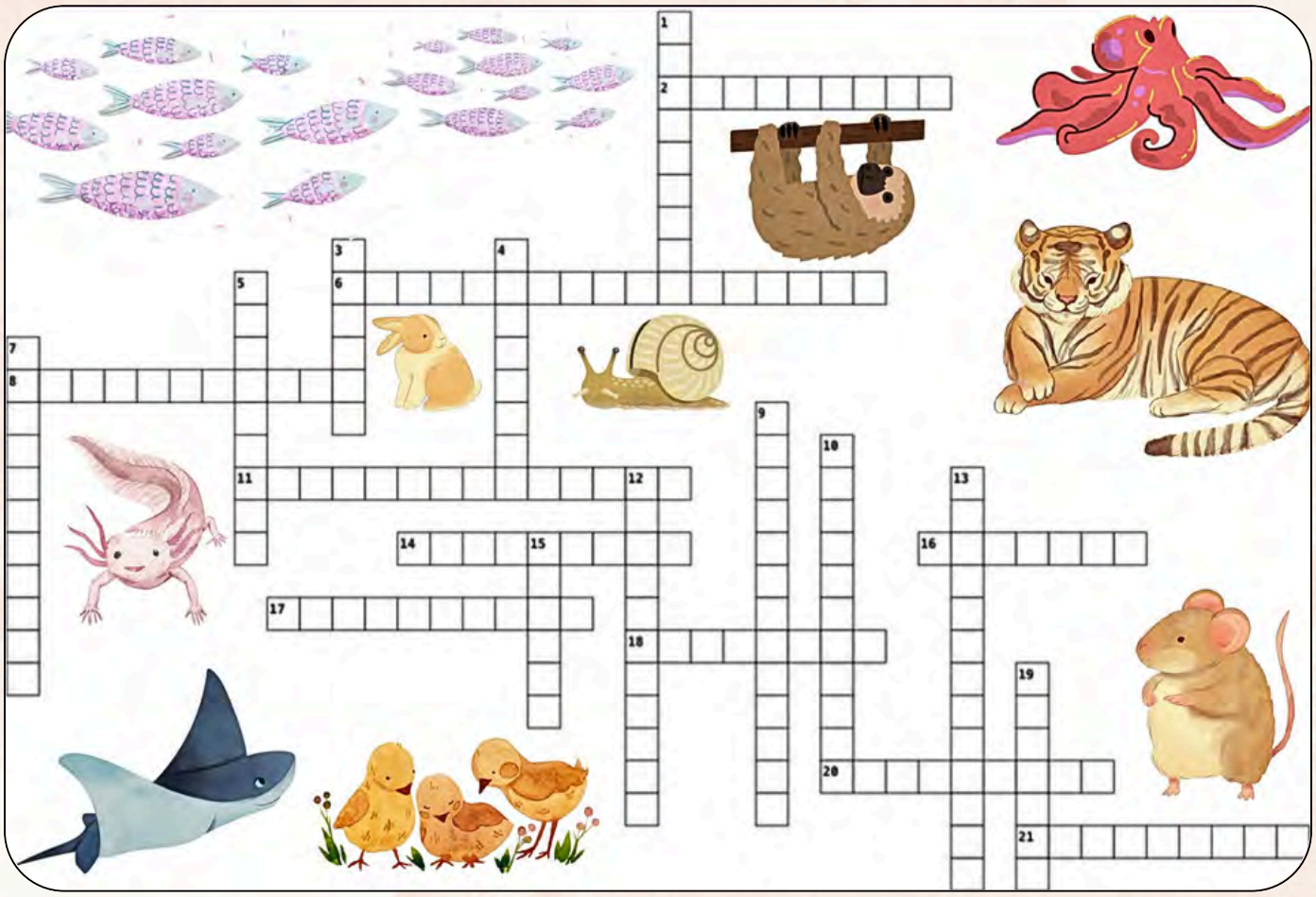


DOWN:

1. We are the organisms that tend to stay active during the night.
2. I am a Molecule that triggers an immune response when I am recognized as foreign.
3. I am a type of cell that engulfs and digests pathogens and dead cells.
5. I am a class of proteins, which includes antibodies.
7. We are the only group of mammals capable of true flight.
10. I am a molecule that serves as the energy currency of the cell.
12. This is the most abundant protein in the human body, providing structure to skin and bones.
14. I am a polysaccharide used for energy storage in plants.

Himanshi Yadav
B.Sc. Life Sciences
III Year

BRAIN TEASER



Answers on Page 77

ACROSS:

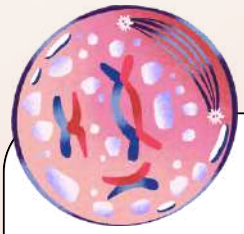
2. Elastic, rod-like structure
6. Sensory system in fish and some amphibians that helps them detect movement, pressure and vibrations in the water around them
8. An animal relies on external heat sources to regulate its body temperature
11. The sister group of the ray-finned fishes
14. Flat thin body part the extends from the back of many aquatic vertebrates, including fish and some marine mammals
16. Jawless fish with a cartilage skeleton that attaches to other fish and feeds on their blood and tissue
17. Cartilaginous fish that's closely related to sharks and rays
18. Fish-like benthic filter feeding chordates in the subphylum Cephalochordata, class Leptocardii, and family Branchiostomatidae
20. A fish's main propulsion and steering organ
21. A paraphyletic class in the subphylum Tunicata of sac-like marine invertebrate filter feeder.

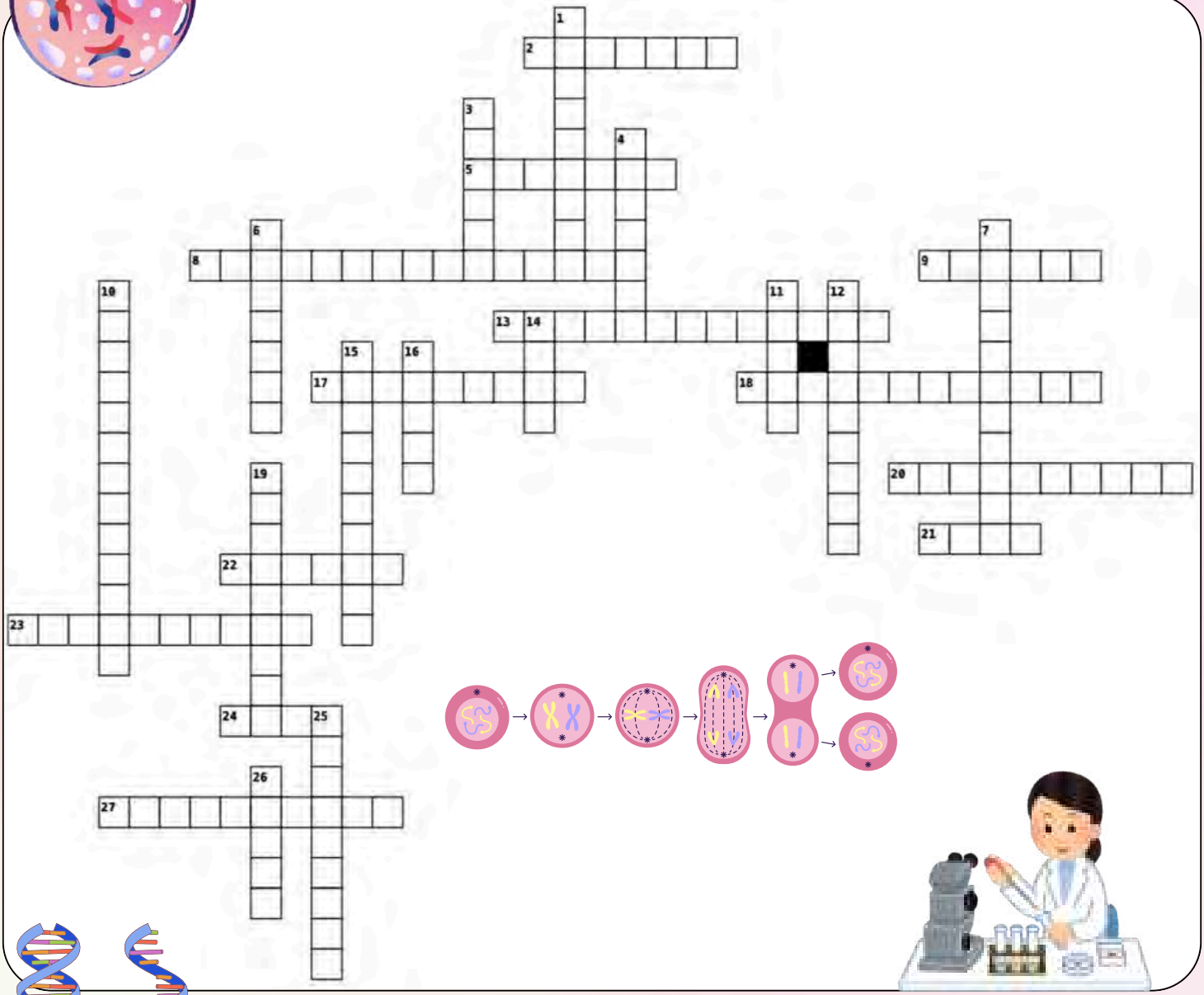
DOWN:

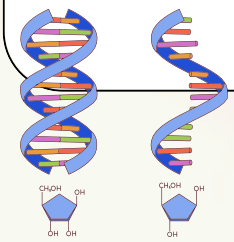
1. A muscular chamber in the heart that pumps blood into the circulatory system
3. A common chamber that serves as the opening for the digestive, reproductive, and urinary tracts of many animals
4. Type of with similar body of an shark but with a flat head and gills on the underside
5. A hard flap serving as a cover for the gill slits in fishes
7. A pair of fins situated on either side just behind a fish's head helping to control the direction of movement during locomotion
9. A fish with its skeleton paired fin formed from small bones in a fan like arrangement that supports the bases of the fins by parallel rows of bones called radials
10. An animal relies on external heat sources to regulate its body temperature
12. Gas filled organ that helps fish maintain their buoyancy in water
13. Teeth like scale that help with faster swimming in sharks
15. A chamber in the heart of vertebrates and higher invertebrates that receives blood and pumps it into a ventricle.
19. Primitive jawless fish that is known for the ability to produce slime

Janvi
B.Sc. Life Sciences
I Year

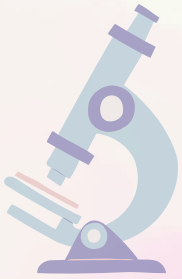
THE CELL-MATRIX





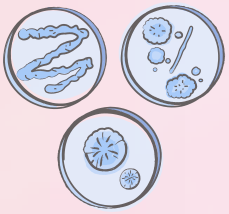


Answers on Page 77



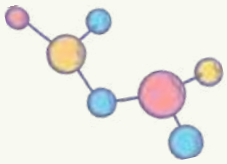
ACROSS:

2. Ordinary body cells in an organism
5. Specialized cells used for reproduction
8. The production of mature sperm cells.
9. A type of nucleotide that consists of a double ring
13. A type of genetic recombination where non-sister chromatids exchange DNA segments.
17. Cells that have the ability to pass on genes to progeny
18. The way DNA is structured that causes the two strands to be organized in opposite directions from each other.
20. A type of nucleotide that consists of a single ring
21. RNA that carries genetic information for synthesizing proteins to ribosomes
22. When homologous chromosomes pair up during prophase I of meiosis.
23. Matching pairs of chromosomes
24. RNA that carries amino acids from the cytoplasm and brings them to the ribosomes to be turned into proteins
27. The monomer of nucleic acids



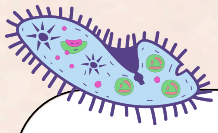
DOWN:

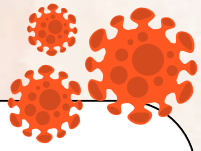
1. The production of a mature ovum/egg
3. The first cell of a brand-new organism
4. A special version of cell division that creates gametes
6. A process where pieces of chromosomes mix to produce a new combination of alleles.
7. The synthesis of proteins from RNA
10. The synthesis of RNA from DNA
11. Changes in the nucleotide sequence that can cause a different amino acid to be joined to the protein chain
12. Equational division of meiosis.
14. RNA that is one of the building blocks of the ribosomes
15. Two genes perform same and overlapping functions.
16. An acid that it the building block of proteins.
19. The study of how the information stored in DNA codes for RNA and proteins
25. The complimentary three-base combination of nucleotides carried by the tRNA
26. A three-base combination of nucleotides that match up with a specific amino acid

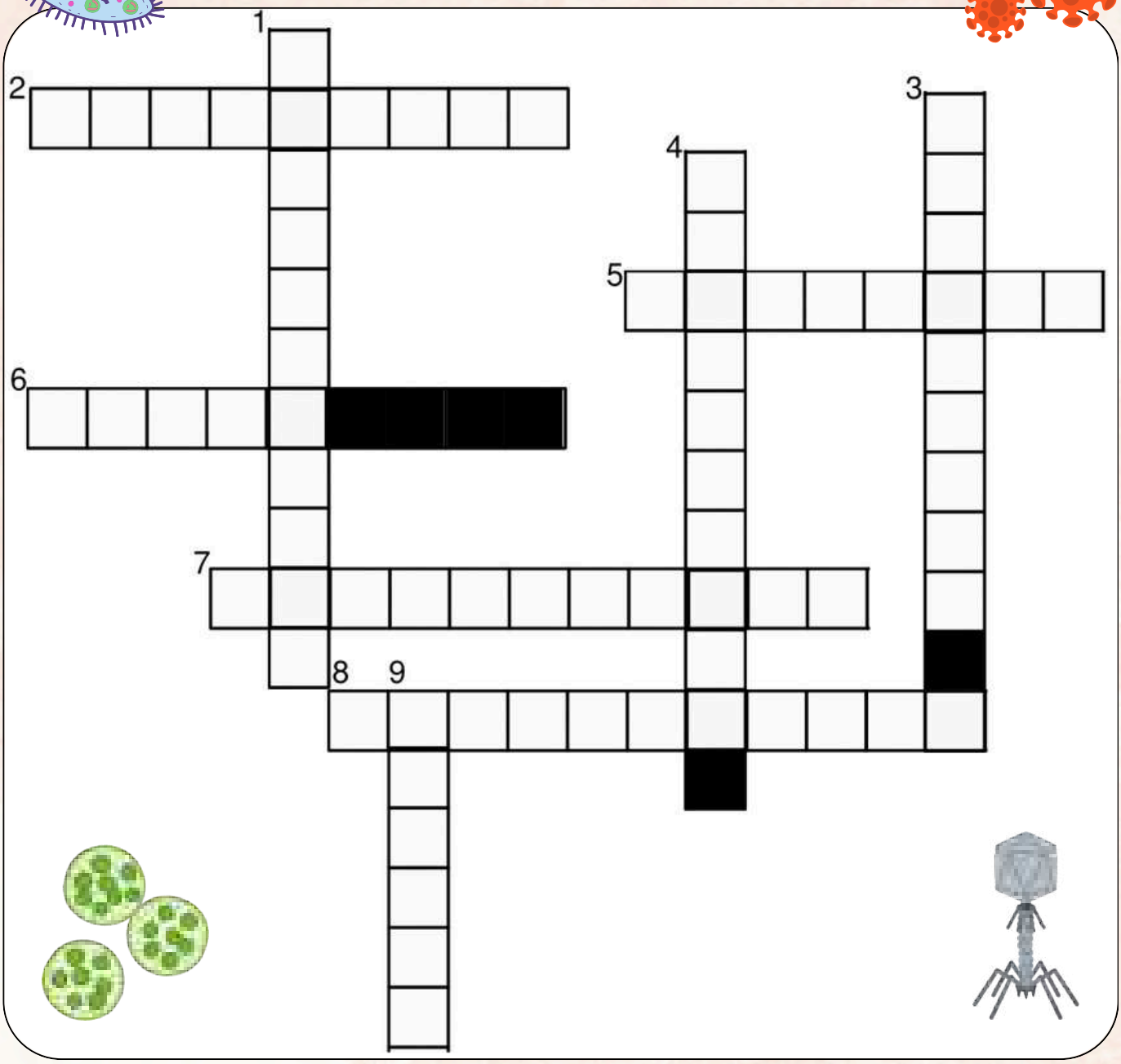


Janvi
B.Sc. Life Sciences
I Year

BIO-BITS







Answers on Page 77

ACROSS:

2. The term used for a microorganism that has beneficial effects on humans
5. This bacterium helps break down toxins in the environment, like heavy metals
6. This microorganisms aids in the decomposition of organic matter in the soil
7. This fungus is responsible for producing penicillin
8. This bacteria normally inhabits soil, water and vegetation

DOWN:

1. The term used for the beneficial microorganisms that live in symbiosis with humans
3. An infection caused by viruses in the respiratory
4. This microorganism is responsible for causing malaria in humans
9. A microorganism that causes an infection in the blood

Rizwana Tabasum
B.Sc. (H) Zoology
III Year

DARE TO SOLVE?

"From corner to corner, letters hold secrets—find the hidden words and claim your title as the ultimate puzzle master!"

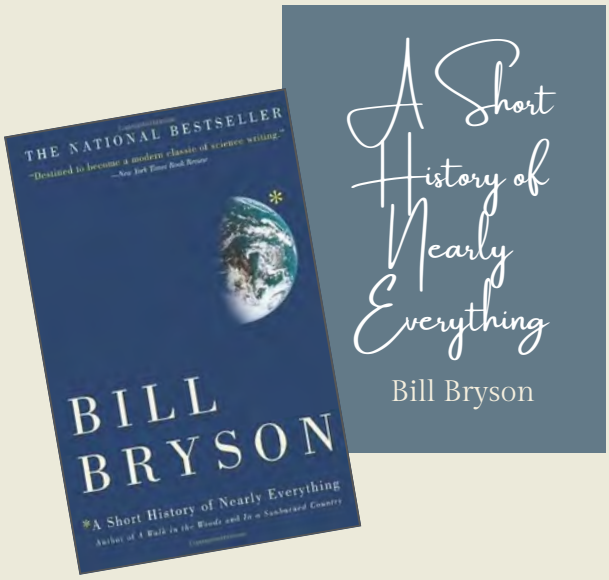
L	X	H	P	K	E	P	O	L	Y	A	N	D	R	O	U	S	H	L	H	G	N	E
G	A	M	P	P	H	Y	L	U	M	L	K	L	Q	E	M	K	T	E	O	P	V	L
H	G	R	U	A	L	D	C	Z	W	A	N	E	Y	H	K	D	K	D	D	A	N	J
L	O	H	V	L	Z	O	T	O	L	L	H	D	J	R	G	D	L	E	G	R	P	E
X	D	M	F	A	W	R	G	D	E	D	X	D	I	F	X	Y	I	P	N	A	M	N
B	O	V	E	T	S	T	K	U	X	L	E	R	S	U	N	E	G	I	I	S	S	E
A	P	G	E	O	R	C	A	I	N	V	E	R	T	E	B	R	A	T	E	I	I	M
Z	O	L	I	L	T	M	I	D	X	J	H	N	K	H	H	R	Z	N	K	T	N	A
I	R	I	N	O	K	H	A	D	P	T	E	W	T	W	E	M	G	E	C	E	I	T
T	H	O	T	G	W	D	E	M	I	O	T	E	R	E	V	Y	V	C	B	S	W	O
I	T	I	Q	U	S	Z	D	R	M	A	L	P	B	A	R	N	A	C	L	E	R	D
G	R	H	Z	G	F	W	I	C	M	A	N	E	N	T	H	A	T	Z	A	O	A	E
G	A	S	K	S	U	L	L	O	M	I	L	W	C	R	S	G	T	D	T	I	D	S
U	W	P	L	U	M	A	G	E	K	B	C	C	H	A	M	E	L	E	O	N	Z	Z
F	L	S	B	Z	R	J	O	S	A	L	A	M	A	N	D	E	R	E	W	G	A	B
J	O	N	J	G	N	U	G	O	M	N	I	V	O	R	O	U	S	Q	G	K	Q	X

Answers on Page 77

Janvi
B.Sc. Life Sciences
I Year

SCI-FLIX: YOUR GUIDE TO SCIENCE-RELATED MEDIA

BOOK RECOMMENDATIONS



A Short History of Nearly Everything by Bill Bryson

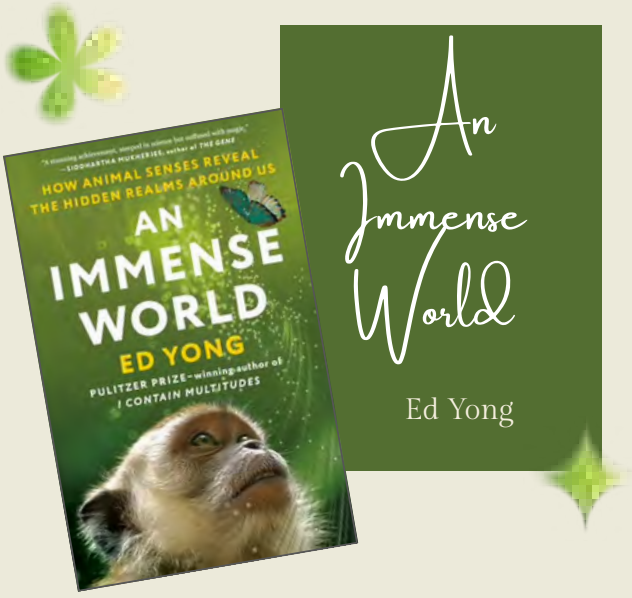
"What's the universe made of—and why do we exist at all?"

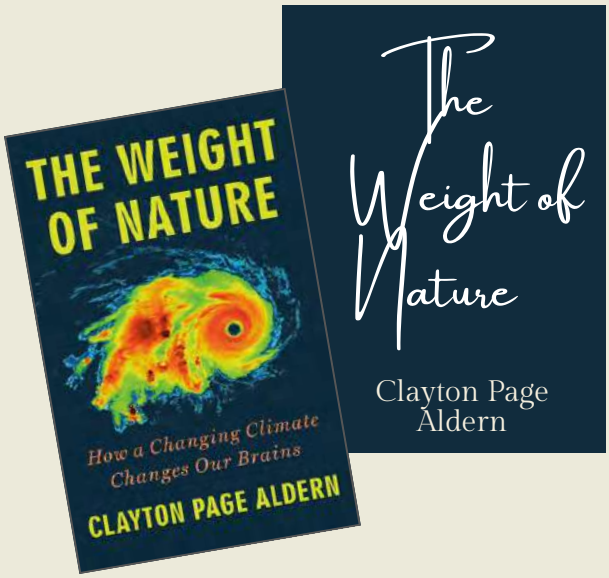
This is a fascinating, accessible book on the history of the natural sciences, covering topics as diverse as cosmology, quantum physics, paleontology, chemistry and other subjects that have always enthralled me. A quick, fun read- this will have you questioning everything about the world!

An Immense World by Ed Yong

Can you imagine hearing colors or tasting sound?

One of my favourite books- this will make you see the world in an entirely new light. It is a well known fact that animals sense and perceive the world in a different way than humans do but reading it was so bizarre and interesting! The book is full of the author sharing his enthusiasm, his writing full of warmth for all the animals who we share the earth with. I love books like this- where there is knowledge, passion and beautiful writing to present it all.





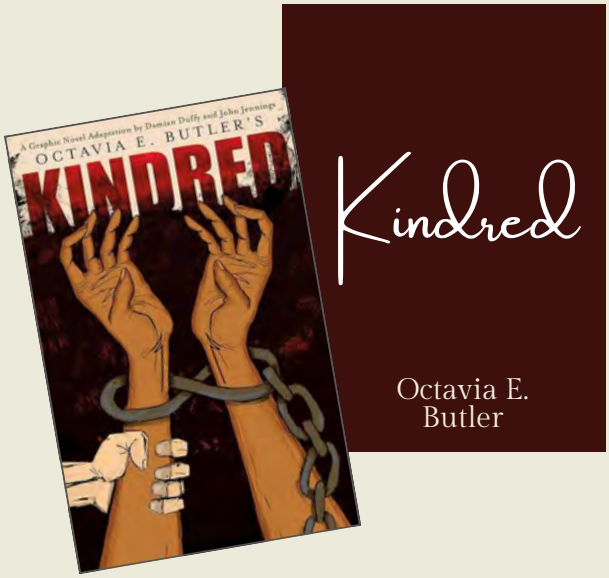
The Weight of Nature by Clayton Page Aldern

"Can climate change alter your brain?"

A riveting yet troubling read- this book delves into the effects of climate change, not just on the earth but also on our body and mind. As someone who gets very anxious about climate change, this was a difficult read, but I think it is important that we educate ourselves on this topic to realise just how serious and alarming it is.

Lyra Singh
B.Sc.(H) Zoology
II Year

BOOK RECOMMENDATIONS



Kindred by Octavia E. Butler

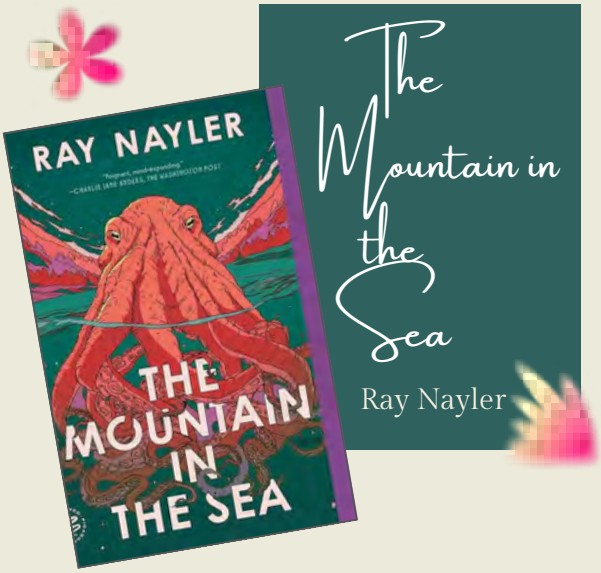
Do you ever think about time travel paradoxes, causality, and how personal history is shaped by past events?

A stunning blend of science fiction and historical narrative, 'Kindred' pulls you into the visceral reality of slavery through the lens of time travel. It's not just a story—it's a deeply human exploration of genetics, memory, and survival. Butler's treatment of temporal paradoxes and inherited trauma is both chilling and captivating.

The Mountain in the Sea by Ray Nayler

Can artificial intelligence help us decipher non-human languages?

This book is a thought-provoking dive into consciousness, AI, and marine biology. It made me reconsider what it truly means to be sentient. Nayler's depiction of intelligent octopuses is scientifically rich and emotionally compelling—a perfect read for anyone fascinated by neuroscience and interspecies communication.



The Windup Girl By Paolo Bacigalupi

"Can climate change alter your brain?"

A gritty, genetically engineered world that feels eerily plausible. Bacigalupi crafts a post-biotech-apocalypse Earth where calories are currency and survival hinges on synthetic biology. It's a haunting, brilliantly constructed narrative for anyone intrigued by genetics, bioengineering, and the ethics of science gone too far.

Janvi
B.Sc. Life Sciences
I Year

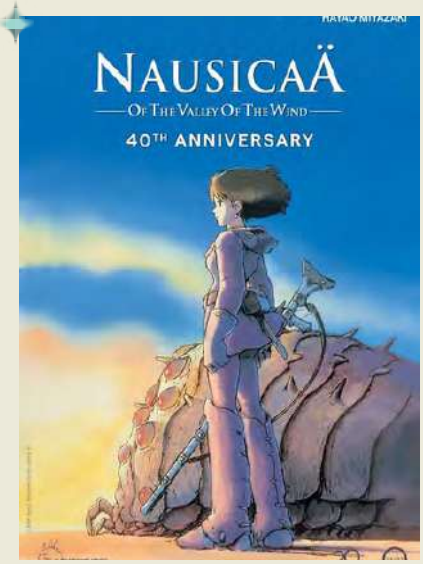
MOVIE RECOMMENDATIONS

Words on Bathroom Walls

'Words on Bathroom Walls' offers a raw, compassionate look into the mind of Adam, a teen diagnosed with schizophrenia. Rather than reducing his illness to clinical terms, the film humanizes it—bringing his hallucinations to life as vivid characters and exploring the emotional and chemical complexities of antipsychotic treatment. It's a powerful blend of storytelling and neurobiology, showing the unseen battles within. More than a story of illness, it's one of resilience, love, and the deep need to be understood. Quietly revolutionary, it urges us to truly listen to those navigating the world with minds that work differently.

Nausicaä of the Valley of the Wind

Before climate change became a global concern, 'Nausicaä of the Valley of the Wind' warned us through a haunting, poetic vision. Set in a world ravaged by pollution and war, Miyazaki's masterpiece blends fantasy with environmental science—exploring ecosystem resilience, toxin accumulation, and nature's quiet rebellion. Nausicaä, both warrior and scientist, sees beauty even in decay, understanding that the toxic Sea of Decay isn't evil, but nature's way of healing. The Ohmu symbolize balance and consequence. More than a fantasy, it's a call for empathy—reminding us that science, without compassion, can lead to ruin rather than redemption.

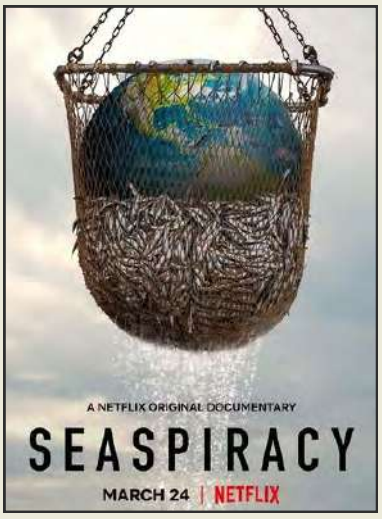


Chemical Hearts

'Chemical Hearts' is a tender exploration of teenage emotion through the lens of neuroscience. Henry seeks love, while Grace is quietly consumed by grief—two minds shaped by different emotional truths. The film captures the turmoil of the adolescent brain, where an underdeveloped prefrontal cortex and heightened limbic responses make every feeling feel like everything. Love pulses like dopamine; grief imprints itself like trauma in memory. Through silence and subtle gestures, the film speaks volumes. Instead of offering a neat resolution, this movie reminds us that emotions aren't flaws—they're evidence of growth, pain, healing, and what it means to be deeply human.

Janvi
B.Sc. Life Sciences
I Year

SCIENCE DOCUMENTARIES

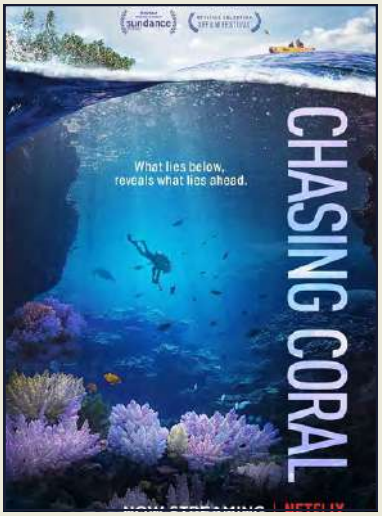


Seaspiracy

This documentary had me sobbing the first time I watched it. It deep dives into the global fishing industry and how it's driving the climate and ecological emergency faster than any other. The filmmakers put themselves in very dangerous situations to expose these exploitative and harmful industries and present it in such a raw and horrifying film. Anyone who even slightly cares for the planet must watch this.

Our Planet

Like all of Sir David Attenborough's works, this docuseries is absolutely beautiful and breath-taking. No one can capture the beauty of this planet quite like him. He is quite literally one of the most important people on our planet, and undoubtedly, the most important person to the planet. This series delves into the world of animals and showcases how different, yet similar, all the creatures of this planet are. A stunning portrayal of nature and our Earth's magnificent glory, this will surely make you fall in love with the planet and its glory.



Chasing Coral

'Chasing Coral' documents the bleaching and death of coral reefs in the ocean due to rising levels of heat. The film starts off a bit weak, but it gets interesting soon enough. It is truly devastating to see how half the world's population of coral has died out, and still continues to perish. The harmful effects global warming has on our oceans isn't talked about enough so it was good to see them highlight it in the film, especially because coral reefs are such an important part of the marine ecosystem.

Lyra Singh
B.Sc.(H) Zoology
II Year

Source: Canva Images

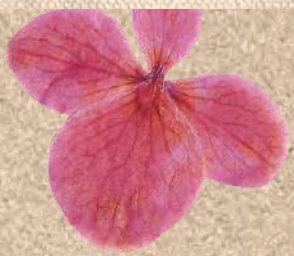
YEAR 2023-24 AT A GLANCE

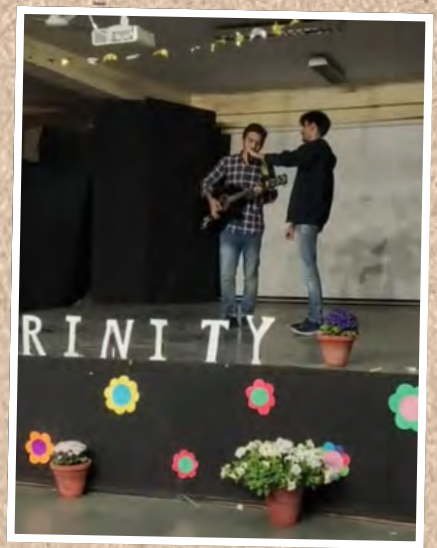
Zoophoria 24

The Annual Fest of Zoology Department, 7 March,2024

trinity 24

The Annual Fest of Life Science Department, 13 March,2024





Zoology Department, Year 2023-24

Fresher's Party: Cheers to fresh start and new hearts!

Teacher's Day: For the mentors who make us shine!

Visit to National Zoological Park, Delhi

Farewell: Ending a chapter, cherishing the story!

Educational Excursion to Jim Corbett and Nainital. February 2024

ANSWERS

THINK, LINK & RESOLVE

Across:
4. Insulin
5. Krebs
6. Amino acids
7.Commensalism
8. Autotrophs
9. Nucleotides
10. Amylase

Down:
1.Nocturnal
2.Antigen
3.Phagocyte
5.Immunoglobulin
7.Bats
10.ATP
12.Collagen
14.Starch

BRAIN TEASER

Across:
2. Notochord
6. Lateral line
8. Ectotherm
11. Lobe-finned fish
14. Dorsal fin
16. Lamprey
17. Chimaera
18. Lancelet
20. Caudal fin
21.Osteichthye

Down:
1.Ventricle
3. Cloaca.
4. Ray
5. Operculum
7. Pectoral fins
9. Ray-finned fish
10. Ectotherm
12. Swim bladder
13. Placoid scales
15. Atrium
19. Hagfish

THE CELL MATRIX

Across:
2. Somatic cells
5. Gametes
8. Spermatogenesis
9. Purine
13. Crossing over
17. Germ cells
18. Antiparallel
20. Pyrimidine
21. mRNA
22. Synapsis
23. Homologous chromosome
24. tRNA
27. Nucleotide

Down:
1.Oogenesis
3. Zygote
4. Meiosis
6. Genetic recombination
7. Translation
10. Transcription
11. Point mutations
12. Second division
14. rRNA
15. Redundancy
16. Amino acid
19. Molecular genetics
25. Anticodon
26. Codon

BIO-BITS

Across:
2. Microbiota
5. Probiotic
6. Influenza
7. Plasmodium
8. Pseudomonas

Down:
1.Actinomycetes
3. Penicillium
4. Lactobacillus
9. Septicemia

DARE TO SOLVE

COELENTERATE
HOMEOTHERMIC
INVERTEBRATE
POLYANDROUS
OMNIVOROUS
SALAMANDER
CENTIPEDE
CHAMELEON
DARWINISM
NEMATODES
ARTHROPOD
PARASITES
BARNACLE
MOLLUSKS
ASCIDIAN
PLUMAGE
TADPOLE
PHYLUM
MAMMAL
GENUS
HYENA
LARVA

RIDDLE ME THIS

Page 24:
Mutation
Page 26:
Mitochondria
Amphibian
Page 28:
Teeth
Hormones
Page 29:
Neuron
Page 31:
Evolution Enzyme
Food Chain
Page 33:
DNA
Ten tickles
Page 36:
Osmosis
Haemoglobin
Page 38:
Cell
Chloroplast
Page 42:
Brain
Bat
Page 44:
Enzyme
Fossil

Riddles by: *Janvi*
B.Sc. Life Sciences
I Year

Meet The Team

Row One (from left to right): Beni Punia, Janvi, Akanksha Khare, Pragya Jha, Khushi, Lt. (Dr.) Archana Aggarwal, Dr. Anshu Arora Anand, Dr. Jaspreet Kaur, Anjali Singh, Manya Sharma, Lyra Singh, Diksha Pathak, Shreyanshee Vaidya, Preyasi Yadav, Apurva Gupta

Row Two (from left to right): Khushi Walia, Wafa Jafri, Siddhi Gupta, Himanshi Yadav, Jasmine Sharma, Nourein Shailesh

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II Year

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