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CBSE SCIENCE NEWSLETTER
ISSUE 6 | AUGUST 2025

LASER

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SURVIVAL SECRETS

NATURE'S HIDDEN SUPERPOWERS

DIVE INTO THE THEME

SURVIVAL SECRETS

NATURE'S HIDDEN SUPERPOWERS

The theme of this edition challenges us to examine life's hidden toolkit and look past the obvious. Nature displays a resilience that verges on the miraculous, from the microscopic tardigrades that can go into a cryptobiotic state and reappear centuries later to the sharks, eels, and birds that navigate with remarkable accuracy by using electroreception and magnetoreception to read the Earth's invisible fields, to the incredible "Lazarus Effect," in which extinct species reappear despite all odds.

These are lessons, not just interesting facts. Life has developed abilities that defy comprehension and redefine possibilities in a world where survival is a constant struggle. This theme, Survival Secrets: Nature's Hidden Superpowers, honours the subtle yet effective means by which life persists, frequently in the most hostile and merciless places.

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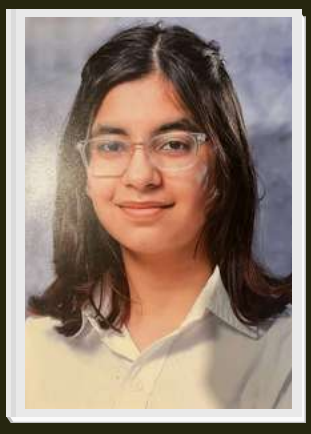

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MEET THE TEAM

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PRIME TIME

OUT OF THIS WORLD

Ghhanali Singh, 10A

NEWS & VIEWS

First real treatment for a painful throat disease

After years of repeated surgeries being the only option, the FDA has approved Papzimeos (zopapogene imadenovec-drba) for recurrent respiratory papillomatosis (RRP), a condition driven by HPV 6/11 that causes wart-like growths in the airway. It's a targeted, non-replicating viral immunotherapy. In trials, about half of adults (≈51%) stayed surgery-free for a full year.

Why it matters: For patients used to multiple procedures a year, this is a genuine life upgrade—less time in the OR, more time living.

Uranus gets a new moon on the board

JWST long-exposure images turned up a tiny, ~10-km companion now tagged S/2025 U1. That nudges Uranus's moon count to 29 and hints there are more faint, ring-skimming objects waiting to be found.

Why it matters: Every small moon helps map how giant planets built—and still sculpt—their ring-moon systems.

Our third interstellar visitor gets a check-up

On Aug 6, NASA used JWST's NIRSpec to study 3I/ATLAS, only the third confirmed object to wander into our Solar System from another star system (after 'Oumuamua and 2I/Borisov). Coordinated observations with Hubble and SPHEREx aim to pin down its size, makeup, and flight path.

Why it matters: Comparing "extrasolar" comets to local ones tells us how other planetary systems form—and how ours stacks up.

Heat waves may be quietly speeding up aging

A 15-year study tracking 24,922 people links cumulative heat-wave exposure to accelerated biological aging—on par with the impact of regular smoking or drinking. Each additional 1.3 °C of heat-wave exposure over two years nudged biological age upward, with manual workers hit hardest.

Why it matters: Cooling isn't a luxury—it's a public-health tool. Policy on shade, housing, and workplace safety now doubles as longevity policy.

The ankylosaur that wore a coat of spikes

Fresh Moroccan fossils of Spicomellus afer show extravagant armor—including neck spikes approaching a meter—pushing paleontologists to rethink why these dinosaurs bristled up. Defense, sure—but display and signaling may have mattered just as much.

Why it matters: What looks like armor can also be a billboard. That insight reshapes how we read the fossil record and dinosaur behavior.

Subhanshu Shukla

“One day, humanity will look back at Earth as the place where our journey started, not where it ended.” – Subhanshu Shukla

What started as a dream under the night sky is now turning into a roadmap for the stars. Shubhanshu Shukla is a group captain and test pilot with the Indian Air Force (IAF) and Gaganyatri (astronaut) with the Indian Space Research Organisation (ISRO). As of 2025, Shukla holds the rank of group captain with the IAF. He is a qualified test pilot with over 2,000 hours of flying experience on a wide variety of aircraft, including the Antonov An - 32, BAE Hawk, Dornier 228, MiG-25, Mig-29 SPECAT Jaguar, and Sukhoi Su-30MKI.

In July 2025 Shukla became the first ISRO Astronaut to visit the International Space Station (ISS) while participating in Axiom Mission 4, a privately organised spaceflight. The mission, a collaboration between NASA, SpaceX, and ISRO, is intended to strengthen international spaceflight cooperation. The Wire noted, "Sharma's mission was a pioneering, Soviet-led diplomatic gesture with limited immediate technological impact for India, while Shukla's mission is a commercially arranged effort where he will spend two weeks on the ISS, conducting around 60 experiments, with at least seven designated by ISRO." The mission successfully lifted off from NASA’s Kennedy Space Centre in Florida on 25 June 2025 at 06:31 UTC. It docked with the ISS on 26 June 2025 at 10:31 UTC. Shukla entered ISS at 12:14 UTC. A few minutes past 14:00 UTC, a formal welcome ceremony for the Ax-4 visiting crew took place, during which Whitson gave Shukla an astronaut pin, as the 634th person to reach space. Exploration is the new patriotism, and this program is carrying the flag upward.

As Subhanshu Shukla passionately addressed the young audience: “What it requires is all the kids seated here to be excited … We need you. To achieve such big and bold ambitions that we have, we need the resources of the entire nation.” The stars may be far away, but with visionaries like Subhanshu Shukla, they no longer feel out of reach.

By: Shreya Batra, 10B

SUBMISSIONS

SURVIVAL SECRETS

EL NINO LA NINA EFFECT

El Nino La Nina Effect, one extraordinary natural calamity known to the humankind. These two effects have been occurring every 2 to 7 years and causing lots of trouble for us. Hi Guys, today I will be telling you guy everything about these effects, so let's dive in and uncover some mysteries together! "Twenty-eight years ago, storms battered the West Coast of the United States... There were droughts in Australia, Indonesia and India... Worldwide, 2,000 people died. Economic losses amounted to billions of dollars... In Indonesia and Borneo, dry conditions spread raging forest fires that consumed hundreds of thousands of acres. Smoke blanketed the area." From the PBS news program, a warning was highlighted "Brace for El Nino!" (October 7, 1997)

WHAT CAUSED THESE DISASTERS? JUST SOME WARM WATER IN THE PACIFIC OCEAN.

Every 2-7 years, trade-winds in the Pacific Ocean slow down or reverse their direction, well it is still unknown to the humankind why this happens. The reason for El Nino La Nina to happen is the complex interactions between the ocean and atmosphere particularly in the Tropical Pacific.

EL NINO

During El Nino, trade winds weaken. Warm water is pushed back east, toward the West Coast of the Americas. El Nino means "little boy in Spanish". South Merica fisherman first noticed periods of unusually warm water in the Pacific Ocean in the 1600s.

LA NINA

La Nina is cooler than the normal sea-surface temperatures in the tropical Pacific Ocean that impacts global weather patterns and the trade winds gets stronger and disastrous for the fishermen.

EL NINO LA NINA EFFECT CONTD.

OCCURRENCES OF THE EL NINO LA NINA EFFECT

1997-1998 (EL NINO EFFECT):

This strong El Nino event led to drier conditions and increased fire risk in area like Indonesia and the Philippines.

2015-2016 (EL NINO EFFECT):

This El Nino event was one of the strongest on record and impacted fire regimes globally, with some areas experiencing changes in fire behavior.

2018 EL NINO IN AUSTRALIA:

This event contributed to drier conditions and a very early start to the bushfire season, with over 125 fires burning in Victoria and Tasmania during October.

2023 EL NINO IN CENTRAL CHILE:

These fires coincided with positive anomalies in the Nino 1+2 region, suggesting a strong connection between El Nino and fire weather conditions.

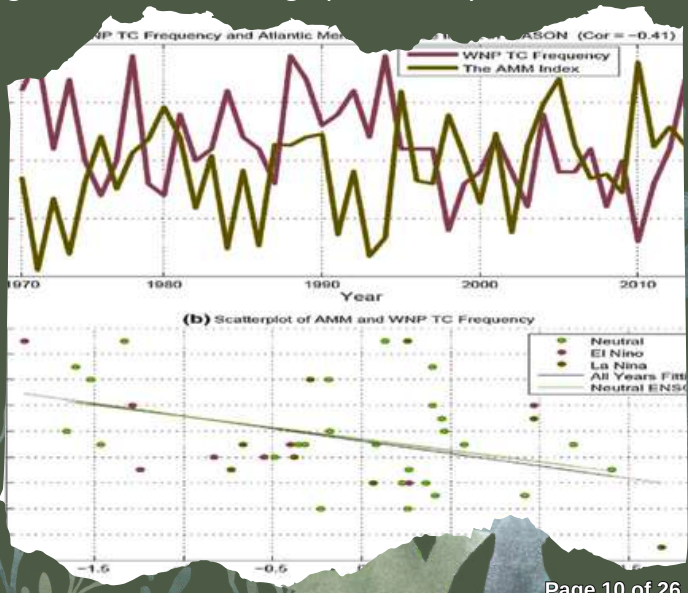
2020 LA NINA:

The 2020-2023 La Nina event was associated with a period of drier conditions in some specific areas, which could increase fire risk.

1988-1989 LA NINA:

This La Nina event was believed to be one of the most severe, causing billions of dollars in damages, including those related to fires in north America, according to the National Geographic Society.

As you can see, the way the graph is organised, it is clearly shown that AMM at each time has been greater than before and has caused so much danger. Each of the above incidents, dating since 1988-2023, has caused a lot of damage to the Americas; the damages are reaching the heights of billions of dollars, which no one could have ever thought of!



EL NINO LA NINA EFFECT CONTD.

POSITIVE IMPACTS OF THESE EFFECTS

EL NINO

- Reduced Atlantic hurricane activity: El Nino suppress the development of hurricanes in the Atlantic.
- Milder winters in some areas: Certain regions, particularly in the northern United States, Canada and Europe, may experience milder winters.
- Increased rainfall in the Southern US: the Southern US can experience increased rainfall during El Nino events.

LA NINA

- Positive impacts on the fishing industry: La Nina can lead to increased upwelling, bringing nutrient-rich waters to the surface and attracting fish.
- Increased rainfall in Southeast Asia: La Nina can enhance the summer monsoon in the Southeast Asia.
- Potential for reduced wildfire risk: In some regions, the increased rainfall associated with La Nina can help prevent widlfires.

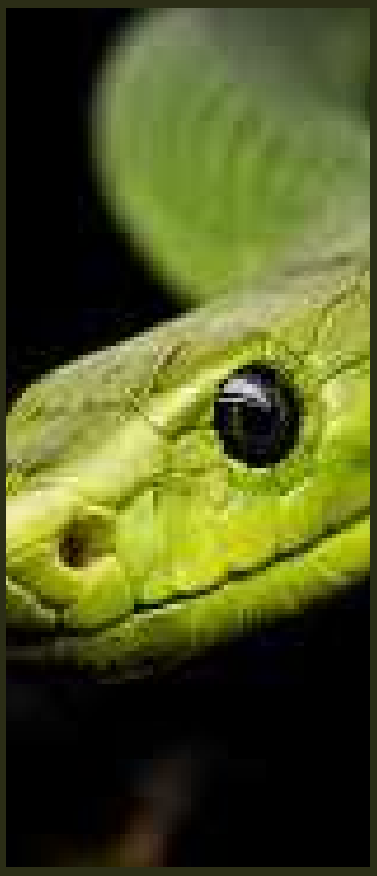
HOW TO MINIMIZE THE DAMAGES CAUSED BY THESE DISASTERS?

- Enhance Early Warning System and Climate Prediction
- Strengthen Agriculture Practices
- Mitigation and Adaptation Policies

Shaurya Meena, 9B

PHYSIOLOGICAL ADAPTATIONS OF ANIMALS TO EXTREME COLD AND HEAT

RUHAAN JAGOTA, 12A



Animals that reside in such extreme environments face very unique challenges when it comes to simply persisting. The opposite ends of the environmental spectrum, from on icy poles to scorching deserts, these adaptations have evolved environment based extremetraits that maintain body functions even as temperatures change.

Creatures in frigid parts of the planet, such as the Arctic and Antarctic use different strategies to keep them warm. Polar bear | They have dense winter fur and a thick fat layer to keep warm, as do others like the arctic foxes for example. The counter-current heat exchange system is used by many species where blood pumped into the limbs warms the cooler blood returning to the heart, reducing heat loss. Even animals, such as bears, hibernate in the winter — thus helping in conserving energy.

Animals living in deserts and hot savannas, on the other hand, keep cool and retain water. For example, elephants use their large ears as radiators to expel excess heat, whereas nocturnal animals like fennec foxes simply avoid the damaging daytime sun by being active at night. They can be dehydrated and store fat in humps that can turn to water and ENergy when needed. And dogs dissipate heat through panting, while humans (and certain primates) have sweat glands covering much of their skin.

Evolution built these impressive changes that allow certain species to exist in places we might not have thought could support life. What we learn from this could provide valuable insights into how nature is able to survive and thrive in some of the harshest environments on Earth, but it also gets people thinking about new technological advancements as well – especially when it comes to designing clothing, architecture, or survival technology for humans.

LIFE OF ORGANISMS IN THE HARSHEST ECOSYSTEMS: DESERTS, POLAR REGIONS, AND DEEP OCEANS

Even in the harshest conditions, life on Earth demonstrates an amazing capacity for adaptation and survival. In environments that appear unsuitable for life, such as sweltering deserts, frozen polar regions, and the crushing depths of the oceans, organisms have developed amazing survival strategies.

Extreme heat, a shortage of water, and sparse vegetation in deserts force organisms to reduce water loss and prevent overheating. Reptiles control their body temperature by hiding in their burrows or basking in the sun, while animals like camels store fat in their humps for use as water and energy. Thick, waxy skins help plants like cacti retain water in their stems and prevent evaporation. In order to avoid the heat of the day, many desert animals are nocturnal, only coming out at night.

Polar regions, on the other hand, are characterized by months of darkness, ice, and freezing temperatures. To protect themselves from the cold, animals such as arctic foxes, penguins, and polar bears have layers of blubber and thick fur or feathers. While some species, such as some fish, produce antifreeze proteins to prevent their blood from freezing, others migrate to warmer regions during the coldest months.

Even though the deep oceans are shielded from harsh weather, they still face difficulties with high water pressure, total darkness, and a lack of food. Anglerfish are among the many deep-sea animals that have evolved bioluminescence to draw in mates or prey. Others have specialized bodies that can tolerate pressures thousands of times higher than those at the surface, and slow metabolisms to save energy.

These amazing adaptations show how resilient and inventive nature is. In addition to deepening our knowledge of biology and evolution, research on these organisms provides information for resource management in harsh environments, climate resilience, and human survival technologies.

RUHAAN JAGOTA, 12A

OUTSTANDING OCTOPUS

A LIVING WONDER

The octopus is an outstanding ocean creature, known for its intelligence, camouflage skills, and amazing eight arms. This isn't just a creature, it's a whole vibe. Come with me on this journey to learn about this mastermind in disguise. Speaking of masterminds, did you know this creature has NINE BRAINS? Talk about genius. The octopus has one main brain, and eight smaller others in its arms. Already jaw dropping, am I right? But this is just the beginning. This wonder can do so many things at a time, and is already so smart. The brains in each arm allow the octopus to do multiple things at once. Talk about multitasking. Anyways, I am about to absolutely amaze you with this next fact. Unlike us, octopuses don't have red blood, but they have BLUE! Magnificent. It really is amazing how such a creature can be so cool. Did you know these things are a master in disguise? Yes they actually are; like literally. This one of a kind creature can change its skin colour

and not only that, even its own texture to blend in, and if you think that is all, you are mistaken.

The octopus, when in danger, squirts a cloud of ink to confuse predators! Just by that fact, you can probably tell it has nine brains. Another fact is that the octopus has three hearts, Two pump blood to the gills, and one pumps it to the rest of the body, stunning fact, right? Did you know that if the octopus loses a limb, itcan grow it back! This process is called regeneration. With three hearts, blue blood, and the ability to solve puzzles, the octopus is truly one of nature's most unique animals. Even though most live only a few years, they leave behind thousands of eggs, ensuring the next generation continues this fascinating way of life.

SUKAINA FATIMA, 6A

FREEZE, DON'T SHATTER

HOW THE WOOD FROG BEATS WINTER

Ghhanali Singh, 10A

Think about a foggy Noida morning in January. Your bus ride is freezing, your hands are numb, and your phone battery drops faster than usual. Now imagine a small animal that doesn't just handle the cold — it actually **freezes solid** and comes back to life in spring. That animal is the **wood frog** (found in North America), and its survival trick is so smart that doctors and scientists are trying to copy it.

The simple idea:

Ice is dangerous **inside** our cells because sharp crystals can burst them. The wood frog's superpower is to let ice form **around** its cells, not inside. It does this by flooding its body with natural "antifreeze" (mainly sugars), and by carefully moving water out of cells before it can turn into ice.

Think of it like this:

Snow outside the house = okay.

Snow inside your living room = disaster.

The frog keeps the "snow" (ice) outside the "house" (cells).

What actually happens (no scary science)

1. First chill: Ice starts on the frog's skin and in its blood—outside the cells.
2. Sugar rush: The frog's liver releases glucose (sugar) into the blood. This works like a mild antifreeze and protects delicate parts of the cell.
3. Water shuffle: Water leaves the cells on purpose, so there's nothing left inside to freeze.
4. Power-saver mode: Heart and breathing pause, and the body runs super-slow to save energy.
5. Spring reboot: When it warms up, the ice melts, water flows back into cells, and the heart starts beating on its own. The frog hops off to find food—no hospital needed!

Why do scientists care?

- Organ transplants: Right now, hearts and kidneys can only be kept on ice for hours. If we learn from the frog—using the right sugars and careful water control—we might keep organs safe for days, which could save many lives in India and worldwide.
- Heart attack and stroke care: A lot of damage happens when blood returns to tissues. The frog prepares for that moment so it doesn't freak out. Doctors want medicines that can do the same for patients.
- Vaccines that travel better: If we can protect cells like the frog does, some vaccines might stay stable without extreme freezers—great for remote clinics.

The wood frog doesn't fight winter with force. It organizes winter—deciding where ice goes and when to use energy. That idea works for us too. Before exams, we plan our time and resources. In sports, we pace ourselves. Even our phones have low-power mode. The frog is nature's master of low-power mode, and it survives because it stays in control.

So next time you're wrapped in a jacket at morning assembly, remember: somewhere out there, a tiny frog is literally frozen—and that's exactly how it stays alive. Freeze, don't shatter.

Lithobates sylvaticus or Rana sylvatica, commonly known as the wood frog, is a frog species that has a broad distribution over North America, extending from the boreal forest of the north to the southern Appalachians, with several notable disjunct populations including lowland eastern North Carolina. - Wikipedia

LIVING FOSSILS

The Animal Kingdom is one of the most vital parts of our ecosystems and moreover some species where some of the first signs of life on Earth which makes the entire concept of them incredibly interesting. Some of the animals today, existing on Earth are often called "living fossils" due to their uncanny resemblance to their ancestors and how little they have changed over the course of 600 million years. Science owes a lot to such creatures because studying them helps us understand the evolution from the start to now and how much has changed in this time.

There are so many fascinating ancient creatures that still are present, for example, Horseshoe Crab, a peculiar shellfish, with a horseshoe-shaped shell, hence the name, which has existed for more than 450 million years, practically older then dinosaurs. Coelacanth, a rare deep-sea fish, thought to be extinct until it was rediscovered in 1938. Something as boring as Jelly fish has existed for more than 500 million years. It was actually one of the first living organisms after simple unicellular organisms like bacteria. Animals like Crocodiles and Alligators have been around for more than 200 years.

Now the questions that made scientists roll in their sleep; why did they survive? They came to the conclusion that these animals adapted perfectly to their environment. Another reason being, most of them lived in water that didn't change as much as land. Also some of them had strong survival features. For example, crocodiles can eat rarely and still live long.

These creatures are really important because they show us how life looked on Earth millions of years ago, they help scientists study evolution, adaptation, and even medicine. For example, Horseshoe Crab blood is used in medical testing. They also show how life can survive mass extinctions. Crocodiles survived the asteroid impact 66 million years ago because they were perfectly built for survival. They could go months without food. They also lived in water away from heat, fire, and climate changes happening on land.

Although these species are ancient, they are endangered due to human activities. Protecting them is important because if we lose them, we lose a vital connection to Earth's past. They remind us of Earth's history and the esoteric survival features of some of the simplest and oldest creatures on Earth.

KARIESHMA MATHUR, 8A

CRYPTOBIOSIS

A TRUE POWER NAP

Life is set within a narrow frame of physicochemical factors, yet some species have adapted to conditions far beyond these constraints. Nature appears to have evolved two principal strategies for living organisms to cope with hostile conditions. One way is to remain active, retaining metabolism through adaptations that enable the organism to match the physiological requirements of environmental change. The other is to enter a state of dormancy with metabolic suppression. One form of metabolic suppression, known as cryptobiosis, is a widespread state across life kingdoms, in which metabolism comes to a reversible standstill. Cryptobiosis represents one of nature's most advanced survival mechanisms—a true “power nap” against extinction.

In a recent study published in the journal of PLOS Genetics, scientists from the University of Cologne in Germany claim to have revived roundworms frozen 46,000 years ago in the Siberian permafrost. The worms, found in a layer of ice that had been undisturbed for thousands of years, were able to resume normal activity after being thawed out and placed in a culture medium. They are even procreated.

Cryptobiosis is a survival strategy where certain organisms suspend nearly all metabolic activity, enabling them to endure extreme conditions like dehydration, freezing, lack of oxygen, or poisoning for years—even decades—until conditions improve. Cryptobiosis describes an almost complete arrest of metabolism in response to adverse environmental stress, such as desiccation, cold, lack of oxygen, high salinity, or toxic substances. Organisms including brine shrimp, seeds, tardigrades, rotifers, and even some insects and nematodes survive in this state. Instead of dying, these organisms enter a form of “suspended animation,” resuming normal life only when conditions are favourable enough.

Cryptobiosis seems to provide animals with a potential to survive conditions that are far beyond any constraints set by their normal environment. Being particularly resilient in the cryptobiotic tun-state, tardigrades are renowned for their ability to tolerate a variety of extreme conditions, including desiccation, severe osmotic shock, freezing in liquid nitrogen, and even exposure to space vacuum and cosmic radiation. When excluding any dormancy periods, tardigrades generally live for a couple of months. However, cryptobiosis may extend their life span by numerous decades.

Cryptobiosis challenges our perception of the transition between life and death of an organism. Understanding the mechanisms that underlie the ability to stabilize biological structures, from macromolecules across cellular, tissue and organ levels to the whole animal, and subsequently restart life after years of metabolic suspension has great potential for translational and applied sciences. As new molecular tools allow for increasingly detailed investigations, tardigrades are indeed gaining attention by physiologists and biochemists.

CRYPTOBIOSIS CONTD.

Understanding these “survival secrets” could help develop new approaches to medicine, biotechnology, and climate resilience—such as DNA repair techniques, preservation methods, or new strategies for human endurance in space travel and environmental disasters.

It is not that only microorganisms or smaller creatures have been granted the power of cryptobiosis. Even among humans, there are some cultural and religious practices that show us the hidden potential of the human body. There’s a tradition in Tibetan Buddhism where the topless bodies of monks are wrapped with a wet blanket on freezing cold nights and they have to dry it with a meditation practice called Tummo, showing the power of human metabolism. In Jainism, monks survive on just a couple of glasses of warm water a day for up to half a year. These practices are proof of our existing ability to reach states other than those we commonly achieve.

If by studying cryptobiotic organisms and humans who achieve such feats – we can figure out ways to artificially induce such states, we will not just change biology and medical science but bring about a profound change in life in the galaxy.

Imagine a future where humans have mastered cryptobiosis. We are able to dehydrate ourselves and survive centuries in a state of suspended animation. This allows us to travel to distant stars and galaxies and explore the universe without the need for carrying excessive food or water.

We could use cryptobiosis to colonize new worlds, bringing life to other planets. We could also use it to preserve our own species, ensuring that we survive even if Earth is destroyed. It could also hold the secret to protecting and preserving the only planet we have so far.

The possibilities are endless. Cryptobiosis is a powerful tool that could change the course of human history. It is a technology we should not take lightly and also ensure is not abused.

Tardigrades or “water bears”
The world's most resilient animal

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ACADEMICS & ACTIVITIES

A GLIMPSE INSIDE

CURIOUS MINDS AT WORK

EXPLORING SCIENCE

BEYOND TEXTBOOKS

From observing the wonders of nature to peering into the microscopic world, our young scientists are learning by doing. These snapshots capture their spirit of inquiry: whether it's examining tree life, experimenting in the lab, working with textiles, or collaborating on projects. Each activity nurtures curiosity, creativity, and critical thinking, proving that science is not just learnt; it's experienced. 🌿✨

THINK AND LINK

TEST YOUR ABILITY

FIND AND UNWIND

By: Ria Chaddha, 12C

E	R	E	A	A	D	A	P	T	A	T	I	O	N	M
D	E	F	X	T	Q	T	Z	T	S	J	H	A	F	Y
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T	A	F	D	I	G	R	A	D	E	O	D	D	W	E
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WORD BANK

Tardigrade, Cryptobiosis, Resilience, Adaptation, Survival, Microscopic, Navigation, Instinct, Revival, Lazarus, Extinction, Mystery

Riddles

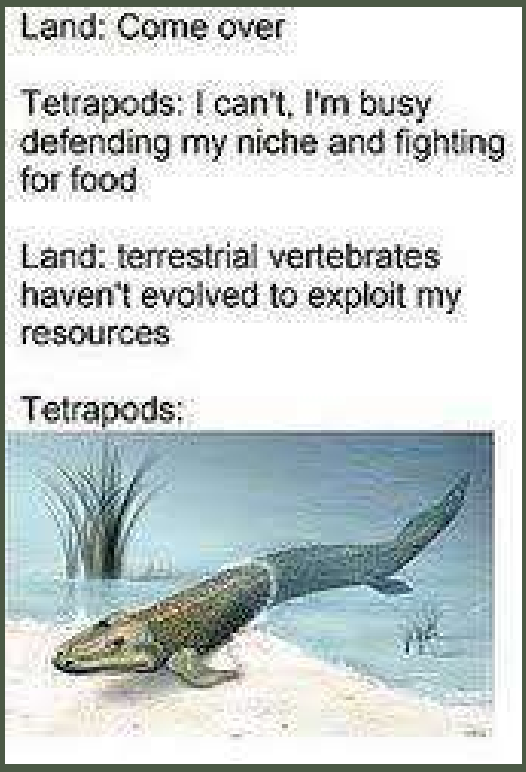
By: Ria Chaddha, 12C

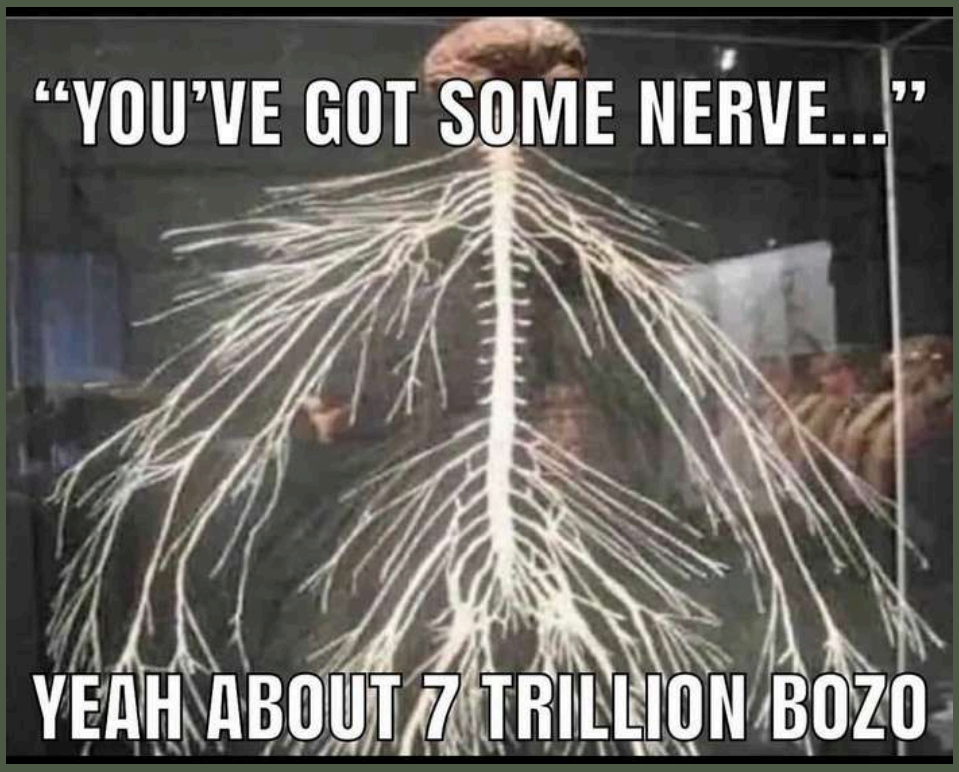
1. I'm tiny as dust, tanking heat, cold, and space. I dry up to live. Who am I?
2. Sleep? Not quite. I press pause on life—no food, no water, still fine. What state am I?
3. I hunt with a sense you can't see—your heartbeat is my beacon. Which sense?
4. I cross oceans with no map or phone; Earth itself is my compass. What am I using?
5. Declared gone, then found again years later — I'm a comeback story in biology. What effect am I?
6. I'm called a "water bear", but I don't growl. What's my real name?
7. I'm not hibernating; I'm tougher and drier. Name the survival trick.
8. I vanish in plain sight, wearing the forest as clothes. Which survival strategy?
9. A seed sleeps in sand for years, then rain whispers, "wake." What's this long sleep called?
10. Lose a limb, grow it back—no drama, just biology. Name the superpower.

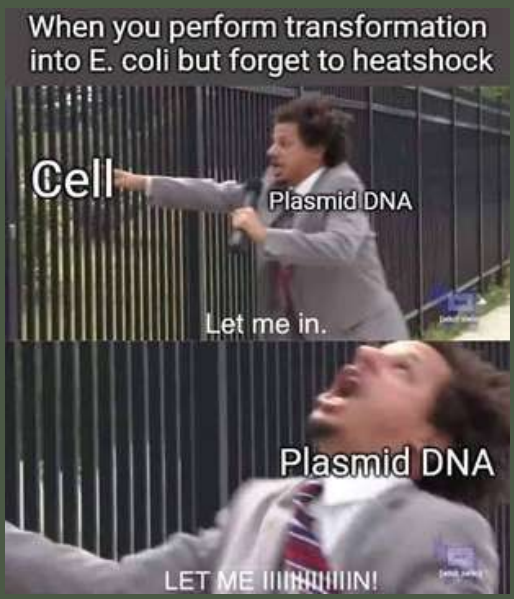
Answers: Tardigrade, Cryptobiosis, Electroreception, Magnetoreception, The Lazarus Effect, Tardigrade, Cryptobiosis (vs. hibernation), Camouflage, Dormancy, Regeneration (e.g., salamanders/axolotl)

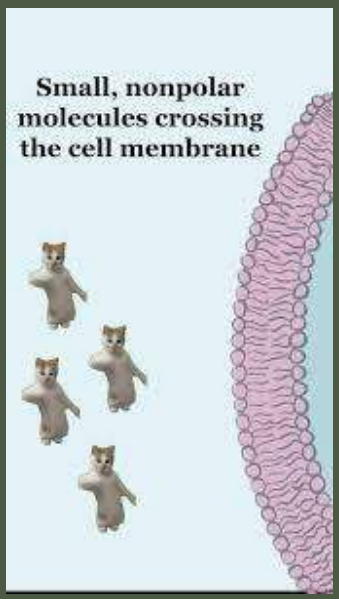
GIGGLES AND GRINS

HAVE A GOOD LAUGH









By: Ruhaan Jagota, 12A

Nature-Inspired Innovations

Tardigrades that cheat death, birds that read Earth's magnetic fields, fish that sense electricity — nature is full of hidden superpowers. Scientists are learning from these tricks of survival to build tougher, smarter, and more sustainable technologies.

THANK YOU FOR READING!

If you have any articles, poems, or creations related to the field of science you'd wish were published in the next edition, please send them at:

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