### SCIPULSE

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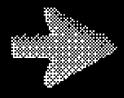
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#### CHALLANGES & TRIVIA

Try yourself!

# Editorial section



Welcome to the first edition of our student-led STEM magazine - a space where curiosity meets creativity, and passion for science, technology, engineering, and math takes center stage.

This magazine is more than just a collection of articles; it's a reflection of the incredible talent, hard work, and vision of our student contributors. Each piece you'll read – from research projects and scientific updates to career advice and ethical debates – was written with the goal of sparking interest, sharing knowledge, and encouraging deeper thinking about the role of STEM in our lives.

As the Student Manager and Editor, I'm incredibly proud of what our team has accomplished. We've brought together voices from different backgrounds, unified by a shared curiosity and drive to explore the unknown. Whether you're a future scientist, innovator, or simply someone who loves learning, we hope this magazine ignites your imagination and challenges you to think bigger.

A huge thank you to all our writers, researchers, designers, and editors who made this possible. This is just the beginning – and we can't wait to see where this journey takes us next.

SCIENTIFIC STUDENT

MAGAZINE MANAGERIEDITOR

# Science spotlight





### Latest news from science

1. NASA's Lucy Spacecraft Reveals Unusual Asteroid Shape NASA's Lucy spacecraft has transmitted new images of asteroid Donaldjohanson, revealing it to be an elongated, lumpy bowling pin-shaped rock. Measuring approximately 5 miles (8 kilometers) in length and 2 miles (3.5 kilometers) in width, this asteroid is larger than initially expected. The flyby, conducted at a distance of 600 miles (960 kilometers), serves as a preparatory mission for Lucy's future encounters with Trojan asteroids near Jupiter. <u>AP News</u>

# 2. Lichens Show Potential to Survive Martian Conditions A recent study by the Space Research Centre of the Polish Academy of Sciences suggests that certain lichens, symbiotic organisms composed of fungi and photosynthetic partners, may withstand the harsh environment of Mars. Exposed to simulated Martian conditions, including temperature, pressure, and atmospheric composition, the lichens remained metabolically active after enduring a year's worth of Martian ionizing radiation in just five hours. This resilience indicates potential for using

lichens in future Mars missions. Live Science

3. Climate Change Framed as a Crisis of Justice
Climate scientist Friederike Otto argues that climate change is
fundamentally a crisis of justice, not merely a physical or
environmental issue. She emphasizes that the impacts of extreme
weather events are influenced by local socioeconomic and political
conditions, with systemic inequalities exacerbating vulnerabilities.
Otto calls for a transformation in political and social decisionmaking to address the root causes of climate injustice. The
Guardian

4. Potential Signs of Life Detected on Exoplanet K2-18 b
Astronomers at the University of Cambridge have detected dimethyl sulfide (DMS) and dimethyl disulfide (DMDS) in the atmosphere of exoplanet K2-18 b using the James Webb Space Telescope. On Earth, these compounds are naturally produced by marine phytoplankton, making their presence on K2-18 b intriguing. While not definitive evidence of life, this discovery offers a step forward in understanding the potential for extraterrestrial life. The Guardian

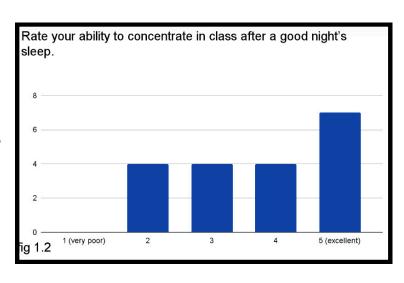
5. Advances in Solid-State Battery Technology
Solid-state batteries are gaining momentum as a promising
alternative to traditional lithium-ion batteries. These batteries
offer advantages such as increased safety, durability, and energy
density. Major automakers like Honda, SAIC, and Nissan are
investing in this technology, with plans to launch vehicles
equipped with solid-state batteries in the coming years. These
advancements could significantly impact the future of electric
vehicles and energy storage. Cosmos

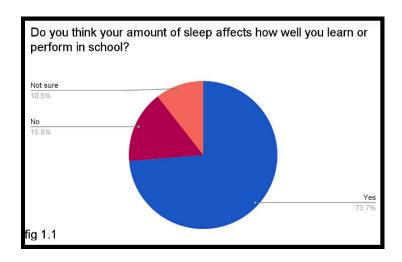
#### **Student Corner:**

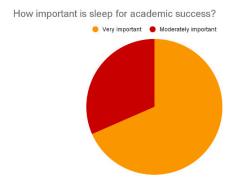
#### **Research & Projects**

In today's digital age, teenagers are spending more time online than ever before. While social media platforms offer ways to connect and share, there are some noticeable drops in levels of sleep intake in teenagers. This paper argues that the lack of sleep that comes from the usage of phones, consequently leads to a lower learning efficiency and rate. To give a concrete opening to this, a research conducted by (Adachi-Mejia et al., 2014, 252-257) "The purpose of this study was to determine if mobile phones interfere with adolescent sleep. We conducted a pilot test in a pediatric primary care practice of 454 patients. Adolescents completed paper-and-pencil surveys in the waiting room. More than half took their mobile phone to bed (62.9%) and kept it turned on while sleeping (56.8%). Almost half used their phone as their alarm (45.7%). More than one-third texted after going to bed (36.7%). Two or more times per week, 7.9% were awakened by a text after going to sleep." Sleeping has a direct relation to concentration, focus, and memory. According to a study by (Maquet, 2001, 1048-

memory. According to a study by (Maquet, 2001, 1048-1052), there are some neuronal assemblies that activate when we sleep, "These neuronal assemblies are proposed to be involved in the processing of memory traces during sleep." In support of this, concluding research, taking place among 11 graders at Turgut Ozal High School, 73.7% of responders agree that the amount of sleep affects school performance as shown in fig 1.1, while another 36.8% respond that a good night's sleep goes hand in hand with their concentration in class as shown in fig 1.2.







RESEARCH: THE IMPORTANCE OF SLEEP IN LEARNING PERFORMANCE IN HIGH SCHOOL STUDENTS

fig1.3

# HOW MUCH DOES IT REALLY MATTER

During the asked question: "Have you ever noticed that you do worse on tests when you're sleep-deprived?", 57.9% of our responders said yes. According to another study by (Walker, 2006, 326-333), "Behavioral tests showed that adequate sleep before and after a training session was essential for learning, whether the task was tennis or algebra." This implies the undoubtingly important need for sleep, from the easiest of daily life occurrences to the hardest.

Considering answers to questions like "how important is sleep for academic success?" With 68.4% being "very important" as shown in fig 1.3, and an overall research, the conducted conclusion would be that, even though not everyone understands its importance, sleep plays an important role in the way we function and it's essential to a normal human being.

#### References

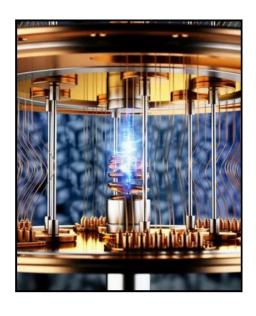
Adachi-Mejia, A. M., Edwards, P. M., Gilbert-Diamond, D., Greenough, G. P., & Olson, A. L. (2014). TXT Me I'm Only Sleeping: Adolescents With Mobile Phones in Their Bedroom. *Family and Community Health*, *37*(4), 252-257.

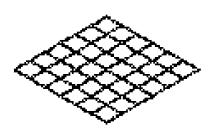
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Walker, M. P. (2006). Sleep to Remember: The brain needs sleep before and after learning new things, regardless of the type of memory. Naps can help, but caffeine isn't an effective substitute. *American Scientist*, 94(4), 326-333. http://www.jstor.org/stable/27858801

# The Future Is Now: Quantum, Embodies AI, and 6G Reshape the World









2025 is proving to be a defining year in the history of technology. From the rise of quantum computing to the robotics boom in China and the European Union's ambitious push for 6G, we are witnessing not just rapid innovation but the rewriting of what's possible in science, communication, and artificial intelligence.

#### Quantum Computing: Entering a New Era



Quantum computing has officially moved beyond the lab. This year, tech titans like Google, Microsoft, IBM, and Amazon have unveiled processors that edge us closer to the quantum dream: performing calculations impossible for even the most powerful classical supercomputers.

Google's "Willow" chip has shattered benchmarks, showcasing computing speeds that challenge what we once thought was possible. Microsoft introduced the "Majorana 1", a scalable chip built using exotic particles aimed at more stable quantum operations. IBM's "Heron R2" represents a significant leap toward fault-tolerant quantum supercomputing, addressing the fragility of qubits. Amazon Web Services launched "Ocelot", tackling key issues like error correction and scalability, bringing quantum closer to real-world applications.

But it's not just the giants. The UK's £2.5 billion investment in quantum tech, alongside startups like Oxford Ionics, reflects a growing ecosystem of innovation. Still, the field faces hurdles—most notably, qubit instability and the looming threat to cybersecurity, as future quantum computers could crack today's encryption systems. This has sparked a global push toward developing quantum-resistant security protocols.

Analysts now predict that quantum computing could generate \$1.3 trillion in value by 2035, transforming industries like healthcare, logistics, and finance. The quantum race is no longer a theoretical competition—it's a practical, global sprint toward the future.



While the West pioneers in quantum, China is pushing boundaries in embodied artificial intelligence – AI integrated into physical forms like robots and drones. This futuristic field is already reshaping urban life in cities like Shenzhen, where autonomous delivery drones from Meituan are becoming part of the everyday landscape. One of the most striking moments this year came during the Yizhuang Half-Marathon in Beijing, where 21 humanoid robots ran the entire 21-kilometer course alongside human participants. The event was both a technological showcase and a glimpse into a near-future where machines interact with us in dynamic, real-time environments. China's investments aren't just flashy - they're strategic. Initiatives like "Huisi Kaiwu", a platform for universal embodied AI, aim to standardize robotic systems for use across industries. Shanghai is also spearheading international collaboration in humanoid robot innovation, aiming to lead in global standards by 2025. The Chinese government sees embodied AI as a tool to tackle demographic challenges, revitalize the tech sector, and assert global leadership. Their plans include developing machine "brains," limbs, and core components, with a goal to surpass 1 trillion yuan in market size by 2031. While full autonomy is still limited by infrastructure and technical challenges, the pace of progress is undeniable.

#### By Enes Cela



#### The EU's Bold Leap into 6G

Not to be outdone, the European Union is investing heavily in 6G, the next evolution of communication networks. Through the Smart Networks and Services Joint Undertaking (SNS JU), over €500 million has been committed to funding 16 cutting-edge research projects that will define how we connect in the future. These efforts aren't just about speed – they're about intelligence and resilience. Projects like UNITY-6G envision a scalable, sustainable, AI-native 6G architecture. Another initiative, 6G-DALI, is pioneering data-driven integration of AI into communication networks through MLOps and DataOps. The EU's vision for 6G includes infrastructure capable of supporting vast amounts of data from humans, vehicles, drones, and smart devices – all while ensuring trust, security, and privacy. As part of its digital sovereignty strategy, the EU is also partnering internationally through the US-EU Trade and Technology Council. Member states have been required to dedicate at least 20% of their national recovery and resilience plans to digital transformation, with 6G being a key priority. This initiative is setting the stage for seamless connectivity that will fuel future innovations in transportation, medicine, and smart city development.

#### Conclusion: A Converging Future

Quantum processors, embodied AI, and 6G networks – each represents a pillar of our fast-approaching future. Together, they illustrate how hardware, intelligence, and connectivity are converging to reshape our world. From how we treat diseases to how we communicate, deliver goods, and interact with machines, these advances promise a new digital renaissance.

But with transformation comes responsibility. These technologies raise ethical, cybersecurity, and societal challenges that must be addressed alongside innovation. As students, future scientists, and informed citizens, it's up to us to stay curious, stay critical, and stay involved – because the future isn't just happening around us. We're helping build it!

# CRISPR-CAS9 PROTEIN

What if we could edit broken genes like we fix a typo, erasing disease before it even starts. What if farmers could seed crops that don't need poisonous pesticides, or doctors could help the immune system seek out and destroy cancer cells? It sounds fictitious, but this is real science in the making. At the center of it all is a tiny but crucial tool called CRISPR-Cas9 that one might refer to as nature's molecular scissors.

#### How It Works:

#### 1.The Guide RNA (gRNA): Your GPS System

First, the researchers create a small chunk of RNA known as guide RNA (gRNA). Imagine the RNA as an instruction set that instructs CRISPR where it must go within the DNA in order to make the change. The gRNA is so precise that it guides the CRISPR tool to where it needs to be specifically and makes the modifications exactly where it needs to happen.

#### 2. Cas9: The Molecular Scissors

Once the gRNA leads the CRISPR system to the target gene, there's another important protein which joins in: Cas9. Cas9 is an enzyme that behaves like molecular scissors. When it reaches the target site, it cuts both strands of the DNA at the very site specified by the guide RNA. This cut produces a break in the DNA. The break itself does not kill the cell outright but instructs the cell to repair it.

#### 3. DNA Repair: "The Game-Changer"

Now, we reach the turning point. When the DNA is severed, the cell knows something is broken and tries to repair it. This repair is where scientists can manipulate what happens next. There are two broad ways this repair can go:

#### BY KEVIN KAÇANI



#### What Is CRISPR-Cas9, Really?

CRISPR stands for Clustered Regularly Interspaced Short Palindromic Repeats, a highly specialized immune response bacteria use to fight off viral infections. Bacteria swallow fragments of viral DNA associated with disease and integrate them into their own genomes. When later infected with the same virus, the bacteria see and release the Cas9 enzyme, a special protein, that acts to cleave the viral DNA and hence prevent infection.

Scientists in 2012 recognized that they could utilize this natural system to make precise edits in genes in other organisms and humans. It is a find-and-replace operation for DNA that is of high technology.

#### 1. Turning off a gene:

When scientists wish to use a gene once more, they urge the cell to repair the cut in a random way, and it becomes sloppy. The sloppy repair will most likely disable the function of the gene and "turn off" the gene.

#### 2. Adding new genetic information

If it's intended to introduce a new gene or fix one that is damaged, scientists provide the cell with a "template", a piece of genetic material with a perfect copy of the damage. The cell copies the template and places it into the break, essentially stitching the broken region by replacing the damaged portion with new, correct information.

#### You thought I was done?

#### CRISPR in Action: Real-World Applications

In just a few short years, CRISPR moved from the research laboratory to affecting the lives in the real world:

- Medical Advancements: Already, there are ongoing clinical trials that are utilizing the potential of CRISPR to cure inherited genetic diseases like sickle cell anemia, muscular dystrophy, and blindness. In 2020, CRISPR cured a patient of sickle cell disease, a quantum leap.
- Cancer Research: Scientists are genetically modifying patients' immune cells to target cancer cells more effectively — for instance, by giving them a boost of genes.
- Agriculture: CRISPR was used to produce tomatoes that age more slowly, disease-resistant wheat, and brown-free mushrooms. In contrast with traditional GMOs, CRISPR edits are able to be introduced without involving foreign DNA.
- Infectious Disease Control: Even research has been conducted to gene-engineer mosquitoes with CRISPR so that they will no longer be able to spread malaria — potentially saving millions of lives.



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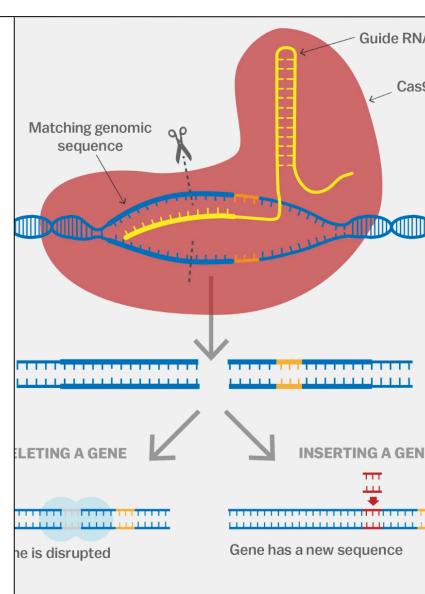
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v=MnYppmstxls



# "DIGITAL IMMORTALITY: SHOULD WE LIVE FOREVER ONLINE?"

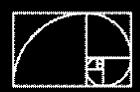


In a world where technology never sleeps, death is no longer the end. With just a few clicks, someone's voice, memories, and even personality can be brought back to life through AI. Creating what some call deathbots. These digital replicas, trained on texts, emails, and voice recordings, allow the living to "talk" to the dead. While the idea might sound comforting, it also raises unsettling questions: Is it really them? Should anyone be brought back to life without consent? And can grief ever truly heal if the goodbye is never final? As AI blurs the line between memory and reality, we're forced to confront a new unnatural dilemma: Should we let technology keep us alive forever even after we're gone?

This future isn't science fiction — it's already here. Companies like HereAfter AI and StoryFile offer tools that let individuals record their stories, memories, and voices while alive, allowing loved ones to interact with a digital version after they've passed away. For some, this is a powerful way to preserve family history, pass down wisdom, or maintain a sense of connection. One woman in China created a voice replica of her deceased father and described how it helped her cope with her grief. In moments of loss, technology like this can offer a comforting bridge — one that allows the living to feel heard, seen, or even guided by those no longer physically present.

From a scientific standpoint, this phenomenon is made possible by natural language processing (NLP), deep learning algorithms, and voice synthesis technology. According to a 2023 report by Statista, the market for AI-based grief tech is expected to grow to over \$3.5 billion by 2030. A study conducted by the University of Cambridge found that 63% of people surveyed would be open to engaging with a digital version of a loved one if it helped them process their grief. Psychologists are now exploring how "continuing bonds" — the idea of maintaining a connection with the deceased — can be enhanced by AI. Some researchers argue that when used responsibly, these tools could assist with closure and emotional regulation. However, others warn that overreliance may create what they call "ambiguous loss" — a state where the deceased is psychologically present but physically gone, complicating the grieving process.

However, these tools raise complex ethical and emotional questions. The number one principle of ethics is consent. What happens when someone's digital self is created without their explicit approval? In the vulnerable state of mourning, some may unintentionally cross moral boundaries, driven more by their own need for closure than respect for the deceased's wishes. Even if consent is granted, how sustainable is the comfort these digital replicas provide? While they may ease the shock of loss in the short term, do they delay or complicate the natural grieving process in the long run?



There's also a deeper philosophical question: what does it mean to "live" digitally? Can a bot truly reflect the soul of a person, or is it just a curated echo of their data? If we never fully say goodbye, do we also lose something essential about what it means to remember, to mourn, to heal? Our human nature is shaped by the fact that life is temporary. The urgency to apologize, to love, to be kind – these are fueled by the knowledge that tomorrow is never guaranteed. If life stretched on forever, even virtually, would we still cherish the moments in the same way?

And yet, it's understandable why some may turn to these tools. Beyond wanting to remember someone, perhaps there's a fear of being forgotten. Digital immortality may not just be about holding onto the past – it may also be about leaving a mark on the future. For people who fear that their voice, their values, or their presence might disappear with time, these technologies offer a form of legacy-building. But legacy, like memory, is fragile. Even those who are remembered today will eventually fade into history. Perhaps the goal isn't to be remembered forever, but to be remembered meaningfully – for the impact we made while we were alive, not for the echoes we leave behind.

Ultimately, while deathbots may offer companionship, comfort, or legacy, they also invite us to reflect on what truly matters: presence, connection, and the irreplaceable beauty of a life lived fully, however briefly.

Technology may offer us illusions of forever, but the beauty of life lies in its fleeting moments. Death teaches us to love more deeply, to speak more kindly, and to value each breath while it's still ours to take. Perhaps the greatest tribute we can give to those we've lost is not to keep them here, but to carry what they taught us and live fully while we still can. At the heart of it, death becomes a blessing not for how it ends life, but for how it honors those who lived with truth, dignity, and strength in a world that often pulls the other way.

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Artificial Intelligence & Machine Learning Engineer
Build smart systems that learn from data and improve over

time, like chatbots, self-driving cars, or personalized recommendations. With AI transforming industries from healthcare to entertainment, this field is exploding.



Biomedical Engineer
Where tech meets human care: create things like prosthetic limbs, surgical robots, or artificial organs. Biomedical engineering combines medicine and engineering to design life-saving devices and technology.



#### **Data Scientist**

Analyze massive sets of data to help businesses, governments, or health systems make smarter decisions. In the age of information, data is power, and someone needs to make sense of it all.



**Environmental Scientist or Engineer** 

Study environmental issues and design solutions to protect the planet, like clean energy systems or pollution control. Climate change, sustainability, and green tech are top global priorities.



#### **Career Pathways in STEM**





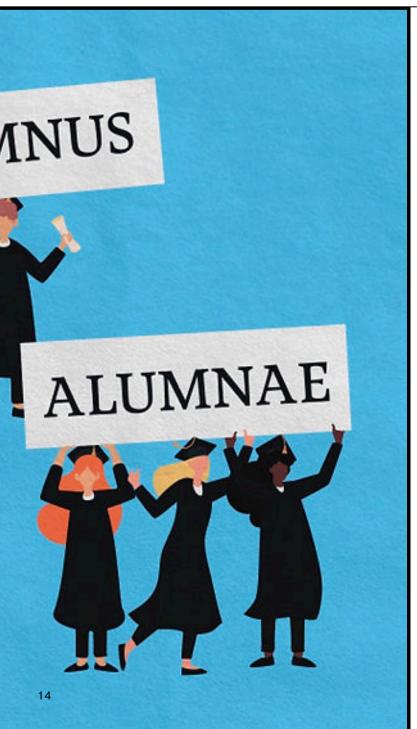
#### **Cybersecurity Analyst**

Protect sensitive information and defend systems from hackers, think digital bodyguards for companies and governments. With digital threats on the rise, cyber defense is more critical than ever.

### **Career Pathway**

### INTERVIEWS: SUCCES STORY

EXCLUSIVE FROM OUR ALUMNI: FROM EPOKA UNIVERSITY TO YOUR PAGES





My name is Sidrit Rrustemi, and I am a 2nd year Software Engineering student. When I first started this degree, everything felt a little new and unfamiliar, and I was not entirely sure what to expect. However, the more I learned about it, the more I realized that this is the perfect degree for me, especially for a person who loves math, technology and solving problems.

Many people believe that Software Engineering is all about learning how to code in different programming languages. Even though this is an essential part of it, this degree is much more than that. It teaches students how to think differently, by looking at large problems and being able to break them down into smaller pieces. It teaches them valuable skills that are very important in working environments. These skills will help you in any career, not just in tech-related ones.

This degree allows students to find their own unique path. Whether you like designing websites, building your own app, developing artificial intelligence or working on cybersecurity, Software Engineering can help you achieve them. Even if you would like to pursue a more business-related path in the future, while still focusing on technology, this degree can serve as a good starting point. With technology always advancing, there is always something new to learn, and you will never stop being a student.

Another thing that makes this degree exciting is the freedom it gives you once you start working. Because many jobs in this field are project-based, you can work from wherever you want, whenever you want. You still have to meet the required deadlines, but you do not need to work on a fixed schedule or commute every day to your office. This freedom allows you to design your workday around your life.

Software Engineering is not just a major. It is a path full of opportunities and possibilities for anyone who pursues it. I am still in my first steps of this journey and I am excited to see where it will take me



#### SCIENCE CHALLENGES

#### TRIVIA

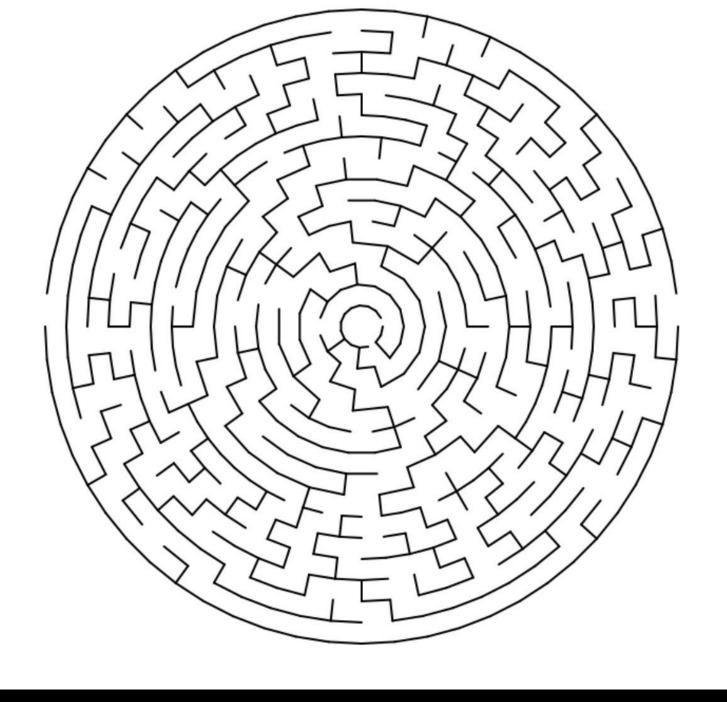
#### **FIND THE WORDS**

Plus A Bonus Word Hint: A Name. Words can be horizontal, vertical, diagonal, or reversed.

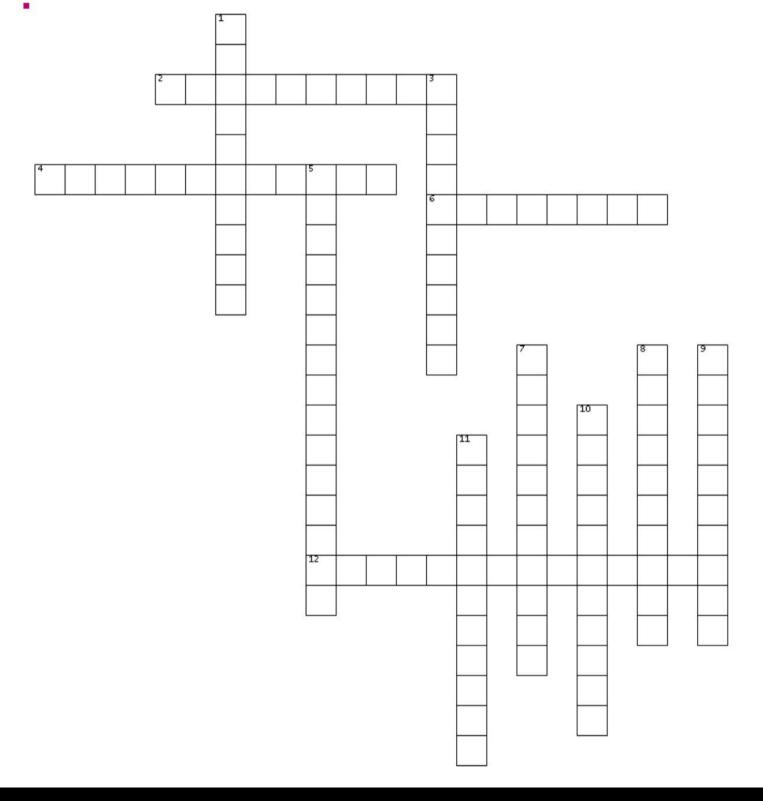
#### DO YOU HAVE WHAT IT TAKES?

EXPERIMENT
EQUATION
MICROSCOPE
THEOREM
RESEARCH
ANALYSIS
EDUCATION
LABORATORY
OBSERVE
CURRICULUM

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# FIND THE WAY CAN YOU DO IT?



#### **ACROSS**

- 2. THE PROCESS OF JOINING A SCHOOL/CLASS
- 4. FANCY WORD FOR GRADUATION CEREMONY
- 6. THE OFFICIAL OUTLINE OF A COURSE
- 12. SCHOOL MANAGEMENT OR LEADERSHIP

#### **DOWN**

- 1. RELATED TO THE CURRICULUM
- 3. OFFICIAL RECORD OF GRADES
- 5. ACTIVITIES OUTSIDE STANDARD CLASSES
- 7. INTRO PROCESS FOR NEW STUDENTS
- 8. BOTH BEHAVIOR AND A FIELD OF STUDY
- 9. EDUCATION GEARED TOWARD SPECIFIC TRADES
- 10. FINANCIAL AWARD FOR ACADEMIC ACHIEVEMENT
- 11. FORMAL TESTING PERIOD



## COME ON! PUT YOUR BRAIN TO WORK!!

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	7	9			5			
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							6	
6	2	5				4	7	8
9							5	
	3	2		9	6			
7				8	4		3	
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# THIS ONE IS EASY YOU GOT THIS

OKAY A
BIT
HARDER...

			6	2	9	8		
1				7	3	4	9	
	9		4	8				3
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9		1	7			5	4	8
6		7		4	8			9
2	7		1		4			
5				6				
	1	4	8		7			

#### LAST PUSH!



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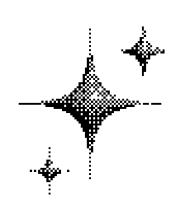
#### Some of our favuorite



#### quotes!



"EVERYTHING IS THEORETICALLY
IMPOSSIBLE, UNTIL IT IS DONE."
-ROBERT A. HEINLEIN, AERONAUTICAL
ENGINEER AND SCIENCE FICTION AUTHOR

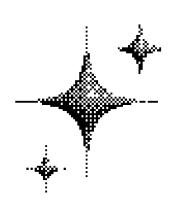


"THE BEST WAY TO PREDICT THE FUTURE
IS TO INVENT IT."

-ALAN KAY, COMPUTER SCIENTIST AND
WINNER OF THE A.M. TURING AWARD FOR
HIS CONTRIBUTIONS TO OBJECTORIENTED PROGRAMMING LANGUAGES
AND PERSONAL COMPUTING

"WE HAVE THE OPPORTUNITY TO CREATE THE FUTURE AND DECIDE WHAT THAT'S LIKE."

-MAE JEMISON, FORMER NASA ASTRONAUT, ENGINEER, PHYSICIAN, AND THE FIRST BLACK WOMAN TO TRAVEL INTO SPACE



"HOWEVER DIFFICULT LIFE MAY SEEM,
THERE IS ALWAYS SOMETHING YOU CAN
DO AND SUCCEED AT."
-STEPHEN HAWKING, THEORETICAL
PHYSICIST, COSMOLOGIST, AUTHOR, AND
RECIPIENT OF THE PRESIDENTIAL MEDAL
OF FREEDOM

#### OUR THANKS!

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# Thank you for exploring science with us!

Got a scientific story to share? Submit your work for the next issue!
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