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# SEEKING SCIENCE

## MONTHLY NEWSLETTER

STEM Action Teen Institution

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Who Retired in his 30s**  
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# Featured Article: Allen Wong, The Man Who Retired in his 30s

Brian Wang

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FIRE, a symbol of heat, burning passion, motivation, and desire, has blossomed into what became known as Financial Independence Retire Early. Thousands who aspire to retire at a young age have joined this movement, both in the physical and digital world. Though, is it as simple as participating in a movement? That was not the case for Allen Wong, a self-made millionaire who retired in his 30s. However, that begs the question: How did he do it?

In a digital world, Allen Wong's family has always been struggling. His parents who were still dwindling in sweatshops and physical labor - gathering herbs for a living - toiled at their mental and physical health. His father built up enough tension in his life to suicide, with his mother, as a result, unfortunately gaining mental illness as a result. Allen, seeing this sight, didn't want to continue his family's heritage like this. From a young age, he already saw visions of breaking out of the lower class barriers, to ascend into a better class for his family, and for his future. His beginnings may have not been fair compared to others, but what WAS fair for both him and those around the world was time. He spent hours upon hours, working with his computer programming skills, to become rich.

Like many self-made millionaires, at one point, Allen Wong threw on the apron and led the kitchen of his life with so much ambition, that he would release one project after another. He released applications on the App Store - a software to download applications from developer around the world on the Apple phone - repeatedly, hoping that one day, his apps will take flight and garner him enough money to support both him and his family. He was barely sleeping, coding for hours on end, until one day, one of his apps did take

flight. Like a plane, it soared. He could only admire, as he questioned how he had done something so significant. The plane that flew, was the plane of his police scanner app. The name was “5-0 radio police scanner app”, which had over 20 million downloads by 2012.

What motivated him to develop this app? After hearing his manager at his workplace talk about his passion for listening to police radio, but it was a hassle to load the radio each time, he was struck with the idea of developing a police radio app. He went on to program continuously until the app was released.

At first, the app only made a humble \$10 per day, with little to no downloads. However, it was his marketing technique of reaching out to the app’s niche audience, that the app’s popularity soared, with its functionality spreading by word of mouth. It skyrocketed, with the app reaching Top #1 in the App Store’s news category. The app eventually brought in revenues reaching over \$1,500 a day, making him the million-dollar mark in less than a year.



What was the secret to his success? It wasn’t luck, nor was it through hereditary privilege. In fact, it was through his very own efforts of discipline that he was able to achieve something so great. Like other billionaires, such as Elon Musk, he had a period of working until he eventually reached success.

Therefore, it is crucial that people around the world, like us, work until we see success, and don’t stop fighting for our dreams until we reach the end of the tunnel.

# Unraveling the Mysteries of Dark Matter

Eddie Zhang

Dark matter remains one of the most tantalizing puzzles in contemporary physics. Despite being invisible and intangible, its gravitational effects shape the universe on a grand scale. This essay delves into the depths of dark matter, exploring its importance, theoretical underpinnings, observational evidence, and the ongoing efforts to understand its nature.

Dark matter's significance lies in its gravitational influence, which molds the large-scale structure of the cosmos. From the rotation curves of galaxies to the bending of light by massive objects, dark matter's presence is inferred through its gravitational pull, outweighing visible matter by about fivefold. Without dark matter, our current cosmological models would fall short in explaining observed phenomena.

Several theoretical models attempt to explain dark matter's nature. One prevalent hypothesis suggests that it consists of Weakly Interacting Massive Particles (WIMPs), particles that interact weakly with ordinary matter and radiation. Supersymmetry, a theoretical extension of the Standard Model, offers potential candidates for WIMPs, such as the neutralino. Other proposals include axions, sterile neutrinos, and primordial black holes. Each model carries distinct implications for particle physics and astrophysics, driving experimental endeavors to detect dark matter particles directly or indirectly.



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Observational astronomy provides compelling evidence for dark matter's existence. One persuasive piece of evidence comes from the rotational velocities of galaxies.

Observations reveal that stars and gas in galaxies orbit at speeds inconsistent with the visible mass alone, indicating the presence of unseen matter, presumed to be dark matter.

Detecting dark matter remains a formidable challenge. Experimental efforts encompass various approaches, including direct detection experiments and indirect

detection methods. Direct detection experiments employ sophisticated detectors shielded from cosmic rays to capture rare interactions between dark matter particles and ordinary matter. Indirect detection methods leverage astrophysical observations to infer dark matter's presence through its annihilation or decay products.

Additionally, particle colliders like the

Large Hadron Collider (LHC) probe for new particles that could constitute dark matter.

The discovery of dark matter promises to revolutionize our understanding of fundamental physics and cosmology. Beyond revealing the universe's composition, elucidating dark matter's properties could provide insights into cosmic structure formation, galaxy dynamics, and fundamental forces. Dark matter remains a profound mystery that continues to intrigue scientists across disciplines. Its pervasive influence on the cosmos underscores the need to unravel its secrets. Researchers strive to shed light on dark matter's nature, unlocking a deeper understanding of the universe's fundamental constituents. In this pursuit, the quest for dark matter exemplifies humanity's curiosity and quest for knowledge about the universe's mysteries.



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# Reality of Deleted Files

Owen Chen

In the digital age, the concept of deleting files is as familiar as it is misleading. When you delete a file on your computer, you might think it disappears forever. However, the reality is far more complex. Deleted files often leave behind remnants that can be recovered through various means. Understanding what happens to a file when you hit "delete" reveals important insights into data storage, privacy, and security.

When you delete a file, it doesn't immediately vanish from your storage device. Instead, the operating system changes the file's directory entry to mark its space as available for new data. This is akin to removing a book's title from a library catalog while the book itself remains on the shelf until someone places a new book in its spot.

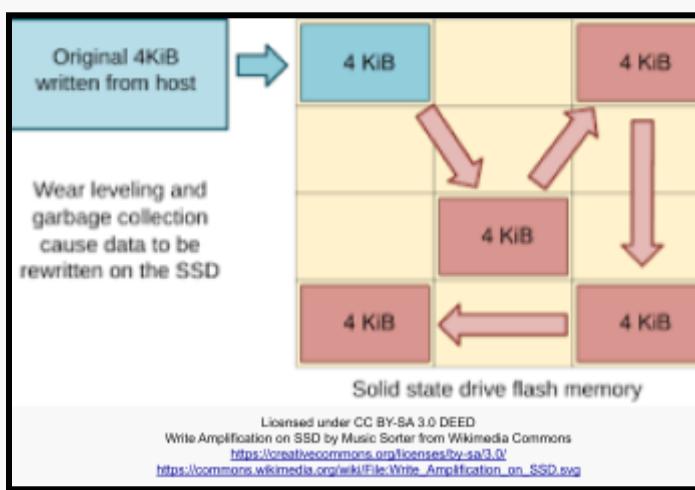


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On most operating systems, the first step of deletion moves the file to a temporary holding area, like the Recycle Bin on Windows or the Trash on macOS. Files in this location can be easily restored if needed. Emptying the Recycle Bin or Trash is often referred to as "permanent deletion," but this only removes the directory entries, not the data itself. Given that "deleted" files still exist physically on the storage medium, they can often be recovered using specialized software. Data recovery tools scan the storage device for traces of files that have been marked as deleted but not yet overwritten. This

process can recover files that were deleted intentionally or accidentally, often providing a second chance to retrieve lost data.

The persistence of deleted files has significant implications for privacy and security. For individuals, it means that sensitive information, once thought erased, might still be accessible. For businesses, especially those handling confidential or personal data, failing to properly delete files can lead to data breaches and legal repercussions. To truly erase a file, one must use secure deletion methods. These methods involve overwriting the file's data with random information multiple times to ensure that it cannot be recovered. Advancements in storage technology introduce new challenges for data



deletion. Solid-state drives (SSDs), for example, use a process called wear leveling to extend their lifespan by distributing write and erase cycles across the memory cells. This can make it difficult to ensure that all copies of a deleted file are overwritten, complicating secure deletion efforts.

The issue of data deletion intersects

with legal and ethical considerations. Laws such as the General Data Protection Regulation (GDPR) in Europe mandate that individuals have the right to request the deletion of their personal data. Compliance with such regulations requires organizations to implement robust data management and deletion practices to ensure that files are truly and securely erased.

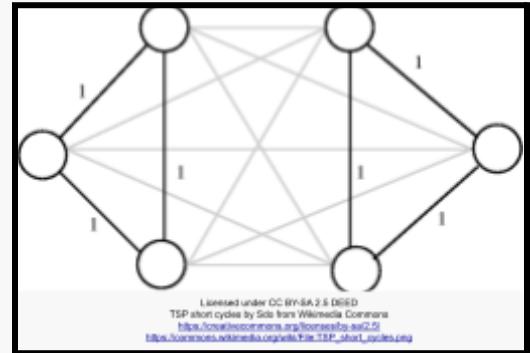
The notion that a deleted file is gone forever is a misconception. In reality, the data remains on the storage medium until it is overwritten, leaving it vulnerable to recovery. This persistence of deleted files highlights the importance of understanding the underlying processes of data deletion and employing secure methods to protect sensitive information.

# Traveling Salesman Problem

Aidan Hong

In Computer Science, numerous algorithms are designed to solve problems, such as hash maps and dynamic programming. These all have the common goal of optimization. One common question in computer science is the traveling salesman problem, in which the programmer must find the most efficient path between all different cities.

The traveling salesman problem works like this: a salesman is traveling through “n” cities. The goal is to find the most efficient and shortest path between each city. However, to find an algorithm that works for all cases is hard. Currently, an algorithm to find the shortest path every time would be unfeasible and have inappropriate time. For example, a brute force solution would have  $O(n!)$  time, which means that the greater the size “n” is, the time to run the program grows at the rate of a factorial. Dynamic programming could also be used. Dynamic programming, despite being faster than brute force, is still unfeasible, running at  $O(n^2 \cdot 2^n)$  time, which is better than  $O(n!)$  but still inefficient overall. It is possible to develop a solution that gives a “good enough” estimate of the fastest time, but it is quite unfeasible to find a solution that finds the fastest and most efficient path every time. As a result, it is one of the most persistent questions in computer science as computer scientists try to figure out which algorithm works in this case.



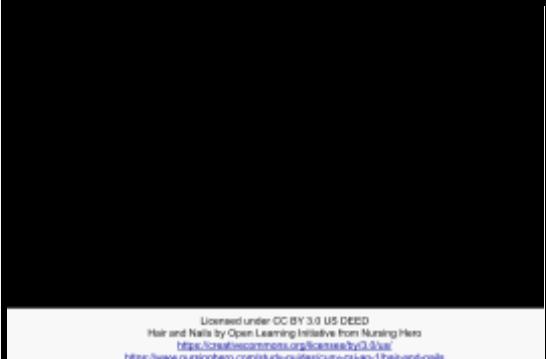
The traveling salesman problem is a computer science problem in which computer scientists try to figure out an algorithm that finds the shortest path that is both feasible and efficient. Currently, no such solution exists, but numerous attempts have created faster and faster solutions that may one day be feasible to implement.

# The Science Behind Your Fingernails

Arthur Liang

One of the many interesting aspects of the human body are our nails. These structures are not made up of cells, but rather a tough protein known as keratin. The growth of our fingernails is a complex cellular pathway consisting of specialized cells and processes. The entire pathway starts at the base of the nail, a place known as the nail matrix. Here, new nail cells are constantly generated to ensure the perpetual growth of fingernails across one's entire life.

These rapidly dividing cells in the nail matrix are known as keratinocytes. As keratinocytes populate and are pushed further out from the nail matrix, they begin to specialize. During this process, the cells lose their nuclei and become filled with keratin,



which causes them to become tough and plate-like. This specialization is also called keratinization. Keratinization occurs relatively slowly, causing our nails to grow, on average, 3 millimeters a month depending on factors such as age and health. Fingernails on the dominant hand usually grow a tiny bit faster because

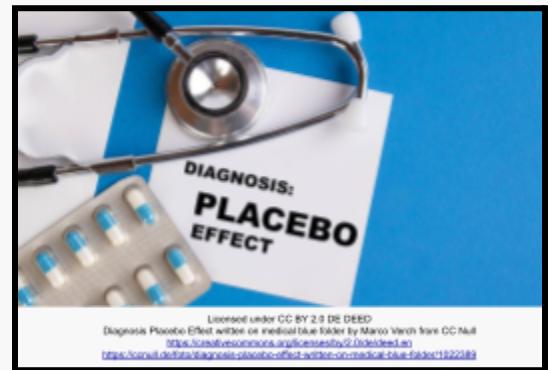
frequent use leads to increased blood flow and cell division. Also, hormones and nutrition can affect nail growth. For example, deficiencies in vitamins and minerals like biotin and zinc can slow the process of keratinization. The visible part of the nail, known as the nail plate, is supported by the nail bed, which is a layer of skin cells that provides essential nutrients. The nail plate extends past the fingertip as it grows, eventually being trimmed or worn away through daily activities. Overall, the growth of fingernails is an interesting process and reflects the immense complexity of the human body and the small processes that contribute to our daily lives.

# About the Placebo Effect

Richard Wang

A placebo is something that takes on the appearance of being the real thing but it actually isn't. Examples could include a pill, a shot, or any other treatment where there is no physical substance that affects health. They are used in clinical trials to test the potency of medical treatments. In these clinical trials, the recipient will not know whether the treatment contains the effecting substance or not because expectations about the treatment can influence the results. The placebo effect occurs through placebos because it provides relief in a psychological way rather than physical. Placebos affect a person's perception and can thus induce chemicals that relieve pain even though the treatment itself could be a sham.

This effect may occur through different psychological mechanisms: self-limiting disorders, remission, change in behavior, altered perception, reduced anxiety, brain chemicals, and altered brain state. Some things like colds are self-limiting which means they'll resolve eventually, so it'll feel like you are getting better. Sometimes diseases come and go, so when they temporarily disappear, it feels like the placebo worked. Taking a placebo also tricks people into taking care of themselves better and that is what allows somebody to ease their symptoms. How people perceive the symptoms may be different because people may think one feeling means something else. One of the biggest psychological effects when given a placebo is when the brain releases natural pain relievers called endorphins. Giving a person a placebo goes against the norm that informed consent is usually required for a study to be considered ethical.



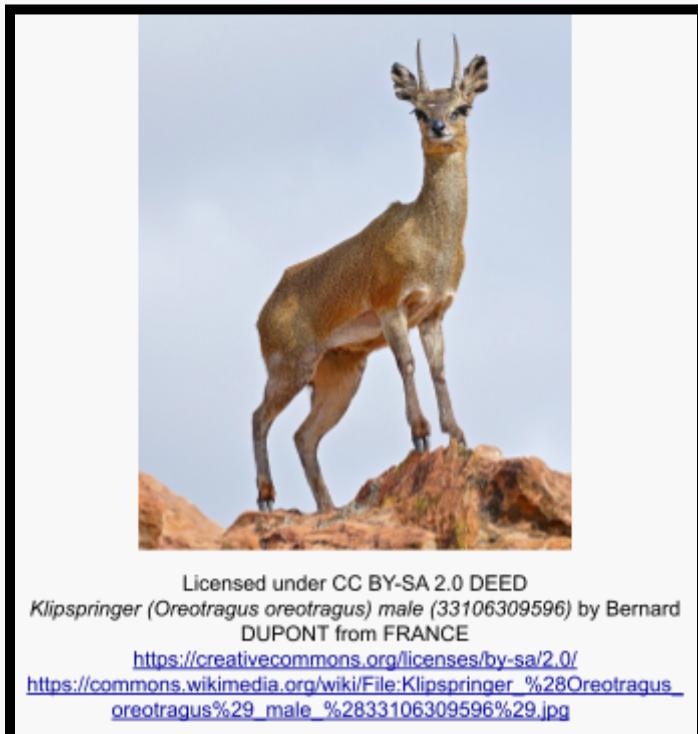
# Klipspringer

Mary Liang

Klipspringers are a type of dwarf antelope that lives among rocks in Africa called kopjes. They are about 2 feet tall and weigh 22 to 40 pounds and their fur is made of hollow, brittle hairs with colors ranging from brown, yellow, gray, or olive green. Their fur insulates them from the blazing heat of the arid area in Africa and historically, they are wanted for their fur to line horse saddles. Their hooves have a slight suction cup to grapple onto rocky surfaces. Due to their shyness, they are fairly rare to spot in their natural habitat, but this does not mean that they are endangered.

These hollow-horned animals live in the mountain ranges of eastern Africa from the Red Sea, the Cape, and the north of Angola near the coastal ranges and river gorges. Baby klipspringers hide inside their homes in the first 2-3 months of their life due to the eagles searching for rock hyrax that lives within the klipspringers' habitat. They mark their territory with dung piles and round tar-like substances from their preorbital glands which are added to branches near their house.

Klipspringers are known to form long-lasting bonds and look after one another by one acting guard to warn the other about danger while the other dine on grass, berries, flowers, seeds, fruit, and leaves.



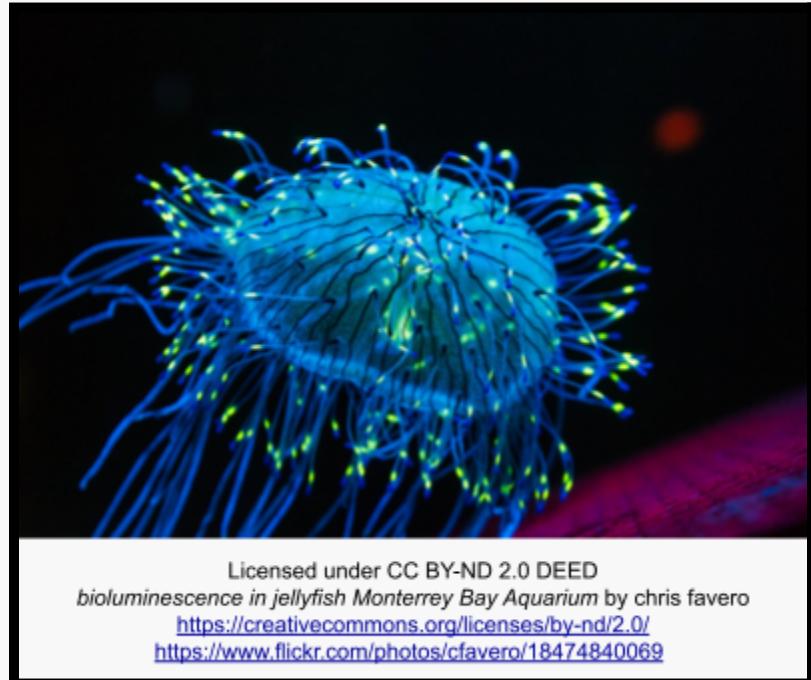
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# Bioluminescence

Angela Chin

If you've ever come across an animal glowing in the dark, you've most likely witnessed bioluminescence. These phenomena primarily occur in but aren't limited to oceans, where creatures have adapted to survive in the dark. First developed over 500 million years ago, bioluminescence involves chemical reactions, assists organisms in survival, and can better our understanding of cellular processes.

Bioluminescence is the term for chemiluminescence inside of a living being. Chemiluminescence is simply the reaction of producing light. The process of bioluminescence takes place through a chemical reaction with the enzyme luciferase and substrate luciferin. When exposed to oxygen, these two interact to produce the familiar glow through an organ called the photophore. The color and intensity of the light may depend on the species of an entity, such as having extra calcium or magnesium ions. Since luciferins are commonly absorbed as food, bioluminescence has arisen dozens of times throughout evolution.

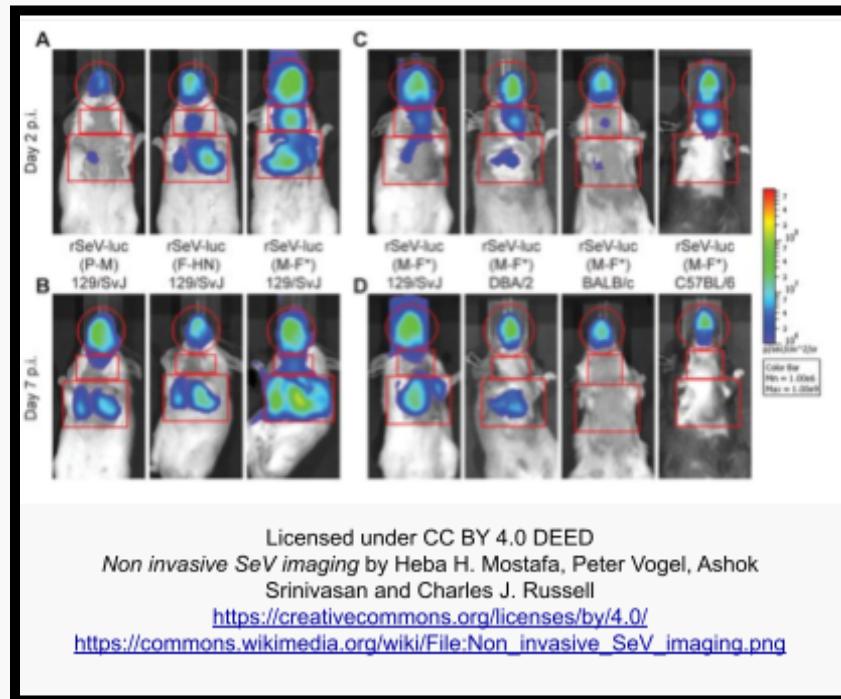


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This ability isn't limited to creatures of the sea, as stated above. Fireflies, fungi, and bacteria also produce such light, whether it be for mating or spore dispersal.

Similarly, back in the sea, bioluminescence aids lifeforms in confusing predators and communicating with others. For instance, the vampire squid releases a bioluminescent fog from its tentacles to escape from predators. The spectacle also aids humans quite a bit.

Finally, BLI, or bioluminescence imaging, is incorporated into detecting illnesses in the human body. When luciferin enters the bloodstream of a cancer patient, it can detect whether drugs effectively contain the disease. Furthermore, it's useful to scientists studying cellular mechanisms such as gene expression, signal transduction, and protein trafficking.



# How does Bitcoin work?

Emily Ma

Bitcoin, the first and most well-known cryptocurrency, operates on a decentralized network called a blockchain. This digital currency is not controlled by any single entity such as a government or central bank, making it immune to interference or manipulation. Bitcoin transactions are recorded on the blockchain, a distributed ledger that is maintained by a network of computers, known as nodes. These transactions are verified and added to the blockchain through a process called mining, where powerful computers solve complex mathematical puzzles to secure the network and confirm the legitimacy of transactions.

The value of Bitcoin is determined by supply and demand in the open market, much like traditional stocks and commodities. As more people buy and hold Bitcoin, its price tends to rise, and conversely, when people sell off their holdings, the price tends to fall. This volatility has led to significant price fluctuations, making Bitcoin an attractive investment for some and a source of concern for others. Additionally, Bitcoin's limited supply of 21 million coins, combined with increasing adoption and institutional interest, has contributed to its status as a store of value and a speculative asset.

Investing in Bitcoin carries inherent risks, as its price can be influenced by various factors such as regulatory developments, market sentiment, and technological advancements.



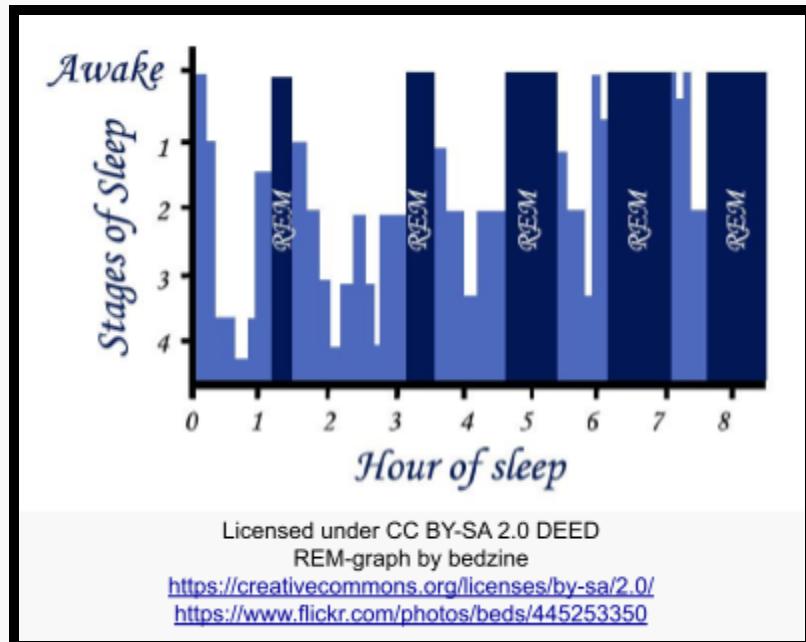
# Science of Sleeping

Wilson Zhu

Sleep: humans usually spend around one-third of their lifetime sleeping. Sleep is a vital biological function that is crucial for maintaining overall health. After falling asleep, many changes start to arise in both the brain and the body. The body begins to utilize less energy during sleep compared to being awake. Throughout the time sleeping, the brain will progress through many sleep cycles; these sleep cycles are crucial in the way sleep actually works.

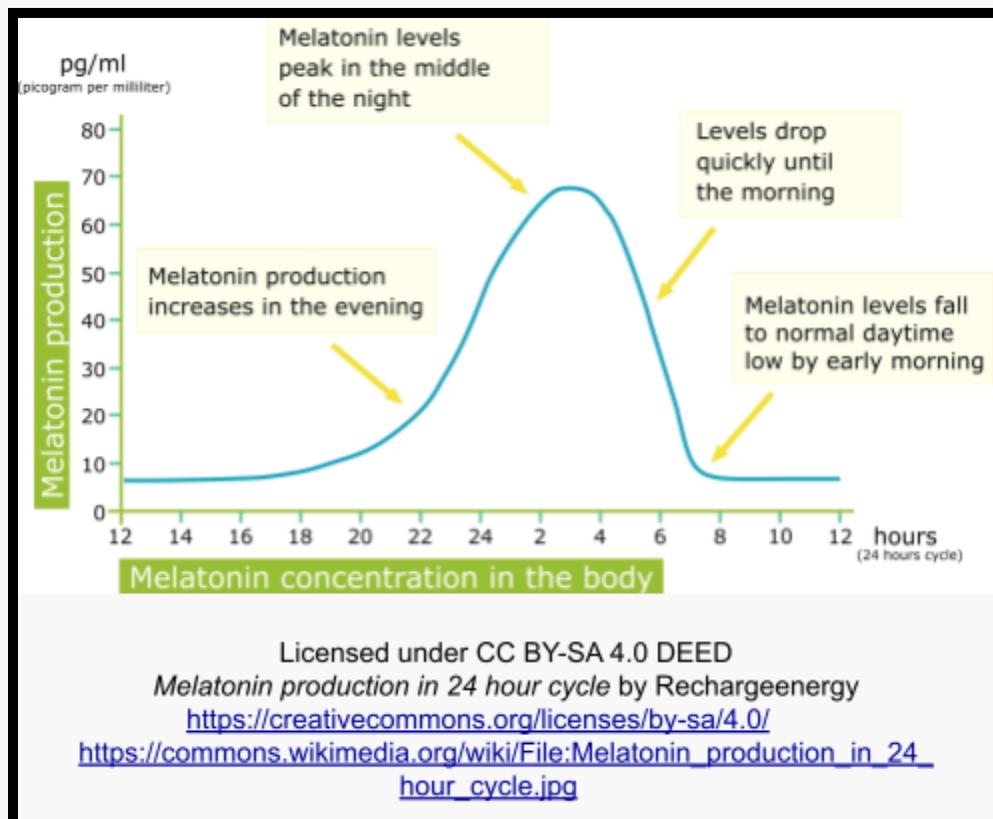
When sleep starts, the brain repeatedly cycles through two different types of sleep: Rapid Eye Movement (REM) sleep and Non-Rapid Eye Movement (NREM) sleep. The first cycle of sleep is NREM and it is made of four cycles. The first cycle begins during the beginning of falling asleep. The second stage is light sleep where the heart rate and breathing start to regulate and the body temperature eventually lowers.

The third and fourth stage is deep sleep. Finally, the brain cycles into REM sleep, which is characterized by the eyes moving rapidly, the breath rate increasing, and the body becoming paralyzed temporarily as it prepares to enter a state. The sleep cycle begins to repeat itself and it starts to spend more time in REM sleep compared to NREM.



Additionally, sleep is regulated due to the circadian rhythm, a biological clock located in the brain. This clock responds to the stimulus of light cues, ramping up the production of the hormone melatonin (a hormone that plays a vital role in facilitating sleep) at night, then switching it off when it senses light. Sleep is important as it helps the brain to adapt to input and helps to process the information that the brain receives during the day.

In conclusion, humans spend about one-third of their lives sleeping, which is essential for overall health. Sleep involves cycling through stages of NREM and REM sleep, each with specific physiological changes and functions. Regulated by the circadian rhythm and melatonin, sleep helps the brain process daily information and adapt to new inputs.

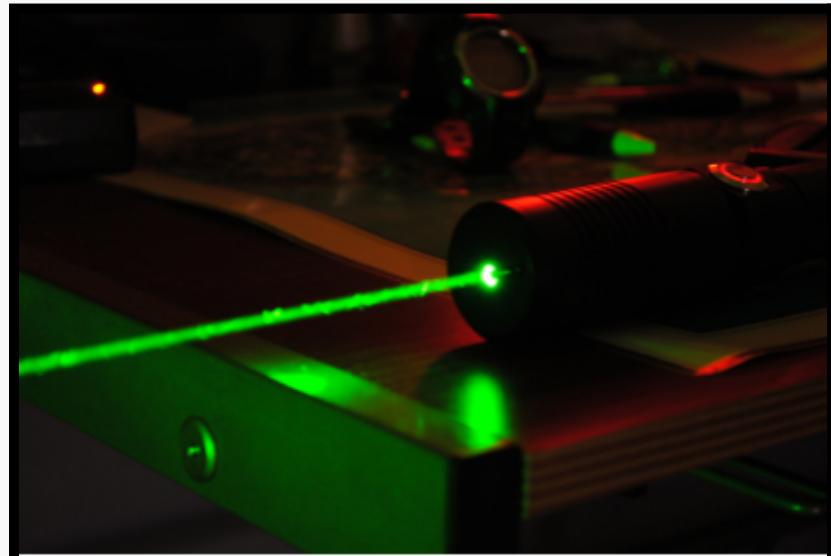


# How Lasers Damage Cameras

Riley Lee

Lasers are powerful beams of light that have multiple uses, such as cutting metal, playing with cats, or creating light shows. However, it's important to know that lasers can damage cameras. Cameras contain sensitive components like the image sensor, which can be harmed by the intense and focused light of a laser. When a laser beam hits a camera sensor, it can overheat, melt, or cause and create certain parts to malfunction.

Some lasers can even result in chemical changes in the sensor materials or disrupt the camera's electronics, leading to malfunctions or total failure. There are different ways that lasers can harm cameras, ranging from causing burned pixels to cracking or melting the sensor. Additionally, lasers can damage the camera lens by creating tiny pits or melting parts of it, which affects the quality of the images. Special filters in cameras can also be ruined by lasers, resulting in unusual colors or reduced sharpness in the images. This happens because lasers have a very high energy density on where the point is pointing. When a lens gets damaged the results will come out with dark spots, dead pixels, or lines.



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To protect our cameras from laser damage, it's important to take precautions. When in an environment where lasers are being used, such as a concert or a science lab, it's crucial to be cautious with your camera and avoid pointing it directly at laser beams. Using special filters on your camera lens can help block harmful laser light without affecting your pictures. If you're in a setting with numerous lasers, you can use physical barriers like a cover or a shield to shield your camera from direct hits. By understanding these risks and taking preventive measures, we can keep our cameras safe and functioning properly.



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# The Most Beautiful Number

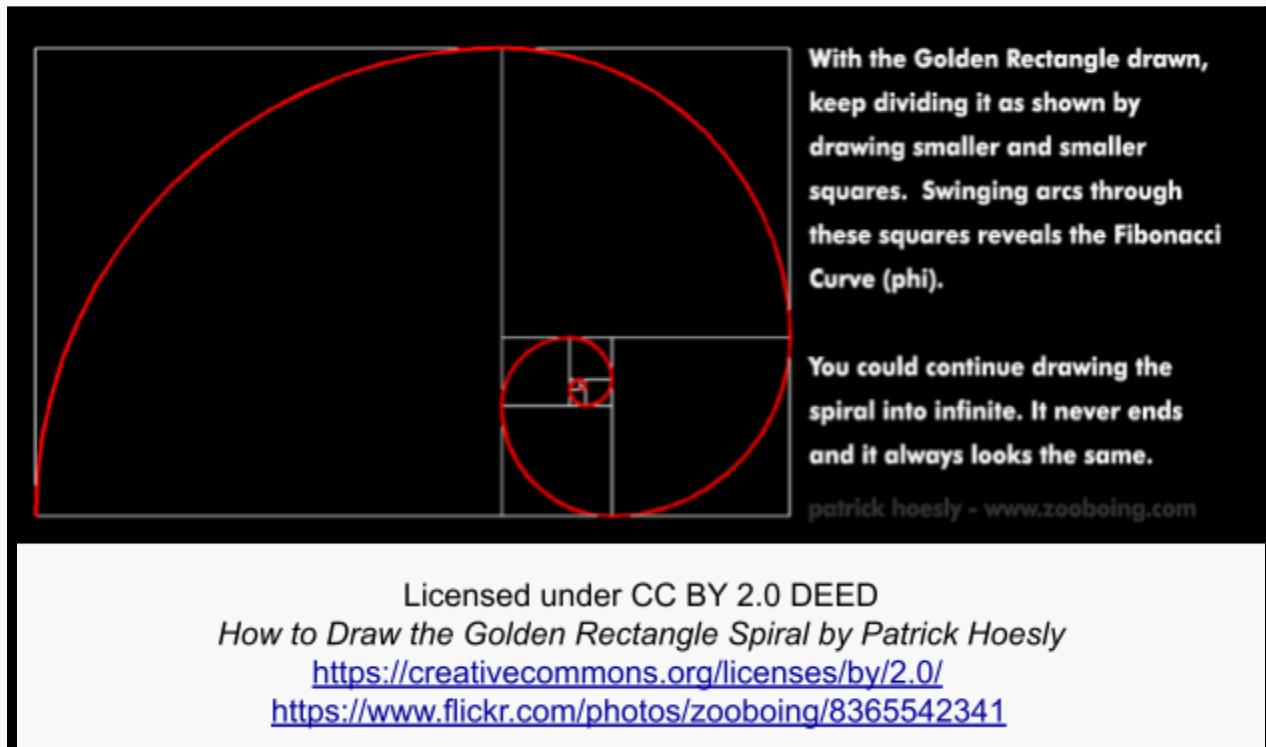
Denise Lee

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What is beauty? Beauty is a combination of qualities that are aesthetically pleasing. The golden ratio, also called Phi ( $\varphi$ ), the Fibonacci number, and the Divine Proportion, is often considered the most beautiful number in the universe. This number, approximately 1.618, is famous for its aesthetic appeal and it is found in numerous parts of life. The divine proportion is evident in the human body, art, architecture, the solar system, DNA, plants, and more.

If you divide your height by the distance from your belly button to your toes, the result is the divine proportion. Similarly, dividing the length from your shoulder to the tip of your index finger by the length from your elbow to your wrist will also yield the divine proportion. The ratio of the length from the top of your head to your shoulder to the length from the top of your head to your chin reveals the divine proportion once again. Furthermore, dividing the distance between your belly button and your knee by the distance from your knee to the bottom of your foot gives you the golden ratio. Now, let's look at the face. When dividing its length by its width, you get  $\varphi$ . The width of your two upper front teeth compared to their height also yields  $\varphi$ . The ratio of the distance from your lips to your eyebrows to the length of your nose results in  $\varphi$  as well.

Even at the molecular level, the golden ratio is present. DNA, the blueprint of life, appears as a double-stranded helix referred to as B-DNA. This form of DNA has two grooves in its spirals, with the ratio of the major groove to the minor groove being  $\varphi$ . A cross-sectional view of the DNA double helix forms a decagon, which is essentially two pentagons with one rotated 36 degrees from the other. Each spiral of the double helix traces out the shape of a pentagon, and the ratio of the diagonal of a pentagon to its side is  $\varphi$  to 1.



Even in space, the golden ratio shines beyond. The average of the mean orbital distances of each successive planet with each other tends to be  $\varphi$ . The inner ring of Saturn is denser than the other rings and exhibits the same golden ratio proportion as the brightest outer ring. The Golden Ratio is used in artworks and architects around the world such as the Great Pyramid of Giza, Notre Dame, The Vitruvian Man, The Last Supper, and The Parthenon.

This divine proportion, 1.618, appears consistently in nature and art, proving that Phi is a universal constant of beauty. Its common occurrence throughout time and the universe makes it a cornerstone of design, resonating through the ages as a timeless symbol of harmony and elegance, and earning its title as the most beautiful number in the universe.

# How Pills Work

Arick Hong

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You've probably taken a pill before. It could have been one that the doctor prescribed to you, or some vitamins you bought from the pharmacy. All of these pills have a science behind how they work, and it's pretty interesting.

When you take a pill, you usually swallow it without chewing, or with the aid of water. These pills then travel to the stomach, where they are broken down by acids. Once it is broken down, the pills release all the vitamins you need. These vitamins are then taken by the body, and they go on from there. Some people, however, like to put the vitamins under their tongue. The bottom of the tongue is home to a whole hub of blood vessels, so dissolving the vitamin there sends the nutrients to your body instantly. The only problem with this, however, is that vitamins are not intended to be used that way. They need the acids of the stomach to properly dissolve them.

Pills are often helpful for you, but taking too many pills can be a bad thing. Overdosing on sleeping pills can make you choke to death, and overdosing on vitamin A can make you drowsy. Most people don't know this, however, leading to many deaths yearly from drug overdoses.



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# Safeguarding our Seas: Tackling Overfishing for a Sustainable Future

Brandon Wang

Overfishing poses severe threats to ocean ecosystems, urgently increasing marine conservation. It leads to the depletion of key fish populations, disrupts complex food webs, and damages marine habitats. This, in turn, affects the biodiversity and the livelihoods of communities that depend on fishing for economic and nutritional needs. Many fish species have experienced drastic declines due to overfishing, highlighting the need for sustainable management practices.

Irreversible fishing practices are essential for mitigating the adverse effects of overfishing. Some techniques such as catch share systems allocate specific portions of the total allowable catch to individual fishes or communities. This creates a sense of liability and encourages sustainable practices since future quotas depend on maintaining fish populations. It assists with reducing overfishing by preventing the need to catch as much as possible, allowing farmers to focus on sustainable methods. Additionally, seasonal closures and gear restrictions help manage fishing populations by enabling recovery periods and minimizing the impact on non-target species. By reducing accidental capture of non-target species, it maintains the ecological balance.



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Marine Protected Areas restrict human activities in designated areas, providing safe havens where marine life can thrive without threats, like fishing and habitat destruction. Studies have shown that MPAs lead to increased biomass, diversity, and persistence of marine species within their boundaries. A great example is the Galapagos Islands, demonstrating their effectiveness in conserving marine biodiversity and supporting ecosystem recovery.

Ultimately, marine conservation efforts and sustainable fishing practices are important for addressing the challenges proposed by overfishing. Implementing and enforcing effective conservation strategies can promote international cooperation, engage local communities, and protect marine biodiversity. This ensures the resilience of ocean ecosystems for future generations. The combined efforts of governments, organizations, and individuals are essential to preserving the beauty and health of our oceans and protecting the ecosystems they support.



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# About Gunpowder

Ben Liang

Gunpowder is an important. It has been important ever since its existence. It is important to know that it is important in the military because it was the earliest form of explosive.

Gunpowder was invented in the 9th century in China. It was made by monks who wanted to make a magical elixir that could make people immortal but made a powder that caused a lot of casualties worldwide. The Chinese made the first guns and cannons. The Chinese were conquered by the Mongols in the 12th century and spread some of those inventions. The inventions spread to the Europeans who improved on the new weapon. The Europeans also made better forms of gunpowder that were suited for different uses.



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Gunpowder is a propellant. It is used to propel stuff or explode stuff by making gas. The gas would build up in its container and explode. Gunpowder can also be used for mining. It was used to make the Panama Canal. The railroads were also made of explosives. The railroads were made by the Chinese in the West and the Panama Canal was made by slaves. Some places such as the military use gunpowder in a different way. They used the fast-burning type of gunpowder and used it in guns. They are good at it because the fastest bullet was 3181 miles per hour.

Gunpowder and guns were made in China. They were sent to Europe by the Mongols. The Europeans made guns and gunpowder better for their uses. In conclusion, gunpowder and guns are made in China, were improved by the Europeans, and are important in the military.

# How Spiders React to Phone Cameras

Yidian Wang

Some animals, spiders in particular, can detect the focus system on a phone camera. They are more sensitive to light waves and use their several eyes and advanced brain functions to see and sense light differently than humans. This means they can detect when a camera lens is focusing on them.

To start, it is relevant to understand how the Camera Focus System works. It is essentially a set of components that work together to ensure the subject of the photo is in focus. The components include the lens, aperture, shutter speed, and ISO settings. The lens first gathers light from the scene and focuses it on the image sensor. The aperture, a hole in the lens, controls the amount of light passing through to the image sensor. The shutter speed controls how long the light will pass through the aperture, and the ISO determines how sensitive the image sensor is to the light. Most people prefer to manually adjust the focus of the image before taking a photo. This way it is easier to achieve sharp images with no blurriness.

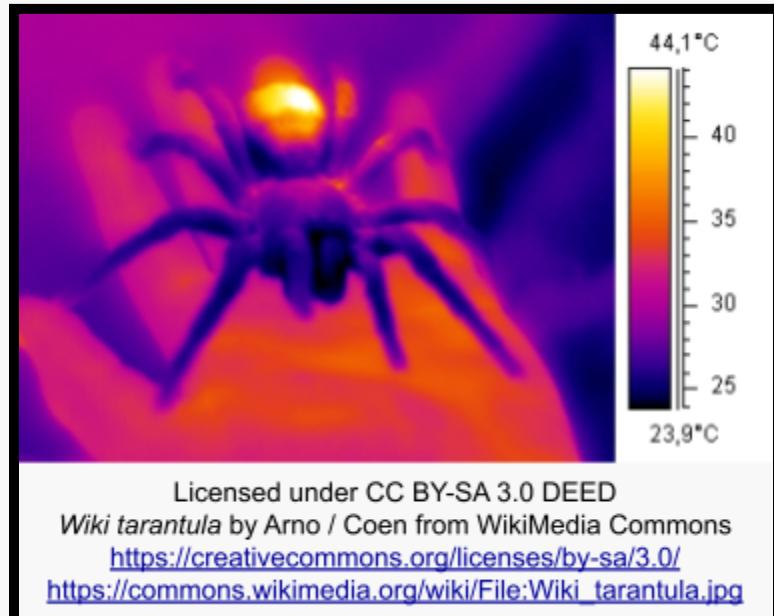


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Phone cameras use infrared light to focus. Some phones use laser autofocus, where an infrared light laser beams out and goes back to the phone to determine distance helping with focusing. The same laser shooting out from these phone cameras during the focus system is the same coming out from a remote control when pointed at a TV to change channels. Humans cannot see IR or infrared light. We see only visible light which sits somewhere between infrared and ultraviolet. Spiders, however, have advanced vision systems letting them see these infrared lights.

Spiders, thanks to their eight eyes, have an impressive ability to detect light and dark better than humans do. They have photoreceptors that help them differentiate between items that differ in brightness. These photoreceptors also enable the spiders to identify the reflection of light off shiny surfaces, letting them hunt prey even with small illumination. Additionally, spiders can distinguish between different contours and shades, allowing them to identify the object in focus and adjust accordingly accurately. This capability gives spiders an advantage in hunting, navigation, and predator defense.

Naturally, spiders can detect infrared light. So every time you try to take a picture of a spider on your phone using the focus system, they see every ray of infrared light shining from the phone camera; shooting light beam at their sensitive eyes. Other animals such as birds, reptiles, and fish have evolved to develop



incredible eyesight. Their features are essential for survival, giving animals with this ability an advantage over others without.

# The Devastating Health Risks of Smoking

Kenny Wu

Smoking is known as a major health risk in modern society. Many smokers are addicted to the toxins and are faced with chronic diseases throughout their time smoking. The main concern of smoking lies in its content of harmful chemicals, including nicotine, tar, and carbon monoxide. These substances damage the respiratory and Cardiovascular systems, eventually forming life-threatening conditions.

To begin, one of the most impacted areas by smoking is the lungs. Smoking is the leading cause of chronic obstructive pulmonary disease and lung cancer. By inhaling mainstream smoke, the airways become irritated and inflammation occurs. Over time, completely normal lung cells will be transformed into cancerous ones. Lung cancer being one of the most deadly cancers is directly tied to smoking, showing the unelectable health risks of smoking.



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In addition, smoking also damages the smoker's cardiovascular system. The nicotine and carbon monoxide

inside cigarette smoke pumps up heart rate and blood pressure, which applies pressure on the heart and harms the endothelial cells that line the blood vessels and manage the bloodstream. Therefore, smoking increases the risk of atherosclerosis, which is a condition where toxins build up in the arteries, increasing the risk of heart attacks and strokes. Smoking increases the possibility of coronary heart disease, contributing to a major part of global deaths.

Furthermore, smoking also plays the role of weakening the immune system, allowing the body of smokers to become completely vulnerable to infections. The harm from smoking spreads throughout the body to every organ, setting up conditions such as diabetes, osteoporosis, and reproductive issues. However, the destruction of smoking doesn't stop there, it also spreads to nonsmokers. The sidestream smoke is known to be more lethal than smoking directly, as the sidestream smoke possesses higher concentrations of nicotine and cancer-causing chemicals than mainstream.

All in all, smoking is a major public health hazard that inflicts countless harm on humanity. The best way to protect ourselves from these health risks is through a combined effort from the community to discourage smoking of any kind. It is made obvious that smoking has pure negative effects on public health and is a selfish behavior that should be prevented at all costs.



# Telegraph To The Cellphone

Brandon Pian

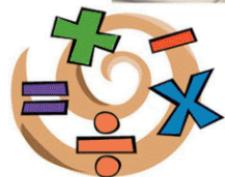
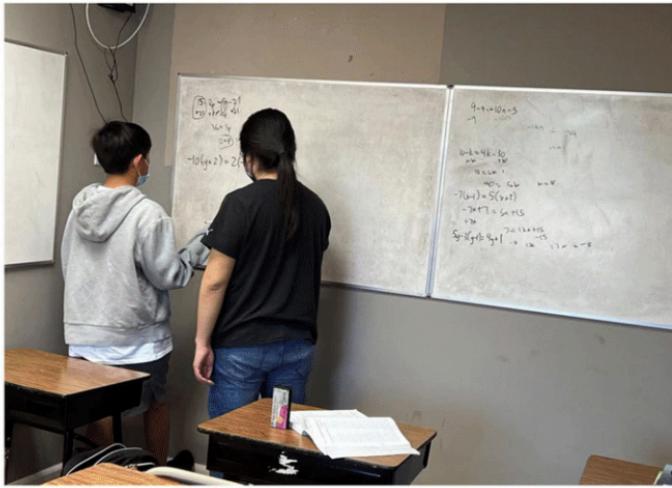
The cellphone we know and use today went through many changes from when it was once just dots and dashes to being able to have a conversation on it. The science in these machines, though made hundreds of years apart. They function similarly, allowing people far away from each other to connect.

Telegraphs are used to transmit telegrams of dots and dashes that each represent a different letter in the alphabet. A telegraph works by transmitting electrical signals over wires. A telegraph can both receive and transmit messages. To send messages the sender pushes the switch downwards to close the circuit letting an electrical current flow through. When the knob is released it opens the circuit stopping the electrical current flow. To receive the messages there is an electromagnet. When the electromagnet receives a pulse of electricity it moves an armature connected to an ink roller.

Modern cell phones are wireless technology. It operates by connecting to cellular networks using radio waves. When you are calling on your phone it is sending signals to the nearest cell tower, which then routes the call to its destination. When you are calling someone there is a tiny microphone in the phone that converts the ups and downs of your voice into corresponding electrical signals. A microchip inside the phone turns the signals into strings of numbers. The numbers are converted into radio waves that are beamed out of the phone's antenna, which then reaches the nearest cellphone tower.



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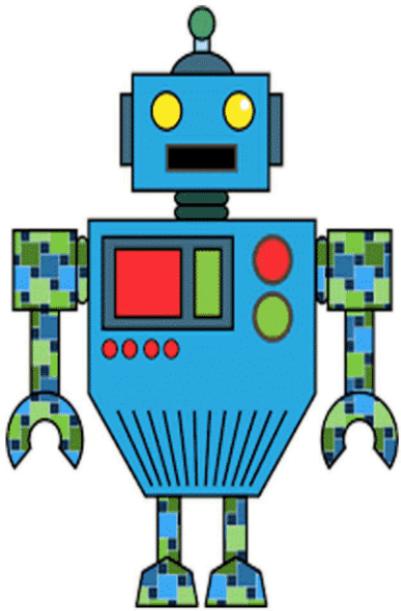
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