

UnEarthed

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morph



UNIVERSITY OF
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Letter from the Editors

Dear Readers of UnEarthed,

UnEarthed's Executive Board and our student-led team of writers, editors, and designers are so excited to bring you our twelfth issue of UnEarthed! Welcome to MORPH, where you can find articles on anything, from linguistics to science to fashion.

We hoped the theme "Morph" would let us explore all kinds of transformations – from mood rings, to chameleons, to emojis. As learners, we hope you use Morph to answer your big questions. If you've ever wondered how baking ingredients combine to make cookies, or how camouflage works, this is the magazine for you.

UnEarthed is a magazine for and by curious people. Our writers pick articles based on their own big questions – they pitch a question, research the answer, and write an article for you to read. Just as you learn when you read an article, our writers, editors, and designers learn, too. In Morph, we thought about all the ways everything in the universe changes – in different ways, from physical to cultural. We hope this inspires you to ask your own questions about all that morphs around you.

This magazine doesn't only include articles – we also have puzzles and games at the end of the issue! Take those spaces to think outside the box; ask your own questions, draw a picture, or design an experiment! There's also a space for collecting your friends' signatures like a yearbook.

Producing Morph was tons of fun, and our next issue will be out soon! We publish a new magazine twice a year and hand it out all over Philadelphia to students like you. If you have any suggestions at all, from ideas about articles to interactive pages, please let us know using the suggestion box on our website. (<https://www.uneearthedpenn.com/suggestion-box>)

Our website has a lot to offer! At www.uneearthedpenn.com, you can find exclusive digital-only articles, interactive quizzes, videos, and read-along audio for articles. We update our website constantly, so stay tuned and make sure to leave us feedback in the suggestion box!

We hope Morph will feed your curiosity. Explore every article that interests you, keep asking questions, and most importantly, enjoy!

Faizah Saadmim
EDITOR IN CHIEF

Julia Van Lare
MANAGING EDITOR

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Our articles are now ranked by difficulty!

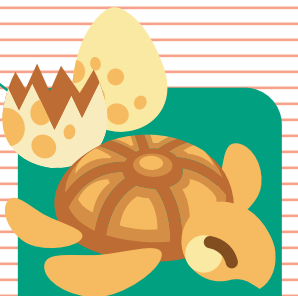
- EASY
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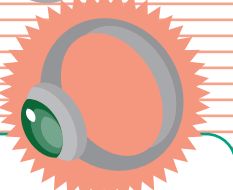
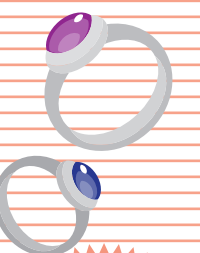
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A Sea Turtle's Journey

Design by MELODY ZHANG

Writing by ANJALI SHANKAR
Editing by ALBERTINA LEE
& SOPHIA JARRAR

Have you ever been to a beach and seen eggs in the sand? Maybe you have and didn't know who they belonged to. They belong to sea turtles! Maybe you have even seen baby sea turtles crawling towards the ocean. The life of a sea turtle has a tremendous amount of ups and downs, starting from the first 48 hours after birth. From egg to adult, turtles constantly transform and adapt to take care of themselves and their offspring. Let's take a deep sea dive (pun-intended!) into how they do that!

There are four main phases that a sea turtle goes through: **egg**, **hatchling**, **juvenile**, and **adult**. First, the mother leaves the ocean and crawls onto shore during nesting season. She digs a hole in the sand and lays 80-120 eggs, covering them up with sand to protect them. The embryos take around 45-65 days to grow and develop until they are ready to hatch. Then, they become hatchlings.

The **hatchling** phase is next and it is a critical one: the turtles must successfully dig out of

their hole in the sand and crawl to the ocean. The path is not easy; there are many predators that prey on hatchlings, like dogs, large fishes, and sea birds. Humans also have a lot of equipment on beaches that may be an obstacle in the hatchling's path.

Unfortunately, many hatchlings **don't make it** to the ocean. For the best chance to survive, they begin at night to avoid being seen, and the drop in temperature gives their body the signal to start going. For the lucky few that reach the ocean, they go into a "frenzy-state" where they swim as far from shore as possible. The currents in the ocean help them out, and the baby hatchlings swim until they reach the open sea.

After the hatchling phase comes the **juvenile phase**, where the sea turtles have to migrate back near the shore to places called "**feeding areas**." The food is more abundant there, but there are also more predators. That's why the turtles wait until they are a little older to venture back to the shore.

If the juveniles go to the feeding areas, then the adults go to the **breeding areas**. The males meet up with the females and the females prepare to lay their eggs. Feeding and breeding can be thousands of miles apart; sea turtles rely on ocean currents to help them swim to these large distances. Once the female is ready to lay her eggs, she goes to her nesting ground.

Sea turtles showcase a phenomenon known as "**natal homing**." Males return to areas around where they were born to find the females, but they move around a lot and mingle with many different turtles before returning to the deeper ocean. However, females seem to have a superpower. They return to the same exact beach as they were born to lay their eggs. Their logic makes perfect sense: if they were able to survive on that beach, then their offspring should have a good chance as well. These shores naturally tend to have less predators or better temperatures for their future offspring.

After traveling **thousands of miles** over the course of a lifetime, how do the females remember how to get back to **where they were born**? Do they have an insanely accurate GPS system? In a way, yes. The turtles use a variety of senses and navigational techniques to find their way back home. There is some evidence that they can use the location of the sun to navigate to the shore. The main sense that they rely on, though, is called geomagnetic imprinting. The earth has a magnetic field surrounding its core, and each coast has a unique "magnetic signature" or set of magnetics in the soil. At birth, the sea turtle has its coast imprinted in her memory so that she can find her way back years later.

The cycle ends the same way it began: **laying eggs during nesting season**. Now, we can understand just how hard and long it was for the sea turtle to return and continue the cycle. Throughout the entire journey, the sea turtle has transformed and completed many stages of life. After all of that growth, the process has a funny way of bringing the turtle back to where they started. Next time you are on the beach and run into eggs in the sand or even hatchlings racing against the clock, think about the large distances that their mother traveled, and that her children will travel, around the earth!

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SHIFTING SCIENCE

Writing by ALY KERRIGAN | Editing by JOYCE LEE & MAYA GOLDSTEIN

Have you ever experienced a power outage? If you have, you know how difficult it is to do everyday things without access to electricity. Today, everyone is used to flicking on a light switch, charging devices, and watching television without a second thought. Regular parts of our life were not possible before electricity was invented.

The discovery of electricity transformed society. Many scientists contributed to this discovery, but it is most often credited to Benjamin Franklin's 18th century experiment with a kite and key. As the popular story goes, he attached the kite to the key during a thunderstorm, and discovered that lightning carries electricity. With the discovery of electricity, people's days were no longer restricted within the time between sunrise and sunset because they could now use electricity to light up their homes at any time of day, so opportunities for work and activities grew.

Legend has it that Isaac Newton discovered gravity while sitting under an apple tree, when he observed an apple fall from the tree to the ground. This observation made him wonder,

"why did the apple fall down instead of forward or sideways?" He concluded it was due to an invisible force known as gravity. Whether this tale is true or not, we know that Newton's theory of gravity changed physics forever, and

changed the way people viewed the world. For one, gravity helped prove that the Earth revolves around the Sun. It was also critical in rethinking scientific questions that were unexplained, like the laws of motion, gravitational waves, tides, the shape of the Earth, and black holes. Thanks to the discovery of gravity, scientists gained the tools to research and language to explain what were previously mysteries of the universe. It paved the way for a better understanding of math and astronomy that helped us make sense of the way objects and planets move.

Lastly, the discovery of the structure of DNA, the molecule that carries genetic information, was a pivotal moment in science. Scientists in 1953 found that DNA's structure is a double helix – what looks like two strands wrapped around one another – made further medical research possible. This discovery was a building block in the study of diseases and disorders. It paved the way for the creation of certain medications (such as insulin for people with diabetes) and for new developments in treating cystic fibrosis, sickle cell anemia, and certain cancers.

Scientific discoveries have the capacity to completely transform society. It doesn't just stop at gravity, electricity, or DNA – new findings are constantly being uncovered by scientists and curious people like you!

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CHAMELEONS

& Their Colorful Secrets

Writing by KRISTINE ENEMUO

Editing by LEEYU ADDISU and ANTONIO MELONI

The unique color-changing abilities of chameleons have fascinated humans since the beginning of time. However, the mystery behind their incredible transformations only started to unfold until recently. Have you ever wondered how chameleons pull off their amazing color transformations? Well, the secret is hidden in a special layer of cells, the basic building blocks of life, called "iridophores." These cells contain very tiny crystals made of guanine (one of the building blocks of our DNA!).

These guanine crystals are arranged in a super neat pattern called a lattice. When light hits these tiny crystals in the lattice, something super cool happens. Some colors in the light are absorbed or "soaked up" by the crystals, while other colors of light bounce back or get reflected. The colors we see are the ones that bounce back from the crystals. Now here's where the real magic happens: when chameleons want to switch up their colors, they can actually change how close or far apart these crystals are. When the crystals are close together, the lattice reflects green and blue, which are the colors we see on the chameleon. However, when the crystals are further apart, the lattice reflects vibrant hues of yellow, orange, and red. How interesting is that?

Now that we have uncovered the secret of how chameleons change their colors, you might wonder why they do it. Many people assume chameleons change color primarily for camouflage, to blend with their surroundings. However, that is not completely true! Chameleons are like living mood rings: they change colors depending on how they feel. When they are relaxed, their crystals are super close together, which makes them green in color and allows them to naturally blend in with their environment. However, when chameleons feel excited, threatened, or want to impress a mate, their crystals spread further apart, which shows off their bright red, yellow, and orange colors.

These remarkable creatures, with their magical ability to change the color of their skin, have shown us that there's more to their colors than meets the eye. Chameleons don't just wear colors for fashion; each one of their shades tells a different story. So, the next time you spot a chameleon donning its vibrant attire, remember, it's not just a change of color; it's a language waiting to be decoded.

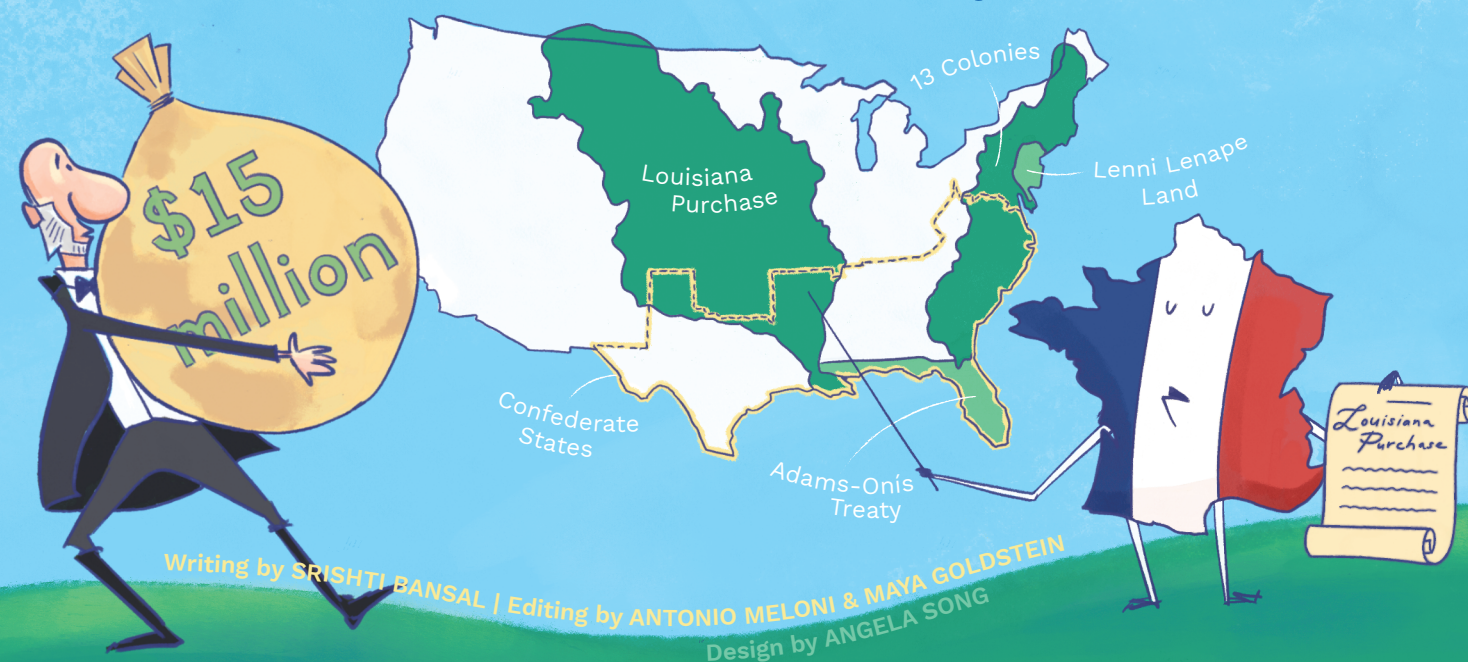
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Design by KAYLA KIM

From Buying Alaska to the Civil War

US Borders Over Time



Did you know that the land we live on today was not always considered the United States? The land that Philadelphia occupies was once the Lenni-Lenape Indigenous Nation, and many Indigenous nations existed across the continent. These lands were taken over to create thirteen colonies (Pennsylvania was one!). However, the colonies looked very different from our states today, and American political boundaries morphed constantly over the years. Here are some of the biggest changes to the map!

The first large change occurred during the American Revolution. Prior to this, all of the territory in the colonies were a part of the British Empire, but afterwards became independent states. The nation's capital moved through nine different cities, starting with Philadelphia and ending with Washington DC!

Next, in 1803, the US made the Louisiana Purchase. America paid \$15 million to France for 828,000 square miles of land. This might sound expensive, but for that much land, it was very cheap! The territory includes 14 current states.

In the early-mid 1800s, the US began organizing its Northwest regions. The 49th parallel was established as the northern border with British Territory (now Canada), and the Oregon territory was established as a shared territory. The Louisiana Territory was also split up, and many territories in the South gained statehood. In a treaty called the Adams-Onís Treaty, Secretary of State (and future President) John Q. Adams negotiated the cession (gaining) of West Florida and formalized boundaries with Spain.

In the late 1800s, the US went through the Civil War. At this time, many states seceded, or broke away, from the Union, including South Carolina and Mississippi, and formed the Confederate States. The states were readmitted during Reconstruction, and many Western Territories were developed further. Alaska was also purchased from Russia for only \$7 million, and we saw the creation of our nearest neighbor, Canada!

In late 1800s-early 1900s, the kingdom of Hawaii was taken over, and pacific territories like Guam and Puerto Rico became US territories. All remaining states in the contiguous US gained statehood, and America took over the Panama Canal region under president Roosevelt. (Have you heard the sentence "a man, a plan, a canal, Panama? Try writing it backwards!")

At the end of the 1900s, the country decolonialized. The Philippines territory gained independence, the Panama Canal region was returned, and Alaska and Hawaii gained statehood.

As you can see, borders were constantly shifting throughout the history of the country. The North-South Carolina border was just fully clarified in 2017! How has the border of your home changed over time?

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Magic in Every Mood:

The Colorful World of Mood Rings

Have you ever wondered how your feelings can magically transform the color of a ring? Well, get ready to dive into the enchanting world of mood rings, where science meets style in the most exciting way!

Like its name suggests, a mood ring can change colors based on your current mood. Sounds like magic, right? Well, it's not magic, but it sure feels like it! Mood rings work based on a fascinating concept involving your body temperature and a special type of stone.

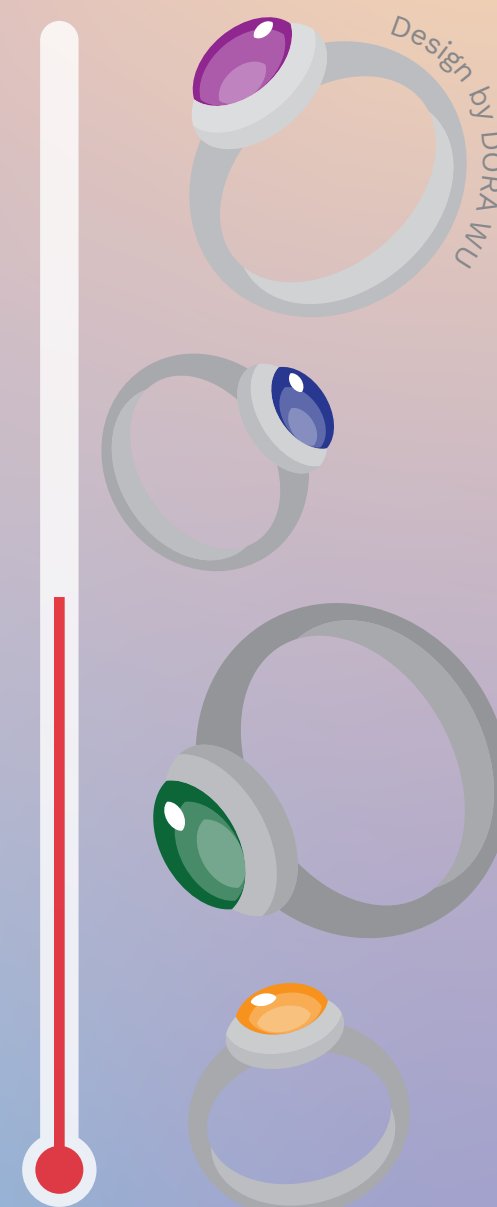
At the heart of every mood ring lies a secret ingredient: cholesteric thermotropic crystal. This liquid crystal is very sensitive to changes in temperature. When you wear a mood ring, the liquid crystal inside the stone reacts to your body heat. Your body temperature changes depending on how you're feeling. When you're happy, your body tends to be warmer, and when you're sad or stressed, it is usually cooler.

Now, here comes the fun part! The liquid crystals in the mood ring respond to your fluctuating body temperature by changing colors. Each color you see on the ring represents a different mood. Relaxing on the beach with your friends? Your mood ring might turn a cool shade of blue or green. Exciting birthday party coming up? Your ring will turn a reddish orange. Feeling a little nervous? Your ring will change to yellow or amber. We have so many different emotions to feel, so your mood ring could turn into almost any color of the rainbow.

Mood rings are not just pieces of jewelry; they're like tiny emotion detectives, helping you understand your feelings in a colorful way! The best part is that you can have fun experimenting with your mood ring. Try holding a steaming cup of hot cocoa and watch the colors change, or splashing some ice cold water and see this transformation happen.

Mood rings offer a great way to express your emotions. They allow you to convey your feelings silently; it's as if you're wearing your heart on your finger. So, the next time you wear a mood ring, embrace your feelings and let the colors tell your story!

Writing by **AMALYA KNAPP**
Editing by **SOPHIA JARRAR**
and **ALBERTINA LEE**



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Morpheus

God of Sleep

Writing by ETHAN LEWIS | Editing by SHIRLEY YUAN & NICHOLAS MAHARAJ

Have you ever had a dream where you could fly or talk to animals? Or maybe you had a nightmare that felt all too real? Have you ever wondered what causes such crazy visions to appear in your head every time you close your eyes at night? Well, the ancient Greeks also wondered! In fact, they had many explanations for almost everything that happened in the world, including dreaming.

Almost 3,000 years ago in the countries we know today as Greece and Turkey, lived a magnificent empire that had a unique and dominant religion. The ancient Greeks practiced a polytheistic religion: this means they worshiped multiple gods. These gods included a wide range of deities, from Poseidon, the god of water, to Apollo, the god of the sun, and of course, Morpheus, the god of sleep. Greek mythology—the myths and stories told about Greek gods—is a rich, diverse collection of history that tells us how society’s views of worldly phenomena (like dreaming) have morphed and changed over time!

Speaking of morphing, Morpheus, god of Sleep, was a major deity, or god, that the Greeks prayed to each night.

Morpheus was the son of Hypnos, god of the mind. Greek historians explain that Morpheus was one of three brothers, Phobetos, Phantasos, and Morpheus. Each brother was responsible for controlling three main images in dreams. Morpheus’ duty was to send images of humans to the minds of sleepers. Think if you’ve ever seen a friend or family member in your dreams! Phobetos was in charge of sending images of animals to dreamers. Have you ever seen a pet in your dreams? Have you been chased by a creature in a nightmare? The Greeks completely thought it was the power of Phobetos! The last of Morpheus’ brothers was Phantasos, the conjurer of nonliving objects in dreams! Have you ever seen a talking pair of scissors in your dreams? Have you seen a park bench dancing in the road? That is the work of Phantasos!

Today, Greek mythology has become more stories than actual beliefs. But 3,000 years ago was a completely different picture! We analyze Greek mythology to teach us stories of the past, and allow us to view whether beliefs have changed, or morphed, since then! The story of Morpheus shows us how history has changed so much in only 3,000 years. Next time you close your eyes and dream, think of the ancient Greeks and their rich, captivating world of myths and legends!

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Design by NATALIE CHENG

LETTING IT GROW: A HISTORY OF WOMEN'S HAIRSTYLES

Writing by ALLIE FRYDRYCH | Design by KAYLA KIM

Editing by LEEYU ADDISU and SOPHIA JARRAR

When you think of your go-to hairstyles, chances are, you are taking some inspiration from previous decades. Trends can build on one another to create something unique for a new generation. Many iconic hairstyles from the past century utilize similar techniques and looks, yet they are distinct enough to define the era.



Inspired by popular silent film starlets, flat bob hairstyles take center stage. Tight waves that frame the face are accomplished by using curling tongs, similar to the irons used today, or by sweeping away the hair with your fingers.¹

1920s

1930s



The bob starts to reach chin or shoulder length, but waves remain in style.² The permanent wave, or “perm,” is maintained through a chemical perm machine.³



1940s

1950s



The poodle cut, which features short, tight curls, is worn famously by actress Lucille Ball. Looser curls are worn by stars like Eartha Kitt and Marilyn Monroe.⁵



1960s

1970s



Bigger is better as the teased, puffy “bouffant” rises in popularity, partly due to icons like Jackie Kennedy. Curled styles become longer and looser. Accessories like headbands and ribbons are used to complement both looks.⁶



1980s

1990s



Texture and volume are essential, coming in the form of teased bangs, perms, and blowouts. Hair rollers are used to help achieve the big, messy look.⁸



2000s

2010s



Personal expression becomes a priority, with feathers, dyed ends, and creative braids. Messy buns and updos give an effortless look—for men and women.¹¹



The definitive style of the 2020s is yet to be determined, although we will soon be able to reflect on the influence of history and pop culture. Take some inspiration or create an entirely new look—the choice is yours!

Looking Forward

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ANCIENT EGYPTIANS AND SCARABS

Writing by LAYLA SAYED | Editing by SHIRLEY YUAN & LEEYU ADDISU
Design by JHAUGHANESSY MORRIS

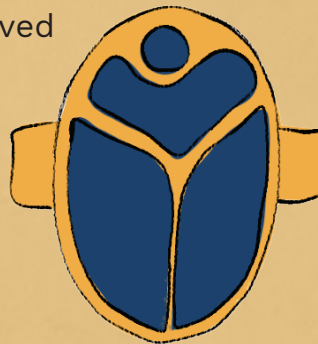
Have you ever heard of an insect that eats its own waste?

As strange as it may seem, dung beetles are insects that have a peculiar habit of consuming their own waste, a habit which many consider unappealing and downright off-putting. Yet, this unsuspecting bug has an amazing life cycle that led ancient Egyptians to find great significance in them.

The dung beetle, also known as the scarab, symbolized renewal and rebirth because of their connection to the ancient Egyptian sun god Ra. This connection to the sun came from a strange ritual these beetles would partake in. This ritual involved rolling large balls of dung where they later laid their eggs. Although initially unappealing, ancient Egyptians believed this was a representation of the sun's journey in the sky from East to West. The balls were then buried and after some time the young would hatch and crawl from the surface in an event the Egyptians believed was “an act of spontaneous self-creation.”

This symbolism turned scarabs into an integral part of ancient Egyptian culture, leading many to own amulets in the shape of beetles. These scarab amulets became necklaces, bracelets, rings, and earrings,

but eventually transcended beyond just jewelry — they were believed to have magical properties. These properties included providing protection, energy, and even spiritual powers to its wearers. The beetles were carved into gemstones like turquoise, amethyst, green and red jasper, and lapis lazuli and often had the owners named inscribed on them.



However, amulets were not reserved for the living.

As strange as it may sound, scarabs were often given to the dead. Ancient Egyptians believed that when they passed, their spiritual bodies would continue to live in an afterlife. Imagine you and your family are packing to move houses. You would bring food, clothes and more. The Ancient Egyptians viewed their preparation for the afterlife in much the same way. The ancient Egyptians buried items in their tombs. These items fell into two categories: those that provided nourishment, leisure, and comfort and those offering protection and guidance. Scarab amulets were a part of the latter. Specifically, the heart scarabs were the most widely used. Heart scarabs

were just like other amulets in the shape of a dung beetle but because they were placed on the person's heart, they were referred to as heart scarabs. Ancient Egyptians believed that these amulets were going to be weighed in the afterlife for their good deeds and help protect them from being lost in the afterlife.

Scarabs were not confined to a specific era but played a vital role across various periods of ancient Egyptian history, spanning the Old Kingdom (2649-2150 BC), the Middle Kingdom, and the New Kingdom (1550-1070 BC). Beyond the borders of Egypt, scarabs left their mark in neighboring regions such as the Levant, Spain, Greece, and even South America, showcasing the widespread impact of this sacred practice.

In the modern context, dung beetles no longer hold religious significance in Egypt. Nevertheless, their impact is still visible, especially in Egyptian gift shops where stacks of replica scarabs, in the form of necklaces, bracelets, and more, can be found. The echoes of ancient Egyptian mythology are also heard in unexpected places. For example, in the early 1900s, a car was named the stout scarab and adorned with a winged scarab emblem, paying direct homage to the ancient Egyptian beetle!

The metamorphosis of scarabs from youth to adulthood held profound meaning for ancient Egyptians. Even though thousands of years have passed since their discovery, the significance of the scarab con-

tinues to be felt today. The scarab beetle, once a symbol of significance for a civilization long gone, remains an enduring testament to the timeless connection between nature, culture, and spirituality.

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LIGHTS, CAMERA, ACTION

CINEMA'S EVOLUTION

Writing by **RACHEL GITTLEMAN** | Design by **COLEMAN WAMPLER**

Editing by **NICHOLAS MAHARAJ & SHIRLEY YUAN**

Your all-time favorite movie hits the big screen. Hurriedly, you buy tickets, snag some buttery popcorn, and snuggle into your seat, awaiting the magic of cinema. Maybe you will see Iron Man soar off an Imax screen, popping out in 3D glory. Or, possibly, you will burst into uncontrollable laughter at Will Ferrell's Elf. Or perhaps Moana and her latest adventure will inspire you to set off on your own quest. Whatever your film of choice, cinema is a thrilling experience. Have you ever wondered how film came to be the way it is today? It's taken over a hundred years of technology and history, but thanks to several revolutionary thinkers, filmmaking has never been so innovative and high-tech.

Our journey of cinematography, or movie making, begins with Thomas Edison's kinetoscope in 1891. Yep, the same Edison who invented the light bulb also kicked off movie-making. Kinetoscopes are similar in design to a miniature wooden cabinet. They house a peephole at their top with a magnifying lens. Within the box lies a spool of film that rapidly

passes through the lens. The spool is powered by an electric wheel and illuminated by a lightbulb, producing a series of still frames that play constantly.

Edison's invention, the kinetoscope, was groundbreaking but impractical; it was challenging to transport and had multiple technical difficulties. Plus, only one person could view the picture series (with no music or color!) at a time. Imagine not being able to share your favorite films with friends or family! However, around 1895, the French Lumière brothers revamped the film game by creating the concept of film projection. Like our projectors today, Auguste and Louis designed the cinematograph, a machine that projected pictures onto any desired surface. Their machine was lightweight and easy to move. Rapidly, short films only a few minutes long were popularized and shown outside at local parks. Movie magic stirred.

From 1904 to 1908, the Nickelodeon craze materialized. Companies saw the vast mon-

ey-making potential of projectors and the film industry. The first film theaters were deemed Nickelodeons (hence the "Nickelodeon craze"). And tickets only cost 5 cents! Working class members gravitated towards Nickelodeons, and the demand for film soon skyrocketed. Many people before this time had never seen a film or any staged production. Live theater was expensive and left for high-class society — projectors brought film to the average citizen.

As the film frenzy grew, cinema companies sprouted up across the nation. In America, most films up until 1915 were shot in Chicago or New York. Movie filming was redirected to Hollywood because of the West Coast's endless sunny weather that enabled year-round filming and Hollywood's cheap land. Also, unlike other states, California was unique in its access to mountains, lakes, deserts, oceans, and forests — nearly every imaginable scene for movies.

Although Hollywood was on the rise, American filmmaking potential didn't truly develop until World War I, which reimagined the scope of filming genres and motives. Now, nationalism could be created through the screen with war propaganda. One notable film in 1918 is the silent drama Hearts of the War by D.W. Griffith. Griffith was commissioned by the then prime minister of Europe, Lloyd George, to go onto the front and shoot clips. Hearts of the War is a story depicting the relationship of two young French lovers shattered by war.

By 1932, the world was introduced to Technicolor, revolutionizing color in movies. Colored movies already existed with hand-tinting processes, exemplified in the Serpentine in 1895. Technicolor advanced color filming by separately recording on three negatives—transparent plastic covered on one side by light-sensitive material. The negatives were red, blue, and green tinted, and when combined, they produced full spec-

trum colored videos that simulated the vibrant colors we see with our eyes.

Steady film production occurred from World War I to approximately the 1960s—the fall of Hollywood's Golden Age. Three reasons account for the fall: First, the 1927 Hays Code. The Hays Code was a self-imposed film industry censorship restricting companies from producing films on specific topics. The hope was to prevent potential government censorship by self-censoring. Next, the U.S. successfully prosecuted Paramount in the Supreme Court case United States v. Paramount Pictures, which tried Paramount for being a monopoly, a company with excessive control and no competition. Afterward, Paramount split itself into multiple companies. The third and most lasting impact was the rise of television. Much of America's growing suburb population, which rose by 43%, wasn't in entertainment districts, and so they bought into television. TV offered constant, varied entertainment.

Many argue that film and cinematography has never fully recovered since the 1960s. But, looking at cinema more optimistically, modern filmmaking uses techniques beyond the wildest dreams of 1900 filmmakers. Artists play with angles, perspective, natural light, and long shots. We even have drones that can film aerial views from the sky and computer-generated animals! Also, storylines have morphed into vastly complex narratives. Initially, movies were silent and only a few minutes long. Now, there are fandoms for series, biographies on the screen, and so much more! Movie night, anyone?

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SHAPE SHIFTERS

Writing by ÉLAN MARTIN-PRASHAD
Editing by SHIRLEY YUAN &
ALBERTINA LEE

MORE THAN MEETS THE EYE

Have you ever wondered what it would be like to change form? One moment you're soaring through the skies as a powerful eagle, and the next, you're gliding through the ocean as a graceful dolphin. Maybe you've even considered what it's like to shrink down to the size of an ant or become as massive as a blue whale!

For ages, shapeshifting has played an important role in myths and stories, allowing people to transform into creatures of their wildest imagination. While vampires and werewolves may be the first shape shifting beings that come to mind, it doesn't stop there! This enchanting ability has actually appeared in many other ancient cultures and stories, each with its own unique spin on what it means to change form.

In many popular myths, shapeshifting is used to punish or save mortals. Remember the story of Beauty and the Beast? In this tale, Belle's love for the Beast causes him to shapeshift from a monstrous creature into a dashing human prince, saving him from his curse. On the other hand, in Greek mythology, the goddess of wisdom, Athena, turns a mortal weaver named Arachne into a hideous spider after losing to her in a weaving contest, jealous of Arachne's victory. In both these stories, however, being human is more favorable than being an animal.

Not all cultures take the same approach towards being animals versus humans. For example, Indigenous cultures often describe shape shifting as the ability to remain connected with the natural world. Many Indigenous cultures also believe shape shifters take the form of bears, eagles and other animals to protect and heal others. Can you imagine transforming into your

favorite animal to protect or others? Some of these cultures rituals and dances to help become their animals by practicing their movements and embodying their qualities, entering the spiritual realm associated with their culture. In this way, shapeshifting blurs the line separating humans and animals, showing how interconnected we all are.

More recently, shapeshifting is also thought to be a representation of kinship between humans and the natural world. Those who believe in shamanism, the ability to enter the spirit realm by transforming into an animal, see no boundary between humans and animals. In this way, shapeshifting extends beyond physical transformation; it represents a morphing of our very worldview. People who practice this worldview also believe that everything in the world is animate, meaning it is alive in its own unique way. Shape shifting is more than meets the eye; it represents a new way of understanding and interacting with the world.

While you may not think that sitting here reading this magazine, you're able to instantaneously change forms into a buffalo or an eagle, you can start by shape shifting your worldview. Consider the lonely rock in your backyard. Is it alive? What does it mean to be alive as a rock? Extend this question to the leaves whispering in the wind, the raindrops dripping down onto the pavement, and even the paper magazine in your hand that was once a tree. Maybe we are all more alike and more connected than it seems.

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Design by
NATALIE CHENG



FROM CATERPILLAR TO BUTTERFLY

THE MAGICAL METAMORPHOSIS ADVENTURE

Writing by AKSA CHOUDHRY | Editing by ANTONIO MELONI & LEEYU ADDISU | Design by HARLEY HAAS

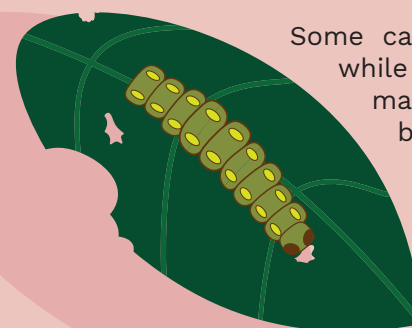
Did you know that butterflies actually start their lives as tiny crawling creatures called caterpillars, before they become the beautiful butterflies you've come to know them as? Their amazing transformation is called "metamorphosis" and we're going to take a closer look at how this incredible journey unfolds.

The Hungry, Hungry Caterpillar

A butterfly's life first begins as a tiny egg. These eggs are laid on the leaves of plants by adult female butterflies. When the egg hatches, a caterpillar will come out. This stage of a butterfly's life is also known as the larval stage.

Can you guess what the very important job of a caterpillar is? TO EAT!!!

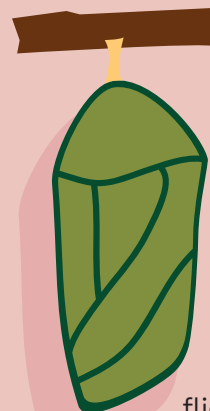
The caterpillar munches on leaves day and night, which allows it to grow larger and larger. Caterpillars have long, soft bodies whose skin can be shed up to five times. Many caterpillars look very different from each other, but all share one really awesome quality: camouflage!



Some caterpillars look like leaves, while others look like twigs. This makes it so predators like birds and other bugs, which like to hunt and prey on caterpillars, are unable to see them. Camouflage is a very essential skill in a butterfly's larval stage.

Building a Chrysalis

After munching on leaves and growing as large as it can for a few weeks, the caterpillar is now ready for the next part of its adventure. This part of its life cycle is called the "pupa" or transition stage.



Here, the caterpillar will spin silk thread around itself to form a protective cast called a chrysalis. The chrysalis may look small but very big things are happening inside. Here, the caterpillar will dissolve into a liquid so its cells can rearrange to build the body of a butterfly. This includes the legs, wings and eyes of a butterfly.

This stage can last anywhere from a few weeks to a month; sometimes even longer! In fact, for some species of butterflies, this stage can last two years!



The Emergence of the Butterfly

Now, once its transformation is complete, the butterfly is ready to emerge from its chrysalis. It will push its way out of its protective silk cast and spread its wings.

These wings may look very wrinkled at first, but rest assured the butterfly will quickly pump blood into them, strengthening itself before taking flight. This process can last several hours.

Now this newly emerged butterfly is different from the caterpillar in a lot of ways! It has colorful wings, antennae, and a slender body.

The Second Chapter of a Butterfly

The butterfly's journey does not end here. Whereas the caterpillar's job was to eat, eat, eat, the adult butterfly's job is to mate and lay eggs, so that this process can repeat.

Butterflies are truly nature's miracles, showing us the magic of metamorphosis. From the metamorphosis of a butterfly, we see how change can be beautiful, exciting, and filled with surprises. Next time you see a butterfly in your garden, remember the long and beautiful journey it took to become the creature it is today.



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Word Evolution (EE • vuh • LOO • shun)

Writing by WANGARI MBUTHUA
Editing by ALBERTINA LEE & JOYCE LEE
Design by SYDNEY LIU

Words are an ever-evolving part of language, morphing as we develop new technologies, ideas, and social norms. We can often see these changes in a short amount of time with slang words like “lol”, “lowkey” and “bussin” that have become popular through social media, but did you know that there are many standard English words we use today which used to mean wildly different things? This change in meaning over time is called a **“semantic shift”** and it can happen in a number of ways. Here we will explore 5 words that have each gone through their own evolution.

Awe

The word ‘awe’ today refers to something that sparks wonder or admiration and overall positive feelings, but in Old English, the word referred to terror or dread. This semantic shift is an example of **“amelioration”** (uh-mee-lee-uh-ray-shuhn), which is when the meaning of a word becomes more positive over time. Interestingly, this change helps explain why the words ‘awful’ and ‘awesome’ have completely different meanings – the newer word ‘awesome’ evolved when awe was used more in a positive way.

Bully

Having a bully today is the last thing anyone would want. But believe it or not, you may have wanted one back in the mid 16th century, when the word used to refer to one’s boyfriend or girlfriend. Later, it referred to a male friend, and from about the 17th century onwards it has been known by its current negative meaning of a person who repeatedly hurts and intimidates. This is an example of **“pejoration”** (pej-uh-rey-shuhn), which is when the meaning of a word becomes more negative over time. This semantic shift is more common than amelioration.

Holiday

We all love holidays – Thanksgiving, Christmas, July 4th, and many more – but did you know that the word originally referred to ‘holy days,’ not any general day of festivities or recreation? This semantic shift is an example of **“broadening,”** which is when the meaning of a word becomes broader and more inclusive than its original meaning.

Accident

Nowadays, the word accident refers to an undesirable or unfortunate event that occurs unintentionally and usually results in harm, or loss, but historically it simply referred to an unexpected event. This is an example of **“semantic narrowing,”** which is when the meaning of a word becomes narrower and less inclusive than its original meaning.

Literally

Although the word ‘literally’ means ‘exactly,’ we often use it in ways that are not so literal. For example, we would say “I literally couldn’t put the book down” to describe reading a great book, but we do not actually mean we were not able to separate the book from our hands. This is an example of **“semantic bleaching”** and refers to the loss or reduction of meaning in a word, in this case due to the misuse of the word.

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PROTEINS: Making Life Possible

The human body is quite fascinating. From simple red blood cells that help transport oxygen throughout our body to complicated organs, such as our brain, processing thoughts and releasing hormones, scientists continue to research our bodies' amazing functions!

When investigating the blueprints of life, deoxyribonucleic acid, or DNA, is the first step to making us... well, us. From hair color, height, and even our face shape, DNA helps us build our own unique character. However, DNA itself doesn’t actually make these unique characteristics. DNA creates proteins, which actually create these distinct features – some are obvious, like the color of our skin, and some are invisible to the naked eye. In other words, DNA is the Lego handbook, and proteins are the masterpieces.

The building blocks of proteins are called amino acids. Each individual amino acid has unique properties, similar to different Lego blocks. By combining different amino acids, unique proteins can exist with different functions. For instance, there could be Lego blocks that are spiral shaped, long, short, or even flat.

Additionally, proteins are complicated to the point where a single change in one of its amino acids can make these proteins unusable – this is similar to changing one of the Lego blocks into something different! For instance, let’s look at a red blood cell. Red blood cells have a protein called hemoglobin, which is able to bind to and carry oxygen around the body. These proteins are designed with careful precision. However, just changing one of the amino acids of hemoglobin can cause this oxygen binding to fail. To put in context, imagine you built a Lego castle; however, you decide to change one of the blocks to something bigger than normal. Although the castle may stand, it may not be able to open its door or the castle may even deform.

Enzymes, a common type of protein, help make certain chemical reactions in our body go faster. Enzymes are very specific to what reactions they are used for through their active sites. Active sites of an enzyme are specific ‘pockets’ that provide a favorable environment so that certain reactions can happen. Similar to hemoglobin, certain active sites have to have very specific amino acids; it’s like making a very specific, tiny little Lego house, where you could store or even build other Lego pockets. Even if one of them is changed, it could change the shape of the pocket and cause reactions not to happen at all!

Finally, certain proteins morph so that they interact with others, creating very strong structures such as collagen, which are seen in body parts like bones and skin. Collagen is made up of three specific strings of proteins. These strings of proteins have very specific amino acids that eventually favor these strings to wrap around each other, creating a very strong rope. This is similar to making a Lego tower; you want to build the Lego so that it is thick so it could support the weight and have incredible strength. The strength of collagen is so strong that they are stronger than steel!

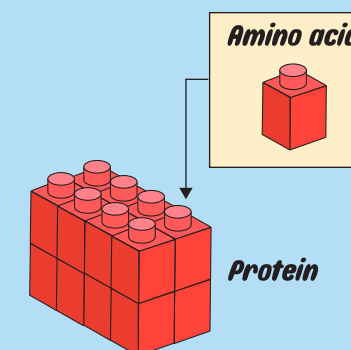
The human body can create lots of weird things. Depending on how we add our amino acids together, similar to Lego blocks, new proteins can exist that can have a variety of functions. From our sense of smell to even the curls in hair, proteins are morphed from their basic building blocks: amino acids.

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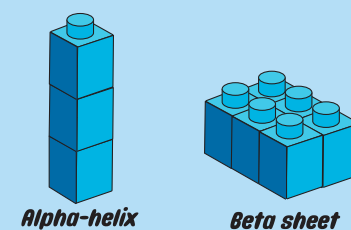
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Writing by HEEJOON SHIN
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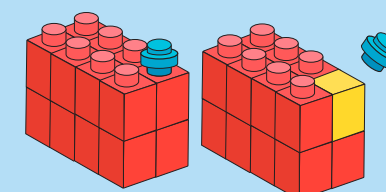
Think of a protein like a lego.



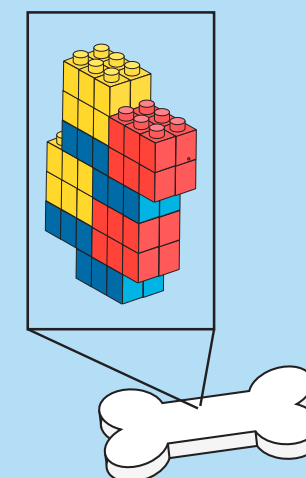
They come in different shapes!



One block can change a lot.



Put them together, and you can build awesome things!

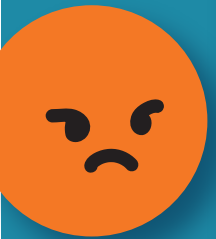




From :-) to 😊

The History Behind Emojis

Writing by ERICA EDMAN
Editing by JOYCE LEE & NICHOLAS MAHARAJ

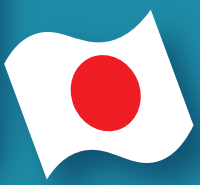


Nowadays, sending a text can be like a scavenger hunt. With 3,664 emojis to choose from, you now have the option to use “Exploding Head” to express your amazement, “Face with Thermometer” for when you’re feeling sick, and even “Burrito” for when you’re about to eat lunch. How did we get to the point where you can pick the perfect cartoon facial expression to match your text?

While emojis are now a staple of everyday communication, that was not always the case. The emoji revolution began on September 18, 1982, when a man named Scott Fahlman made history by creating the internet’s first emoji. However, it did not look like the emojis we know today. Fahlman had typed up a simple colon, hyphen, and parentheses to look like this: “:-)” (Korn, 2022). This is what we call an **emoticon**. It’s a combination of punctuation marks, letters, and numbers that look like faces and emotions.

Fahlman’s clever creation introduced the idea of conveying your emotions in a more efficient and fun way through emoticons sprinkled in with your writing. This general idea of emojis was adopted by and improved on by others, but it would take another fifteen years before the modern-day emoji would be developed.

SoftBank, a phone company in Japan, released the first emoji keyboard in 1997. However, their emojis did not gain widespread popularity until 1999, when a Japanese phone company, Docomo, released 176 little images to add to your text messages. The designer, Shigetaka Kurita, wanted to make communication easier and more stylish. He made colorful and informational symbols like weather symbols, modes of transportation, and numbers.



Here are what some of the first emojis looked like:



Emojis continued to gain popularity and expanded in Japanese phone companies. Finally, in 2008, Apple released their first emoji keyboard. Apple’s first emojis looked very similar to the ones we use today.

Here are what some of Apple’s first emojis looked like:



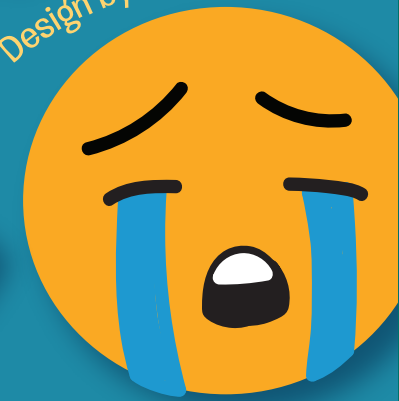
After the first emojis were created, they took over popular culture. You could find emojis on pillows, candy, books, and much more! Since then, emojis have expanded more and more to include new emotions, skin tones, activities, flags, animals, and practically anything else you can think of!

So the next time you send your friend a smiley face 😊, you can think about **the 40 years of work that went into perfecting your favorite emojis.**



100%

Design by SYDNEY LIU



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KITCHEN CHEMISTS: The Magical Chemistry of Baking

Writing by NOEMI RUBAR | Editing by MAYA GOLDSTEIN & NICHOLAS MAHARAJ | Design by DORA WU

Have you ever thought of being a chemist? Picture your kitchen as a science lab where you perform experiments to make yummy treats. When you mix, stir, and bake, you’re actually making reactions happen with chemicals that turn everyday ingredients into tasty goodies. Pick up a lab coat and a chef hat and let’s start our sweet experiment!

Ingredients

- 2 ¼ cups all-purpose flour
- ½ teaspoon baking soda (our special ingredient!)
- 1 cup unsalted butter
- 1 cup packed brown sugar
- 1 teaspoon salt
- 2 teaspoons pure vanilla extract
- 2 large eggs
- 2 cups semisweet and/or milk chocolate chips

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Step 1: Preparing our cookies

- Our magical transformation begins in a big bowl by mixing flour and our special ingredient: baking soda. Baking soda produces carbon dioxide gas when mixed with other ingredients. It will cause our cookies to rise and become fluffy, just like a hot air balloon filling with gas before taking flight.
- Next, we add butter. Make sure the butter is warm, but not melted! Remember the carbon dioxide gas produced by the baking soda? Butter will create little air pockets that will make our cookies more airy and less dense, and because of this, soft and tender!
- Brown sugars sweeten our cookies, creating a delectable taste. When sugar heats up, it transforms and caramelizes, turning the cookies a beautiful golden brown, just like leaves changing color in the fall.
- Finally, add salt, vanilla extract, eggs, and chocolate chips! Salt and vanilla intensify the flavors, while eggs act as the binding spell, ensuring all our ingredients stick together.

Step 2: Mix, mix, mix!

It is time to make your move as a kitchen chemist and start your reaction by MIXING! While you mix these ingredients, the proteins from the eggs and flour team up, forming a doughy structure that helps your cookies keep their shape. At the same time, the baking soda joins forces with the brown sugar, creating tiny bubbles of carbon dioxide gas. These pockets puff like a balloon inside your cookie dough, making it rise and become light and airy.

Step 3: Baking Alchemy

Before continuing, ask an adult to help you with this step!

- Preheat the oven to 375° F, so it is warm enough to transform our dough into magical cookies.
- While you wait, spoon cookie dough portions onto clean baking sheets lined with parchment paper. Make each spoonful about the size of a rounded tablespoon, and be sure to leave 2 inches of space between them. Put them in the oven.

As the heat envelops the cookies, the carbon dioxide gas produced by the baking soda expands, causing your cookies to puff up. The butter melts and transforms into steam, making the cookies even more fluffy. The eggs and flour proteins set, giving your cookies structure, just like a magician building a house of cards. And those chocolate chips? They melt and create pockets of chocolate, making your cookies utterly irresistible.

Step 4: The Grand Reveal

After about 10-12 minutes in the oven, your cookies are ready. Make sure to let it cool for 30 minutes! When you take a bite, the transformation is complete. You will experience the perfect blend of soft and chewy, sweet and slightly salty, with gooey, melted chocolate. The chemical reactions have turned your dough into the most delicious reward! It is time to enjoy your creation. Good job Kitchen Chemists!



Writing by TAMMY NGUYEN

MAGIC IN PLAIN SIGHT: CREATURES THAT CAMOUFLAGE

Editing by ANTONIO MELONI & MAYA GOLDSTEIN

Do you ever wish that you could shape-shift like the characters in your storybooks? Being able to change colors and shape may seem like magic to us mere humans, but for some animals, it's as easy as the blink of an eye. These animals have the ability to camouflage, which is another word for disguising or changing their appearance. This allows them to hide in plain sight!

Why do animals have this cool superpower? The main reason is for predators (the hunters) or the prey (the hunted) to blend in with their surroundings. Camouflage can help predators hide while they stalk their prey, like how a leopard uses its spotted fur to blend in with the shadowy jungle or the rocky mountain terrain when it hunts. Prey, on the other hand, use camouflage to hide from these sneaky predators. Take a look at stick and leaf insects: they're built to look exactly like their name—sticks and leaves! Underwater creatures, like the octopus and the cuttlefish, can change colors to look like coral or even other sea creatures. How is this possible?

Different species from all over the planet are born to look like their surroundings. This can manifest itself in many different ways, two of which include color matching and countershading. Color matching is where the exterior of an animal matches the shades of its habitat, like in the way an Arctic fox's white fur matches its snowy environment. Countershading is where the top of an animal's body is darker while its underbelly is lighter. Unlike color matching, where the animal matches its surroundings from all points of view, countershading works primarily for looking top-down and bottom-up at the animal. Countershading also works based on shadows and light rather than the actual color of the habitat. Why is this helpful?

Sharks, who typically have dark gray backsides and white bellies, use this technique to match the bright light from the sun and dark shadows of the deep ocean. Creatures below the shark looking up see the light from the surface, while animals above the shark see darkness below them. This makes the shark especially difficult to spot, helping them hide from potential predators and their prey.

But some animals don't just imitate one thing—there are a few that can actively change their appearance to mimic anything! The octopus is one of the best demonstrations of this ability; this sea creature has special systems in its skin that enable its transformation in color and texture. Special cells called chromatophores in the soft flesh of the octopus help the animal change colors. These colorful sacs of pigments, controlled by the octopus' nerves and muscles, can expand and contract to brighten or darken the color of the octopus' skin. Think about a red balloon: when it's not inflated, the color of the balloon is a fairly dark red. But once you blow air into the balloon and the balloon expands, the color of the balloon becomes lighter as the material becomes stretched out. This is exactly how the chromatophores on the octopus work: the thousands of sacs expand and contract based on what the octopus wants, making the color more or less visible.

Octopuses can also change their skin to form small bumps or tall spikes to mimic coral. Small bundles of muscles called papillae allow the octopus to smooth or raise their skin and create different textures. The combination of texture and color transformations allows the octopus to instantly and magically change its appearance. This is why the octopus is one of the world's master camouflagers!

In the colorful world of nature, camouflage is a superhero power that animals use to hide and survive. Whether it's a sneaky stick insect blending into a tree or an out-of-this-world octopus, these creatures teach us that adaptation and clever tricks are the keys to survival. So, the next time you explore the outdoors, keep your eyes open for some magical and surprising creatures waiting to be discovered right before your eyes!

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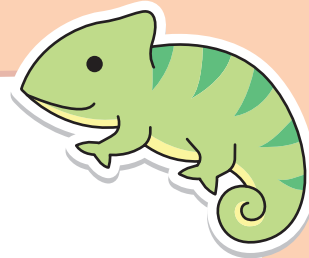
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**Find 10
hidden
objects!**

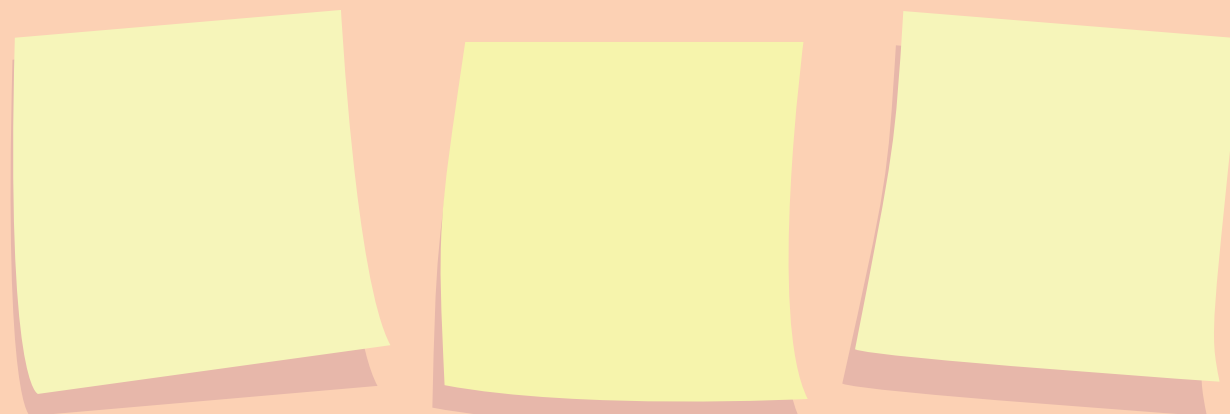


Sign This Page!



DRAW YOUR OWN EMOJIS!

What emojis would you like to see? Are there two emojis that would look cool morphed together? It can be anything!



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