

CURIOUS?

IFLSCIENCE

WHAT CAME FIRST: THE
CHICKEN OR THE EGG?

COULD YOU TURN A
FLAMINGO BLUE?

APRIL 2026

A stylized illustration of the Earth, split vertically into two halves. The left half is light blue and green, representing land and water. The right half is dark blue. A dashed white line runs diagonally from the top right to the bottom left, representing the Earth's axis of rotation. A solid white arrow points from the top left towards the center of the Earth, indicating the direction of the tilt.

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Our ancestors clearly knew the Earth had a tilt, but who were the first to figure it out? Dr Alfredo Carpineti investigates.

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Citizen Science Month

Small acts of science can make a big impact, and you don't have to be a professional scientist to contribute. Anyone, anywhere around the globe, can contribute to the knowledge of the world around us – and a little further afield! – more easily than ever before, and since April is Citizen Science Month, if you've not got involved before, why not start now? Whether it's counting bees, bats, or trees, comet hunting in Vera C Rubin data, mapping craters on the Moon, or even assisting on archaeological digs, there's something for everyone. To get started, try SciStarter.org or [Zooniverse](https://Zooniverse.org). Citizen science is helping **change the world** and you can be a part of it.

Comet(s) Of The Year

There are two strong contenders for Comet of the Year and both may make their appearance this month, with luck visible to the naked eye.

C/2025 R3 (PANSTARRS) is a long-period comet discovered by the Pan-STARRS survey in September 2025. It's predicted to brighten significantly as it nears perihelion (closest point to the Sun) around April 19-20, potentially reaching a magnitude where it could be visible with binoculars or even to the naked eye from dark locations. A week later, on April 27, C/2025 R3 will make its closest approach to Earth. Meanwhile, **C/2026 A1 (MAPS)** is a newly found Kreutz sungrazing comet set to skim extremely close to the Sun around April 4. Because of this, it might become exceptionally bright for a short time if it survives its fiery passage, possibly almost as bright as Venus. However, its actual brightness is still uncertain and depends on how well it holds together during perihelion.

Earthshine Peak

Earthshine, Da Vinci Glow, ashen glow, the "New Moon with the old Moon in its arms"; there are many names for this phenomenon, and April is the best month of the year to see it. Earthshine is a soft glow that lights up the usually invisible, unlit part of the New Moon because the Sun's light reflects off the Earth's surface and back onto the Moon.

In fact, if you were standing on the Moon, not only would Earth appear about four times larger than the Moon appears to us, but it would be around 50 times brighter than the Full Moon on Earth. The best time to see it is right after sunset or before sunrise, a few days either side of a New Moon – on April 17.



A Gorilla Story

As we approach the 100th birthday of wildlife broadcasting icon David Attenborough next month, expect a wealth of new nature documentaries to celebrate. Netflix is getting in early with *A Gorilla Story: Told by David Attenborough*, out worldwide on April 17. In it, Attenborough revisits an iconic moment in natural history filming: the moment a 3-year-old male gorilla named Pablo decided to use Attenborough as a pillow while filming in Rwanda for *Life on Earth* in 1978. Pablo grew up to be a top silverback and now we get to see how his descendants are doing, while enjoying extraordinary gorilla behavior never filmed before.





Once-In-A-Decade Superbloom

Death Valley, California, is experiencing an epic wildflower display that may be one of the desert's uncommon superblooms. Thanks to unusually heavy winter rainfall, the usually dry landscape is sprouting carpets of colorful flowers in yellow, orange, and purple. While this technically happens every year, the National Park Service (NPS) has acknowledged it's an above-average bloom year. These spectacular events happen about once a decade when the specific conditions of rainfall, temperatures, and a sufficient seed bank from last year come together. The last time California experienced this was in 2016. If you plan to visit, the NPS says at higher elevations, it could continue through June. Of course, these rainbow carpets look great on the 'gram, which is why officials are begging people to bloom responsibly. Stay on the paths, don't pick the flowers – and bringing a drone? Don't even think about it.

World's Tiniest QR Code

Tens of millions of QR (quick-response) codes are used every day as shortcuts to websites, menus, forms, and more. They can carry significantly more data than bar codes and have much wider applications. Now, a team at Tu Wien has just been awarded the Guinness World Record for the world's smallest, just 1.98 square micrometers – smaller than most bacteria. Each pixel measures just 49 nanometers, about 10 times smaller than a visible light wavelength. This makes it literally impossible to see with the human eye, and most optical equipment. You may not be able to order brunch with it, but it could have vast applications for future data storage.



WHAT'S UP?

SMILE MISSION LAUNCH

Studying space weather never looked so cool

Name: Smile

Appearance: Fun black and yellow spacecraft that may or may not be Bumblebee in disguise

Location: Soon to be orbiting 120,000 kilometers (74,565 miles) above Earth

What exactly is the Smile mission?

It's a joint endeavor from the European Space Agency (ESA) and the Chinese Academy of Sciences (CAS) to better understand how our planet responds to the solar wind – the continuous stream of charged particles thrown out by the Sun – and in turn, solar storms, geomagnetic storms, and space weather in general.

When is it launching?

There's not a precise date, but there is a launch window that begins this month, on April 8. Any time from then to May 7, the spacecraft will blast off on a Vega C rocket from Europe's Spaceport in French Guiana to its destination 121,000 kilometers (74,565 miles) above Earth, where it'll carry out its mission for the next three years.

What's it going to do when it's up there?

So much cool science! The spacecraft will carry four instruments, including a soft X-ray imager, ultraviolet imager, magnetometer, and light ion analyzer.

Using these, it'll be the first spacecraft to take detailed and long-running X-ray images of Earth's magnetic field, as well as the first to record the Northern Lights for a whopping 45 hours at a time.

That all sounds impressive, but why should we even care about the solar wind and space weather?

Because it affects us more than you might assume. Stop for a minute and think about how much of our technology relies on Earth's magnetic field and upper atmosphere – it's a lot, huh? A hefty coronal mass ejection colliding with our magnetosphere and ionosphere could disrupt power grids, interfere with radio communications, and affect GPS navigation. We might get a bunch of pretty auroras, too, but what would even be the point if you couldn't charge your phone to post a picture of them on the 'gram?!

You make a valid point. So how is the mission going to help?

By, fingers crossed, finally figuring out some of the key mysteries about the solar wind and its impacts that we are yet to solve, including: what happens when the solar wind meets our planet's magnetic shield, how we can predict the most dangerous magnetic storms earlier (so you have enough time to charge your phone and all five power banks), and what causes magnetic glitches on the dark side of the Earth.

HOW DO WE KNOW THAT THE EARTH HAS A TILT?

Our ancestors recognized the effects of Earth's tilt but who were the first to figure it out?

By Dr Alfredo Carpineti



Our world has a tilt, and it is pretty important. In fact, as a feature of our planet, it's so important that it has been considered a crucial player in the emergence of complex life on our planet. Its main effect, the seasons, has been known to our species since ancestral times, but we do not know when people realized why or how. Without an obvious discoverer, we must travel back to the earliest known people who measured this tilt, and it is still a journey of over 2,000 years into the past.

Who was the first?

The main protagonists of this adventure are two Greek thinkers, one from what is now modern-day France and the other from Egypt. They lived a few decades apart and provided the astronomical understanding that our planet is tilted with respect to its orbit, even though neither of them was a proponent of heliocentrism: they still believed that the Sun went around the Earth.

Before the history lesson, we should talk a bit about the tilt itself. By "tilt" we mean the angle between an object's rotational axis and its orbital axis. Basically, the Earth is spinning on its axis currently at a 23.44° angle to the orbital plane of the Earth around the Sun, like a wonky spinning top. This is known as obliquity and the first known measurements come from the fourth century BCE.

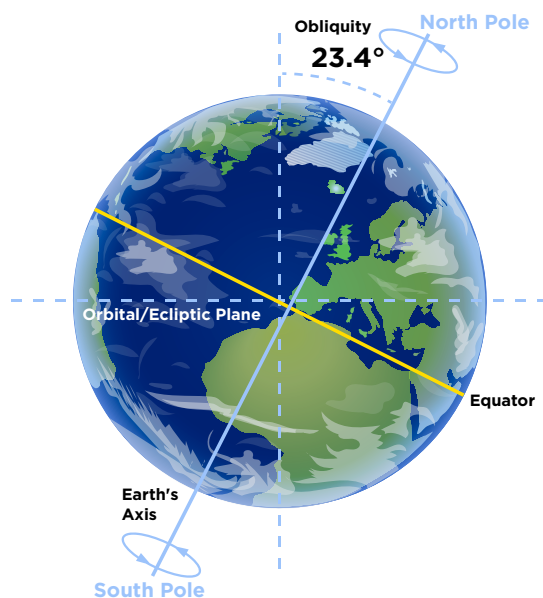
The person who conducted that experiment was Pytheas, from the Greek colony of Massalia (today's Marseille, France). He was the first person we know of to connect the tides with the Moon, as well as writing about the many features that exist at the higher latitudes of our planet: the Arctic, polar ice, and even the midnight Sun. Now, it is important to remember that several populations, such as the Sámi and the Inuit, already lived at those latitudes, and details about the Arctic had reached the Greek world centuries before.

Pytheas conducted measurements of latitudes both in Massalia and in the far

north, estimating the obliquity, recording his measurements in a work that has not survived in full. What we know comes from an excerpt quoted by later authors, even those who disagreed and did not believe his findings. Haters or not, he was influential. Still, he might not have been the first to calculate the tilt, with Oenopides, another Greek astronomer, allegedly giving the value of obliquity as 24° about a century before. If and how he obtained that number are unknown, only reported by later philosophers.

How did they do it?

Even without direct descriptions, we know how Pytheas calculated latitude, the distance north or south of the equator. He used different methods. One is to measure the elevation of the North Pole. You find the North Star, and



you see how high it is in the sky. This is very easy for us now; today, Earth's axis points directly at Polaris, the North Star. But the actual direction of the tilt moves in a little circle every 26,000 years. At the time of Pytheas, the axis was not pointing at any particular star, but an empty space. The Greek astronomer refers to it as an empty corner in a quadrangle, possibly formed together with star β Ursa Minor and α and κ Draco.

The other method is using the Sun. You need a specific (but arbitrary) location, a stick, and

a chosen specific date and time. Keep the stick as you travel elsewhere, and once it is that same date and time, you can compare the shadow of the stick when the Sun is overhead in the two locations and obtain the difference in latitude. For Pytheas, that was done on the summer solstice, the longest day of the year.

The first to measure Earth's circumference

A few decades later, in Egypt, another Greek astronomer used that very method to make a measurement no one had done before. Eratosthenes knew, like many people in Egypt, that in the city of Syene (modern-day Aswan), at noon on the summer solstice, the light of the Sun went straight down to the bottom of the city-center well. As the Sun was right above it, there were no shadows. The city is located on the Tropic of Cancer.

Eratosthenes used this knowledge and then measured the shadow cast in a well in Alexandria, where he lived. That gave the philosopher the angle between the two cities, and by knowing the distance between the two, he was able to work out just how big the Earth was. His estimate is only 330 kilometers (205 miles) off the correct modern value.

"The importance of Eratosthenes' experiment in measuring the circumference of the Earth cannot be overestimated. To be clear, the fact that the Earth was spherical was already known by his time, no matter what today's flat-earthers may say," **Dr Luigi Prada**, an Associate Professor of Egyptology at Uppsala University, told IFLScience.

"But nobody had previously come up with a system to measure its size, which goes to show Eratosthenes' ingenuity and deep knowledge of mathematics and geography (a term, the latter, which was supposedly coined by him, as history has it). Sadly, Eratosthenes' written work containing his own account of his experiment is lost, but we have records of it from later Greek writers."

The crucial pieces of information for this experiment were known at the time: the apparent movement of the Sun and the fact that the Earth had a tilt. The word "tropic"

itself comes from the Greek “trepo”, meaning to turn back. Even the fact about the well of Syene on the solstice was well established long before Eratosthenes came to Egypt.

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“The ancient Egyptians, who were keen observers of nature, knew all too well that the Sun was perfectly overhead in Syene, in the south of the country, on the June solstice. But, from all we know, nobody had ever thought about possible astronomical/geographical applications of this phenomenon for measuring the circumference of Earth prior to Eratosthenes,” Dr Prada added.

Eratosthenes also provided a measurement of the obliquity of the ecliptic – the astronomical term for the degree of tilt in Earth’s axis and ecliptic/orbital plane – once again finding a value remarkably close to the actual one. From then on, many astronomers performed this calculation, discovering the precession of the equinoxes – the term for the 26,000-year cycle caused by the Sun and Moon’s gravity that makes Earth’s axis wobble – as well as the changes in obliquity produced by the gravitational perturbations. The effect of the other planets also changes the axial tilt by a small fraction over time.

Tale as old as time?

Studying the sky is one of the oldest pursuits of our species. We have **used the stars to travel** and to mark the passing of time for as long as we have been alive. We give the primacy on assessing the axial tilt to those three Greek

philosophers, however, as their measurements have survived, indirectly, to today.

If you have noticed that in winter the shadows are longer and the Sun is lower on the horizon, or that when traveling, the position of certain stars or the Moon changes, then you too have appreciated the fact that Earth has a tilt. Maybe not all civilizations that understood the consequences of the obliquity grasped the geometry or geography of how the Earth must be oriented, but many must have had an inkling.

THE FIRST PEOPLE TO TRULY
GET IT MIGHT HAVE LIVED AT
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OF *HOMO SAPIENS*. WERE
THEY A NAVIGATOR CROSSING
THE PACIFIC? A TRIBE LEADER
REACHING THE FAR NORTH
AND SEEING CONSTELLATIONS
NONE OF THEIR ANCESTORS
EVER MENTIONED?

We can be confident that we have known of the obliquity for at least over two millennia, but probably longer. The first people to truly get it might have lived at any point in the existence of *Homo sapiens*. Were they a navigator crossing the Pacific? A tribe leader reaching the far north and seeing constellations none of their ancestors ever mentioned? A child sent to fetch water from a well in Syene at noon on a summer solstice a long time ago? Maybe all three and many more.

Their identity is lost to time but the idea was not. It eventually fed into the work of astronomers all the way to the Copernican revolution, when we understood that the Sun, not Earth, was the center of the Solar System, and beyond, including how we study and appreciate the sky today. 🌟





THE ROAR OF THE FROGFISH

Smartphone category winner for the **Underwater Photographer Of The Year Competition 2026**, Jack Ho, was shooting at a depth of 15 meters (49 feet) in the Lembeh Strait, Indonesia, when he found a frogfish lying in wait for prey. "I waited for at least 15 minutes," he said in a **statement**.

"I aimed a macro light at its head to capture the split second it opened its huge mouth. Luckily, I got the perfect moment."



COULD YOU TURN A FLAMINGO BLUE?

And how you go about keeping them gloriously pink.

By Eleanor Higgs

Q&A

As a self-confessed bird nerd, I'm often left marveling at both the variety and breadth of the colors that can be found even in the feathers of the birds that visit my garden. Set your sights further afield than suburban England, however, and all manner of hues will be there to greet you.

And of all the bird species, is there anything more iconic and instantly recognizable than the perfect pink feathers of a flamingo? I spoke with Tim Savage, Section Manager of Birds at Whipsnade Zoo, and Amanda Ferguson, Diet Management Officer for both Whipsnade and ZSL London Zoo, to learn more about what goes into keeping these birds a rosy shade of pink – and if they could potentially be turned another color, too.

How do you decide what to feed 40 flamingos at the zoo?

AF: The most important thing is looking at what these animals would eat in the wild, their natural diet, [and] the nutritional composition of that diet. That gives us a really good idea about what the animals should be eating when we have them in managed care.

And of course, we've got a lot of information from all the keepers that have been at London and Whipsnade Zoo as well, and they've worked with different birds, they may have tried different diets. We bring all that together and then decide what kind of food items we want. We do some calculations to work out how much they need to eat depending on their metabolic rate, body size, and activity.



What needs to be introduced into their diet to make them that gorgeous pink color?

AF: In the wild, they are eating lots of little [brine] shrimp and microscopic algae, and all of those things contain a pigment inside them. And when the flamingos eat them, that gets transferred into the flamingos and [then] into their feathers. We have to feed them this bespoke pellet [with this] pigment, called canthaxanthin. It's a carotenoid pigment, and that's put into the pellet at the processing stage, and then when the flamingos eat it, they are actually ingesting that as well, and that's what helps keep their lovely pink color.

Carotenoids are a special group of substances. The colors that they generally give are kind of the red, yellow, orange kind of color, and that's the color that these natural organisms have inside them that then gets transferred into the flamingos, into their feathers, so they grow out with these beautiful red colored feathers.

Do they start off like this?

AF: When they hatch, they're covered in down to start with, which is a sort of gray/white color. And even as their feathers start coming through, they tend to be white to start with. And it takes them a good couple of years – in a few molts, where they lose their feathers and replace them – before they get this pink color. Interestingly, when pairs of flamingos are feeding chicks, because obviously they're passing a lot of that food over to their chicks, their feathers actually get sort of washed out. So they get a bit lighter. They're not as pink as they would be.

If the flamingos never ate this pigment, would they stay white their whole lives?

AF: They would be very pale, wouldn't they?

TS: They would probably be a very light pink color, certainly not the vibrant color they should be.

Hypothetically, if we were to inject a blue or purple chemical into their food, could we turn a flamingo blue?

AF: Well, this is where it gets really interesting, because we come into considering how a bird gets its color in its feathers. And there's lots of different ways, actually.

Blue and green are generally not produced by pigments. They're produced by the feathers having a certain structure, and the way that the light hits the feathers. And that's how you see all these lovely, vibrant blues and greens. So if you're thinking of the kingfisher with the blue, that's all to do with physics really, the physics of the light hitting the feathers and then bouncing off, and then we perceive just the blue color.

That doesn't happen with flamingos. And if you give any other dye or substance that's not a carotenoid, it will get broken down in the stomach and digested and metabolized. It doesn't ever get transferred into the feathers. If you feed it lots of green food coloring or blue food coloring, it won't make any difference to the bird at all, it will just get digested and [eventually] excreted.

Is there one cool thing you want people to know about flamingos?

AF: I've got one really cool thing that flamingos do that people may not know about: they actually produce milk to feed their young. [It's] a very special secretion, full of nutrition and protein and fat, and they produce it in their crop. Their crop is like an organ at the beginning of their digestive tract, and this crop produces this secretion, and then the adult birds will kind of dribble it out of their beaks and feed the baby birds. They're one of the only species [of birds] that do that; that's something very special and unique to that species.

TS: Interestingly, when they do produce this milk, it's red. *



WHAT CAME FIRST:

THE CHICKEN OR THE EGG?

Is it really such a mystery?
Rachael Funnell investigates.





far older than animals themselves. Egg cells likely evolved in early multicellular organisms more than **600 million** years ago, long before vertebrates appeared.

So, what if we get more specific and focus on the kind of egg most of us picture: a hard shell, and soft gooey inside. These eggs first evolved around 320 million years ago in early amniotes, ancestors of modern reptiles, birds, and mammals.

It was a big step for life on Earth. One that enabled animals to reproduce away from water thanks to a protective shell and internal supply of moisture that supported life on land. The amniote egg made it possible for dinosaurs and birds to evolve. So, yes, even that egg came a long, long time before the chicken.

What about a chicken egg, specifically?

This is where it gets a bit confusing. New species arise through a long and slow process as random genetic mutations push an animal past the threshold of becoming a separate species to its parent. That means the first chicken wasn't born to a chicken, but a chicken-like bird. But because the embryo inside carried the mutations that defined the first true chicken, the egg containing that embryo was technically the first chicken egg.

One frequently cited wrinkle involves a protein called ovocleidin-17, which helps guide the crystallization of calcium carbonate during eggshell formation. Because it is produced in a chicken's oviduct, some people argue that a chicken must exist before a chicken egg. However, similar proteins occur in other birds, and evolutionary changes in eggshell proteins likely occurred gradually, so this doesn't overturn the evolutionary explanation that the egg came first.

So sorry, chicken, the humble egg has you beat. Not bad losing out to such a worthy adversary, however. After all, some of Earth's most spectacular creatures have cracked their way out of a shell, as well as some of science's most curious mysteries.

What came first, the chicken or the egg?

People have wrestled with the question since at least the time of Aristotle. The ancient Greek philosopher reasoned that chickens and eggs must have existed in an endless cycle because each depends on the other to exist. It's the kind of problem that touches on what philosophers call infinite regress – a self-perpetuating chain where each thing depends on something that came before it.

It's enough to make your head spin if you think of it quite literally – picturing a shiny egg popping out of a cloaca, only to then wonder what egg that cloaca hatched from (not something I'd suggest you ever admit to, FYI). The mind boggles, but fear not – my oddly curious friends – science, as it so often does, has the answer.

Several, in fact.

The dawn of the egg

If we're to just consider the egg as an independent means of embryo development, then the debate is a slam dunk in favor of the egg coming first. Most people associate eggs with birds, but the vast majority of animal life on Earth hatches from an egg.

Then there's the egg cell. While only five mammals lay eggs (hello, monotremes), all female mammals produce egg cells (fun fact: at ~0.1 millimeters, the human egg cell is large enough to be seen with the naked eye).

Research published in **2024** suggests that the genetic programs behind embryo-like development may date back more than a billion years, long before animals evolved. Scientists observed a single-celled relative of animals forming multicellular structures that resemble early embryos, hinting that the biological toolkit for making eggs may be

When one egg-based mystery is not un oeuf

Of all the weird and wonderful creatures that have emerged from an egg, perhaps one of the most remarkable finds takes us to Antarctica in 2011. Here, scientists discovered a giant fossil egg they nicknamed “The Thing”. Why? Well, because nobody had a clue what came out of it.

The mysterious egg was rather leathery and dated back to around 66 million years ago. This egg was big, too. At **28 by 18 centimeters** (11 by 7 inches), it’s not quite the largest ever laid on Earth – we’ll get to that shortly – but it’s

“YOU CAN MAKE A HUGE OMELETTE WITH A SINGLE OSTRICH EGG, BUT THINGS LIKE ELEPHANT BIRDS HAD EVEN BIGGER EGGS.”

about a third larger by volume than any known soft-shelled dinosaur egg.

“It is from an animal the size of a large dinosaur, but it is completely unlike a dinosaur egg,” said Lucas Legendre, lead author of a 2020 study on it, in a **statement** at the time. “It is most similar to the eggs of lizards and snakes, but it is from a truly giant relative of these animals.”

We still don’t know the species that laid The Thing, but scientists have some ideas as to what it might have looked like. A leading hypothesis is that it belonged to a large marine reptile such as a mosasaur, though the exact animal remains unknown.

Still, it’s unlike any egg we’ve ever found from this period. Based on the folds in the shell (that indicate it bent, instead of breaking), it appears to be a thin, soft-shell egg. Scientists think it came from a marine reptile that was at least 7 meters (23 feet) long, but all the key culprits were thought to give birth to live young, not eggs. For now, the egg’s maker



remains a mystery, but the fossil has been named *Antarcticoolithus bradyi* and raises interesting questions about whether we need to rethink our understanding of giant Cretaceous creatures’ breeding behavior.

The world’s largest egg

“What about the largest egg ever laid on Earth?” I hear you cry. Well, that award goes to the now-extinct elephant birds. It’s thought the elephant bird (*Aepyornis maximus*) may have been the **largest bird to have ever lived**, weighing in at a whopping 450 kilograms (992 pounds). It holds another record, too, starting life by breaking out of the biggest eggs of any known animal.

These elephant birds’ eggs were about 150 times larger than your average chicken egg. An omelet to feed a feast, but with delicious eggs comes great peril.

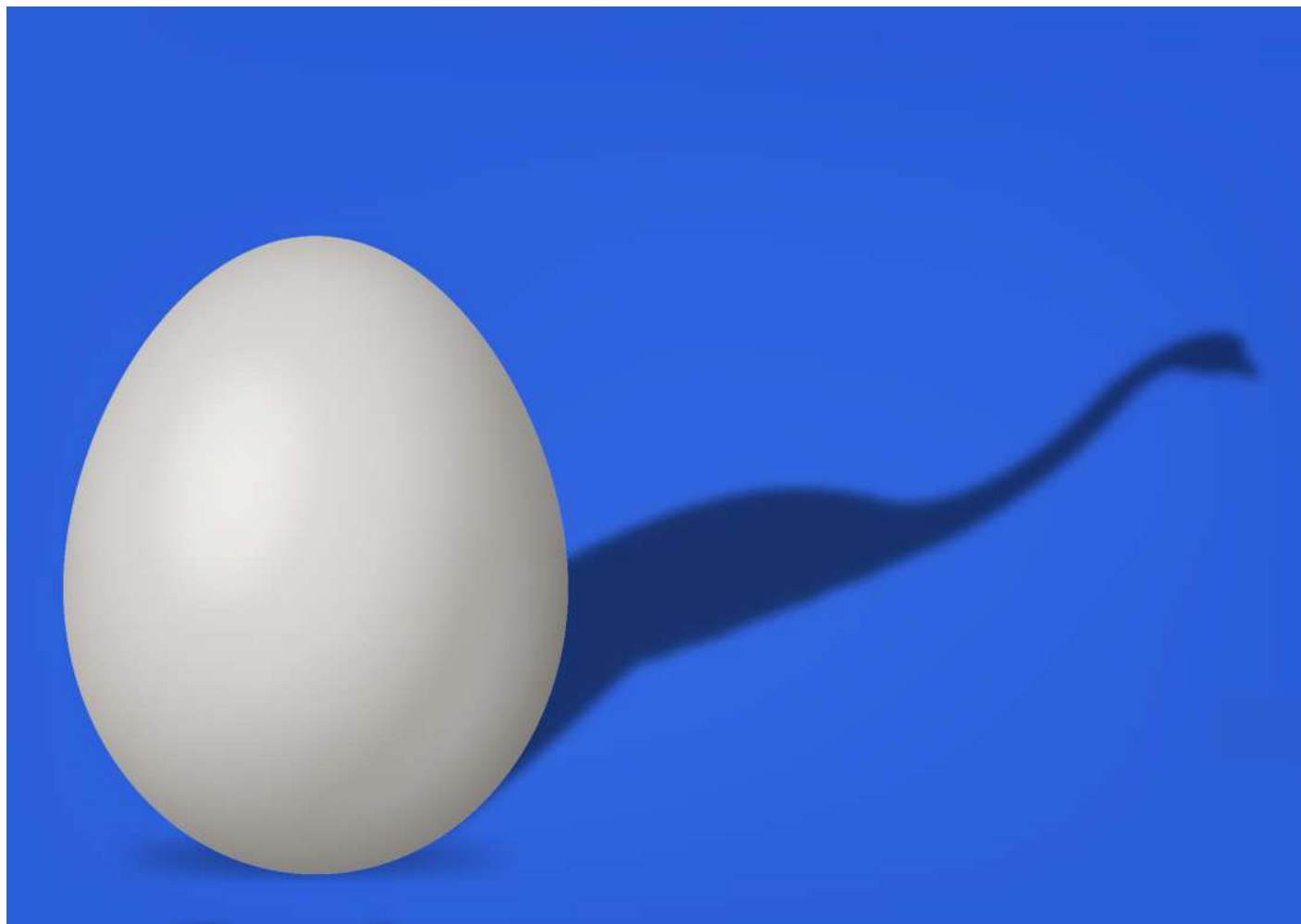
“You can make a huge omelette with a single

ostrich egg, but things like elephant birds had even bigger eggs,” palaeontologist and author of *The Story Of Birds*, **Professor Steve Brusatte**, told IFLScience. “Literally, they were the size of watermelons and humans did overlap with elephant birds. They only lived on Madagascar, and it does seem like humans are the reason those birds are extinct.”

“That’s happened time and time again, especially as people have reached different islands where there’s weird and wacky birds. And there have been so many that have gone extinct. It really is a tragic thing. My hope is that we can acknowledge this, understand this, and learn from history and from the fossil record of humans interacting with these birds going extinct and not repeat those same mistakes.”

What comes next?

Primordial germ cells have become a hot area of research in Colossal Bioscience’s mission



“MOA EGGS WERE LIKE THE SIZE OF A BASKETBALL, SO WE’RE WORKING WITH OUR EXOGENOUS DEVELOPMENT GROUP TO DEVELOP AN ARTIFICIAL EGG THAT WILL BE ABLE TO ACCOMMODATE MOA.”

to de-extinct animals like the dodo and moa by introducing their phenotypic traits into the genomes of their closest relatives. For the dodo – essentially a large pigeon – that’s the Nicobar pigeon, and for the moa that’s an emu.

An emu egg is a spectacular thing to behold. Emerald green and about the size

of a large grapefruit, it’s an eye-watering accomplishment for something that comes out of a cloaca. Still, emu-big is nothing compared to a moa.

The nine species of moa varied hugely in size from the South Island giant moa, *Dinornis robustus*, which towered at **3.6 meters** (11.8 feet) tall and weighed approximately 230 kilograms (507 pounds) to *Anomalopteryx didiformis*, known as the little bush moa, that was the size of a turkey. For millions of years, they acted as ecosystem engineers, helping to shape New Zealand’s grasslands and forests, and the effects of their extinction can still be seen across the landscape today.

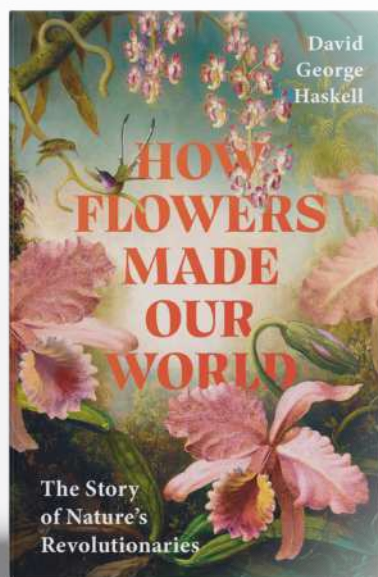
Overhunting by humans and habitat loss meant they abruptly went extinct around 600 years ago, but the mighty moa left behind some memorable remains. As well as fossils, they include a remarkable **foot with soft**

tissues intact, and the de-extinction company Colossal is working towards building genomes for all nine species.

Thing is, if an emu is smaller than a moa, then how can a surrogate hope to lay an egg sizable enough for its gene-edited chick? In this case, the bird may come before the egg.

“That is a particular challenge for the moa, because we’re using emu as the surrogate,” **Dr Anna Keyte**, species director for all things avian at Colossal, told IFLScience. “Moa eggs were like the size of a basketball, so we’re working with our exogenous development group to develop an artificial egg that will be able to accommodate moa.”

The world’s got a bit of waiting to do before we find out if we’ll ever see a moa-like creature in the forests of New Zealand. For now – bravo, egg. You sure got those birds beat. 🌟



In this excerpt from *How Flowers Made Our World: The Story of Nature's Revolutionaries*, biologist David George Haskell reveals why we're already living in a *Jurassic Park* of sorts.

A delicious aroma announces summer's arrival in Atlanta. In front of office buildings in Midtown, my nose plunges into sweetened almond and tangerine, then resurfaces in a miasma of truck fumes. The scent brushes past me, too, on the scuffed lawns of city parks and along shady streets in older neighborhoods. To find the source of these delights, I look up. White flowers the size and color of porcelain dinner plates sprout from the branch tips of huge southern magnolia trees. A plume of scent streams from each bloom. These aromatic trails dance like ribbons in a breeze, so I can never know when one will warm me with its touch. Over the next month, this scant first bloom will grow. By June, a large tree can have 100 or more flowers open at the same time.

FLOWERING WITH DINOSAURS

The delights of magnolia flowers are portals into deep time. When *Tyrannosaurus* stomped through the subtropical forests of the late Cretaceous, magnolia-like plants had been thriving for 50 or more million years. If magnolias were rare animals, they'd be corralled into theme parks, at the center of movie franchises, and central characters in thousands of children's storybooks. In the floral world, we don't need a dinosaur movie; we live in one.

The Earth's first flowers left traces of pollen in the fossil record about 130 million years ago, in the early Cretaceous. Studies of DNA suggest that flowers evolved before this, sometime between 150 and 250 million years ago. This is astonishingly late in the evolution of life. Most of the major groups of complex animals evolved 500 or more million years ago. The first plants, none of which had flowers, came onto land at about that time, too. Flowers were latecomers, but when they finally showed up, the party really got going. Within a few million years of flowers' appearance, perhaps as few as 3 million, the family tree of flowering plants splayed into almost all of the main branches that are still with us today. After this initial frenzy of diversification, evolution calmed down, producing new floral diversity at a more leisurely pace.

Ancestors of water lilies and of *Amborella*, a shrub known only from the island of New

Caledonia in the southwestern Pacific Ocean, were among the earliest offshoots of the family tree. Magnolias were another early branch. The palm and lily branches of the family tree came later, then came plants that would later become roses, sunflowers, and their kin. By the time fossil pollen shows up in rocks, evidence from genetic genealogies shows that all the major branches of the flowering plant family tree were established. By 100 million years ago, flowering plants were flourishing all over the globe and, by 90 million, were dominating not only the understory where they first evolved, but forest canopies.

Truly, this was a revolution. In a few million years, the green-brown world of tree ferns, conifers, and other ancient plants was overthrown by the flowering plants. Plants that had dominated the land's surface for 300 million years were suddenly in the shade of upstarts. Nothing was ever again the same. Most ecosystems are now founded on flowering plants. Our own species would never have evolved without them. We are sustained today by floral gifts, from the food on our tables to the perfumes on our skin. The Earth is a floral planet and, although we seldom realize it, we are a species almost entirely dependent on flowers. 🌸



Q&A WITH

DAVID GEORGE HASKELL

AUTHOR OF:
HOW FLOWERS MADE OUR WORLD

Many of us picture flowers as a single stem in a bouquet, but these fragrant works of art have some serious work to do out in the natural world. Author and biologist David George Haskell is on a mission to change that, and we wanted to find out what he'd learned along the way.

Why did you want to write this book?

Flowers are gorgeous, but we underestimate them. We often regard them as pretty but powerless. Ornamental but not in charge. Yet, flowers are revolutionaries. Soon after they evolved, they took over much of the world and built most modern habitats. Today, they sustain life worldwide. We live on a floral planet. I wrote the book to put flowers back where they belong, at the centre of the story of how our world came to be. The book is an exploration of the many creative powers of flowers.

I also wrote the book to celebrate the exuberant diversity of flowers. So many scents, colours, and forms, each one of which carries a story about how it came to be.

Learn anything unusual along the way?

Researching each chapter was like immersion in a soap opera. So many seductions, illusions, life-and-death dramas, and expected connections. Two that stand out are the magnolia and the grass. Magnolia because they are so over the top in their sexual displays and are also diligent mothers to the developing seeds. These are two of flowers' innovations: novel ways of being sexy and enhanced botanical motherhood. Grasses astonished me because I had no idea that they essentially made humans. Without grasses, we'd still be small-brained apes living in the trees. Today, most food calories we eat depend on grasses. We are grass apes.

Tell us about an unsung hero from the plant world.

Seagrasses look humble but have astonishing powers. They are amazing climate and biodiversity champions. They grow by spreading tough roots through the mud and sand in shallow marine waters, then waving green fronds into the water. They even **flower underwater**, using water currents and tiny shrimp to disperse pollen. Underwater flowers! Seagrasses trap 50 times more carbon than the lushest rainforest and are home or nursery to many marine species.

How can flowering plants help us in the climate fight?

Tropical forests, grasslands, seagrasses, mangroves, and salt marshes are all built by flowering plants and are amazing carbon stores. They also regulate regional rainfall and temperatures directly. Flowering plants also offer us better ways of thinking about how to thrive on the planet. They built the modern world largely by cooperating with other species – pollinators, fruit dispersers, fungi, bacteria – stitching unlikely partners into productive webs. If we could do the same, we'd be better members of the living Earth community.

Tips for taking in all that flowers have to offer?

The key: open your senses. Send ears into the world like octopus tentacles, feeling for sound. Sniff strange or delightful aromas. Run your fingertips over surfaces. They'll find textures your eyes cannot perceive. Be curious about the ever-shifting quality of light. Awakened senses are superpowers that allow us to invite others into our experience. When I'm writing, I seek verbs and analogies that feel true to experience, feelings, and ideas. Paying attention is 90 percent of the preparatory work. The rest is playful exploration in the underbrush of language. Part of the joy of reading and writing is inhabiting other people's experiences, and so offering your writing to the world is a way of stitching together different consciousnesses. Strong magic. No wonder authoritarians and dogmatists burn books.

One thing you hope the book will inspire?

Newfound wonder and delight at living on a planet made by flowers. 🌻

How Flowers Made Our World is published by Torva and is out now.



What a beautiful chapel, eh? High ceilings, symmetrical design, and what's that embedded in the ornate walls? Oh yeah, it's a bunch of skulls. Welcome to Portugal's Capela dos Ossos, a small chapel attached to the Church of St Francis that's decorated with thousands of human bones.

By Rachael Funnell

PORTUGAL'S CHAPEL OF BONES



Step inside the Capela dos Ossos in Évora, Portugal, and you find yourself faced with quite a confronting scene. This peaceful place of worship and reflection was built by Franciscan friars in the late 16th century, but they built it with a difference. Shunning more traditional materials to complete the interior décor, they exhumed the remains of around **5,000 people** from several cemeteries in and around Évora and got to work with their bones.

Confronting? It's meant to be.

It forms what's known as an ossuary chapel, or "bone chapel", and you can find beautiful examples all over the globe. That which sits alongside the Church of St Francis in the city of Évora is really quite remarkable. Its walls and columns are lined with thousands of human bones arranged in decorative patterns.

The people of Évora were enjoying a period of prosperity around the time the chapel was built. This coincided with an overcrowding crisis for their cemeteries, considered then to be too numerous and taking up valuable land. The only problem was that making space involved relocating the remains of thousands of people.

This is thought to have inspired a novel solution from the Franciscan monks. One option was to simply lock them away in a safe place, but why hide them where nobody can see them, when you could serve a powerful message to those who had lost sight of the transience of wealth?

So, they created a reflective space from the dead that could act as a great leveler for the living. An inscription above the chapel's door summarizes its purpose quite nicely: "We bones that are here, for yours we wait."

Yes, ossuary chapels aren't about testing the limits of what passes for gothic interior design. They are a kind of **memento mori**, a Latin phrase that translates to "remember you must die".

Death has become quite sanitized across parts of the globe, with our loved ones being concealed from us almost immediately after death. However, research suggests that seeing the dead can be beneficial in numerous ways. Not only is there the aspect of closure, but it can also help us to respond more positively to the unavoidable fact that one day we all must die.

The Victorians took photos of their dead, but it seems the Franciscans wanted a more hands-on approach. Turns out human bones are a hardy choice for interior design, as the chapel still stands over 400 years later. 🌟



LISTEN

WE HAVE QUESTIONS

Podcast from IFLScience

Can you roll your Rs? This writer is shaking their head, and it's always been something of a sore spot. I did Spanish lessons in school, I'm set to marry into an Italian family, and yet if I try to recreate that irresistible sound, the noise that comes out makes it seem like a bee just stung my tongue. So, am I a lost cause? Health & Medicine Editor Laura Simmons set out to find out in this eye-opening conversation with Dr Helen Nuttall, Senior Lecturer in Cognitive Neuroscience and head of the Neuroscience of Speech and Action Lab at Lancaster University.

Available April 20.



WATCH

HOPPERS

Film from Pixar

Studying animal behavior is hard because you can only get so close before the investigator effect starts to influence their movements. What if you could find some way to infiltrate the natural world unseen? What if, say, you could pull an *Avatar* with a beaver and suddenly see the world through a wild animal's eyes? Just so happens that's exactly what goes down in this movie.

Available now.



READ

OUR FATHER WHO ART IN AN IRON LUNG

Book by Douglas Dodd

This memoir tracks the extraordinary life story of Bruce Dodd, who in 1955 contracted polio. The illness left him paralyzed and dependent upon an iron lung – a vast metal chamber that acts as a negative-pressure ventilator. The technology paved the way for modern day intensive care units, but it was cumbersome, weighing around 300 kilograms (661 pounds). Some patients only stay in an iron lung for a few weeks or months, but for Dodd, it would become his new normal for 21 years.

Available now.

WATCH

THE IFLSCIENCE SHOW

YouTube series from IFLScience

Join hosts Chris Carpineti and Eleanor Higgs for our latest episodes of *The IFLScience Show*, which digs into some of the latest science news. This month, you can expect a deep dive into the influence of different diets, and an investigation of questionable science experiments from history.

Available on YouTube.

READ

CLIMATE CAPITAL: INVESTING IN THE TOOLS FOR A REGENERATIVE FUTURE

Book by Tom Chi

Is the global economy destroying the planet? This toolkit provides tangible strategies for venture capitalists through to individual investors on how we can create a sustainable economic future.

Available now.



WATCH

BREAK IT DOWN

Podcast from IFLScience

Did you know that IFLScience's podcast had gone multimedia? Each month, we break down the biggest, weirdest, and most surprising science news and now you can catch the action on our YouTube channel. Join hosts Rachael Funnell and Eleanor Higgs as they unpack what the world has learned, and what IFLScience has been up to.

New episodes each month on YouTube or wherever you get your podcasts.

READ

RENEWABLES OR NUCLEAR

Book by Professor Elmer Lewis

Lewis confronts one of the most divisive questions in climate policy: should the transition to net zero be led by renewable energy, nuclear power, or a combination of both?

Available April 24.

Space Aliens And Monsters On The Big Screen

How one day took Rachael Funnell to London, Tau Ceti, Erid, and Skull Island.

It's not often that I get to laugh, cry, visit two alien planets, and question who would win in a fight between King Kong and a giant squid-like Titan all within 24 hours. Last month, that became just another Tuesday.

IFLSscience is proud to showcase the weirdest and most wonderful discoveries unfolding in the real world, but we also love delving into the creative world of science fiction. 2026 is already shaping up to be a great year for sci-fi fans, and we were invited to London to check out two of the most exciting new releases.

Stop one took me to Paddington (the place, not the bear), where I would be asked to secure my phone in a strange little bag to enjoy 2 hours and 36 minutes of uninterrupted space peril. **Project Hail Mary**, based on the novel of the same name by Andy Weir, hit the silver screen on March 20, and hoo boy, is it a ride.

Ryan Gosling steps into the squeaky yellow raincoat of Dr Ryland Grace, an outcast scientist-turned-teacher who finds himself alone on a spacecraft and consequently wrapped up in a mission to save the world. We'll avoid spoilers for anyone who has not yet read the excellent book but let's just say I will be purchasing any and all plushie merchandise that comes out of the movie.

I spoke to Weir about why he's so drawn to stories of people stranded alone in space, what inspired Rocky's melodic language, and how you even begin to invent a life-supporting atmosphere when, so far, we've never found one beyond our own.



Then it was a swift turnaround to Battersea Power Station. The Grade II listed building used to be one of the world's largest coal-fired power stations, but today hosts shops, restaurants, a cinema, and some serious industrial chic.

For the Apple TV premiere of season 2 of **Monarch: Legacy Of Monsters**, an offshoot of the Godzilla Monsterverse, we were treated to a sneak preview of episodes one and two, followed by a Q&A with the actor who plays Lee Shaw and the actor who plays Lee Shaw.

Confused? That's because father and son double act Kurt and Wyatt Russell play the same character across two separate timelines. While Wyatt's Shaw is getting into trouble with a scientist and cryptozoologist in remote corners of the world in the post-war 1950s, Kurt's present-day Shaw is getting into hot water with Titan X, a foe that even manages to give King Kong the slip.

Let's just say, as far as aesthetically pleasing escapism goes, our eyes are eating good this month. 🌟



The actors who play Lee Shaw.

1

ARTEMIS II LAUNCH WINDOW OPENS

April 1 (no joke) is the first possible date of the new launch window to send the four-strong Artemis II crew further (and faster) than humans have ever gone before in space. Possible other dates include 3-6 and 30, before the launch window moves to next month.

2

FULL MOON (PINK MOON)

The April full moon is traditionally called the Pink Moon due to the colors of spring flowers that pop up around this time in the Northern Hemisphere. It's also known as the Sprouting Grass Moon, Egg Moon, or Fish Moon and marks the start of spring as the first full Moon after the March equinox.

4

MERCURY ELONGATION

Mercury will appear furthest from the Sun than any other time this year, making it the best time to view the planet, so grab those binoculars or a telescope.

2026 APRIL

This month, Spring officially starts in the Northern Hemisphere, and there are plenty of reasons to look up: to catch a shooting star, an elusive planet, or possibly even to witness humans take to the skies in a long-awaited spaceflight.

CITIZEN SCIENCE MONTH

12

INTERNATIONAL DAY OF HUMAN SPACE FLIGHT

This marks the anniversary of the first human spaceflight by Yuri Gagarin in 1961.

14

WORLD QUANTUM DAY

GLOBAL ASTRONOMY MONTH

13 - 20

INTERNATIONAL DARK SKY WEEK

22

LYRIDS

The Lyrids meteor shower will be active between April 16 and 25, but the best time to see it is when it peaks on the 22nd, when you can expect 10-20 meteors per hour. This is the oldest recorded meteor shower, with records dating back to 687 BCE.

22

EARTH DAY



24

NEW BREAK IT DOWN EP!

On IFLScience's **YouTube** channel or wherever you get your podcasts.



27

NEW WHOS PODCAST EP!

Can you learn to roll your Rs? In this latest episode of *We Have Questions*, host Laura Simmons explores whether that rolled "Rrrrrrr" sound is innate or can be learned.

ARE YOU DRAWN TO **THE DARKER** OR **LIGHTER** SIDE OF SCIENCE?

Choose how you end each issue. For those who prefer the darker side, Holly Large explores why it's not a good sign if you're a fan of corporate jargon. If you like your science lighter, discover how dogs, cats, and toddlers measure up when it comes to being helpful.



EXPLORE YOUR SIDE ON FACEBOOK

MEASURING CORPORATE BULLSHIT

Synergizing, silos, touching base – let's be honest, for most of us, there's little worse than sitting through a meeting packed with corporate lingo that says everything and nothing at the same time. But the fact that it still exists means that there are those out there who really buy into it. Unfortunately for them, a recent **study** suggests that might also mean that they're bad at their jobs.

It all came as a result of cognitive psychologist Shane Littrell attempting to validate a brand-new measure that he'd developed to assess individual susceptibility to corporate jargon – the brilliantly named Corporate Bullshit Receptivity Scale, or CBSR (yes, you're allowed to swear in scientific literature).

To verify whether the new measure worked, Littrell carried out four studies in which he presented over 1,000 office workers with statements of two origins: they were either real quotes from Fortune 500 leaders, or statements generated by the "corporate bullshit generator" he created. Both types were presented alongside each other, and the workers were asked to rate the business savvy shown by them.

The office workers were also tested on their workplace-related skills, such as analytical thinking, cognitive reflection, and fluid intelligence – and it's in comparing these results with that of susceptibility to corporate jargon that things start to get a little troubling.

On the upside, people who were more susceptible to corporate BS tended to have higher job satisfaction. Problem is, they also tended to score lower than those who were less receptive when it came to their workplace skills, particularly when it came to decision making. Not exactly great for them, or the company – you can only get away with circling back for so long, after all.

"This creates a concerning cycle," Littrell explained in a **statement**. "Employees who are more likely to fall for corporate bullshit may help elevate the types of dysfunctional leaders who are more likely to use it, creating a sort of negative feedback loop. Rather than a 'rising tide lifting all boats,' a higher level of corporate BS in an organization acts more like a clogged toilet of inefficiency."

So, what's the solution? "Whether you're an employee or a consumer, it's worth slowing down when you run into organizational messaging of any kind – leaders' statements, public reports, ads – and ask yourself, 'What, exactly, is the claim? Does it actually make sense?'" said Littrell. "Because when a message leans heavily on buzzwords and jargon, it's often a red flag that you're being steered by rhetoric instead of reality."

DOGS = TODDLERS?

Ever thought that dogs give off similar vibes to toddlers? A new **study** suggests that there might be something to that, particularly when it comes to how helpful they are – and especially in comparison to cats.

To reach that result, the study authors set up a scenario in which a familiar caregiver (be that parent or owner) searched for an object in front of their untrained dog, cat, or toddler without asking them for help.

All three were able to see the hidden object, but would they show signs to their caregiver that they knew where it was, or even bring it to them, without being rewarded? That would be spontaneous prosocial behavior, a voluntary action that benefits others – and it's exactly what the researchers were trying to spot.

While cats, dogs, and toddlers all showed similar levels of attention towards their caregiver, a divide appeared when it came to their prosocial behavior. Cats were far less likely to help find the hidden object unless it was something they actually wanted, like a treat – which as a cat owner, is just about the least surprising finding you could ever read. They'll happily stare at you while you struggle with an arm under the sofa, but if there's a Churu involved? Well, now we're talking.

Dogs and toddlers, however, were a different story. "Interestingly, the majority of dogs and children showed similar behavior patterns," said first author Melitta Csepregi in a **statement**. "They readily engaged with the situation, and more than 75% of them either indicated or retrieved the object, suggesting strong motivation to help – despite being untrained, receiving no reward, and the hidden object, a dishwashing sponge, being irrelevant to them."

The difference between cats vs. dogs and toddlers "suggests that domestication, sharing our home, and forming close bonds are not sufficient to produce spontaneous, human-like helping behavior," said senior author Márta Gácsi.

The researchers think this could come down to the differences in how dogs and cats **became domesticated**. Cats, quite famously, domesticated themselves – while their history with humans is long, it's also one marked by their continued independence. As for dogs and children, the authors write that their similarities "can be explained by the social/cooperative nature inherited from their ancestors and the specific selection effects that occurred during dog domestication." In other words, we shaped dogs to be this way.

So, if you find yourself in a bit of a pickle, and the only choice for help is between a cat, a dog, and a toddler, you're probably better off going for one of the latter two – science says so.



The Darker Side of Science



THE LIGHTER SIDE OF SCIENCE