

Made
in **RSA!** 

supernova

The mag for curious kids



Bees

& other pollinators

Vol
11.1



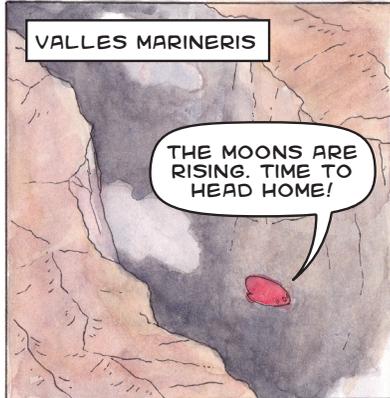
BK
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PUZZLES | SCIENCE | NATURE | ACTIVITIES | SPORTS | COMICS



Story and artwork
Maya LeMaitre

MIMI'S LIFE ON MARS



Discover the secret message

Hobby-X

hobby-x.co.za

Find these hobbies in the word search. Then, crack the secret message by finding the letters for each colour and writing them below.

Reading

Gardening

Crafting

Journaling

Woodwork

Pottery

Dance

Gaming

Baking

Photography

Cooking

Bird-watching

P	J	O	U	R	N	A	L	I	N	G	S	Y
H	E	K	C	Y	A	F	U	F	B	A	T	R
O	T	P	O	G	N	I	D	A	E	R	W	E
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Y	F	G	G	V	A	O	W	L	B	C	W	P
Y	B	I	R	D	W	A	T	C	H	I	N	G
U	S	W	G	A	M	I	N	G	V	W	F	J

Save the date for



4-7 May 2023

Hi SuperKids



Candice

Starting something new is always filled with mixed emotions. New can be exciting, but it can also be scary; like starting a new grade, or even starting at a new school. Newness can even be as simple as starting a new day or trying a new ice-cream flavour! Sometimes we need to let go of the familiar and comfortable, and journey into the unknown.

This issue of *Supernova* kicks off the start of our new volume (Vol III!), and it comes with a lot of change and newness. While that can be scary and intimidating, it is also a chance for fresh and exciting things – challenges, opportunities and of course a chance to grow and become better! While *Supernova* is already pretty awesome, our team of creatives constantly strive to make every issue bigger, better and more exciting – just for you.

To each and every reader who enjoys an issue of *Supernova*, and who continues to support our dreams, thank you! We hope you love this new volume just as much as we do. Stay curious, kids!

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Benoit's top picks in this issue!

Hey guys! These are my absolute top picks that you **HAVE** to check out in this new issue!

This issue marks the beginning of two new sections in the magazine!

Trends (page 15), focuses on what's up in the world and the way we live our lives. I can't wait to see what topics the Supernova team picks over the next year.

Oh, I love the new format of the short articles. They are so informative and punchy and they leave me wanting more.

I grew up loving everything about Egypt and the Nile plays such a big role in ancient Egypt that I found this article really interesting.



Benoit
Supernova's publisher

Of course I enjoyed illustrating the cover the most. I love bees so much.



I actually have a beekeeping suit and I help my dad with his hives. Since I got my first camera as a teenager, I've spent hours of my life observing bees and taking photos of them.



Conversations with Candice (page 43) is brilliant! It's about the real issues which affect people (both kids and adults) and our readers can now send Candice a burning issue and she'll discuss it in the magazine!



So creating a detailed illustration of a bee was pure bliss!

Looking for more?



@supernovamag



supernovamagazine

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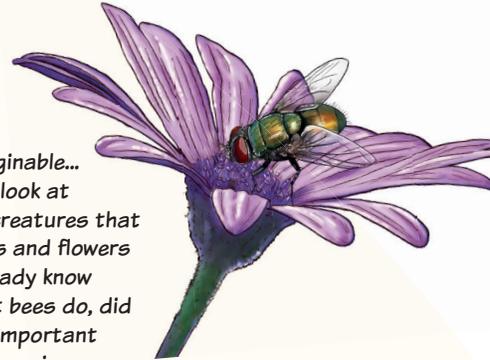
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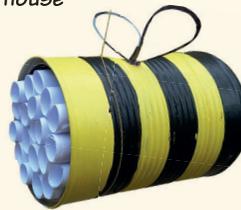
24 Bees & other pollinators

A world without pollinators is not just unimaginable... it's impossible! Take a closer look at the little (and not so little) creatures that keep our plants, fruit, veggies and flowers growing! While you might already know about the important job that bees do, did you know about these other important pollinators that account for one in every three bites of food we eat?



29 Make a bee house

Attract pollinators to your garden this summer and watch your plants bloom! Get crafty these holidays with a buzzing bee house using some recycled materials you can find lying around your house.



Journey up the Nile River 34

Known for its ginormous crocodiles and huge role in Ancient Egyptian life, the Nile River is the longest river in the world and has a fascinating and rich history!



Answer for Brain Games on page 48.



Secret Message: I've made a mind-blowing discovery!

Scientists that experimented on themselves 30

Many scientists test their life's work with experiments. But, what about when the experiment can cost you your life? Experimenting on yourself can either go extremely wrong, or extremely right, but you never know until you test it... These scientists put their lives on the line in the name of science.



44 Comics

Supernova now features four awesome comics! Check out a new Mimi's Life on Mars, Dr RIP, Young Leonardo & Marine Animals in every issue! Let us know which one is your favourite!



Ask Jules?

Adriaan (14)
from Auckland Park asked us:

Do forests make us healthier?



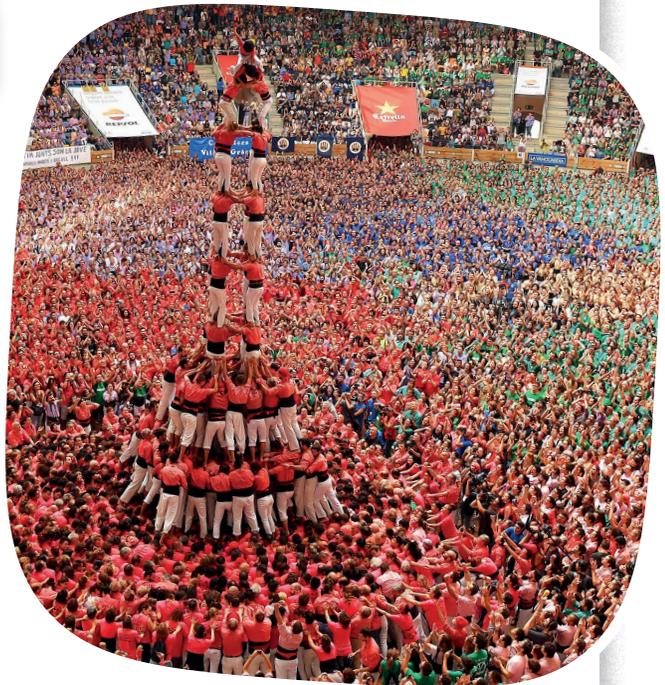
Jules

We all know that trees are responsible for giving us oxygen, and that spending time outside is good for your mood and mental health, but did you know that it actually improves your immune system? Trees and plants have essential oils that protect them from bacteria and insect predators. These are given off into the air as phytoncides – airborne chemicals. When we spend time outside and breathe in these phytoncides, it increases the production of protective white blood cells in our bodies. These cells then fight off viruses and other diseases! Numerous studies around the world have looked deeper into this subject, and Japan has even introduced the practice of shinrin-yoku, or 'forest bathing' to the world! This form of ecotherapy involves being calm and quiet amongst trees, and observing nature around you while breathing deeply. This can reduce your blood pressure, improve immune function, and reduce depression!

Human Towers

Each year, hundreds of people show up for Catalan festivals to build human towers called **castells**. More serious than a human pyramid, these towers can reach 15 metres into the air and consist of 300 people!

These death defying structures come from 18th-century Catalonia, and started as a fun, community event at celebrations. Now, building **castells** has even become a competitive sport! The sport represents strength, balance, courage and mindfulness.



Best inventions of 2022

Every year, TIME magazine puts out its list of best inventions that are changing how we live, work, learn, and play. Here are some of our favourites!



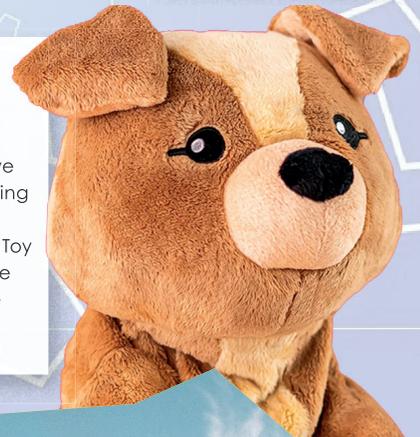
The **Esper Hand** is the first AI-powered, cloud-based, robotic prosthetic that gets smarter over time. The lightweight device has up to 24 sensors which detect and process muscle activity and brain impulses.



The **Super Sunnies** boost color by 30% to the naked eye! This could mean better visibility when biking or snowboarding. It's like having an Instagram filter for real life!



BLK2FLY is a self-guided flying laser scanner that captures detailed images of hard-to-reach or dangerous places using radar sensors, cameras, and GPS.



The **Hugimals** weighted stuffed animals have a removable glass-bead filling that give the sensation of being hugged. They've partnered with the Toy Foundation to make Hugimals available to patients in five children's hospitals!

Creature FEATURE

These ocean critters are older than dinosaurs! The oldest known horseshoe crab species is estimated to be nearly 450 million years old! While they have a few evolutionary changes, most of their body has remained the same over time, which is why they are called 'living fossils'. And, they're not actually crabs! These interesting creatures are closer to spiders and scorpions. They use their primary set of legs to move around, and the legs close to their mouths to crush up food and feed themselves. Their nine eyes also mean that they can see super well!

While they are not the prettiest sea animals, horseshoe crabs are actually medical heroes. Their blue blood is used to help test the safety of modern-day medicines and vaccines. This is because their blood has a certain molecule that reacts to bacteria that can be very dangerous to humans. They are returned to their homes in ocean after the extraction process.



Did you know?

Polar bear skin is black!

The black skin allows them to absorb more UV light to stay warm.



Danica's Book Review



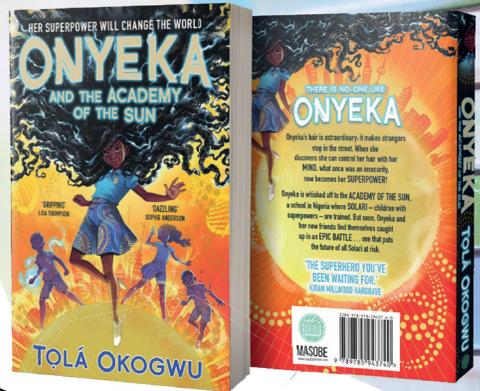
JonathanBallPublishers

Danica (11) read 'Onyeka and the Academy of the Sun' by Tolá Okogwu. Here's what she had to say about it:

"I loved reading Onyeka, using my imagination with all the characters was so much fun! I absolutely adored everyone and I liked the fact that they used Onyeka's insecurity and turned it into a blessing in disguise. I also really liked the jokes, how awkward Onyeka was, and how relatable the characters were. This was an amazing book and I would definitely read something like it again."

CHOC KIDS CORNER

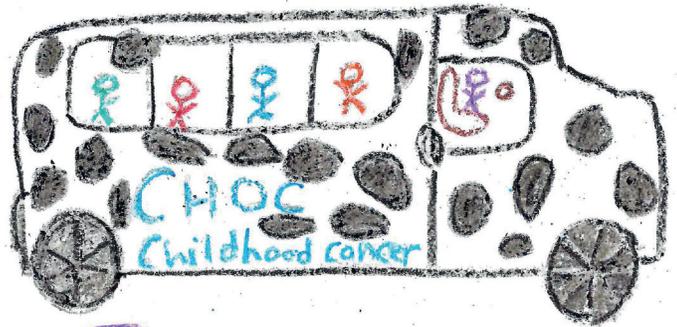
To make sure CHOC kids get to their appointments, CHOC's transport programme helps families get to treatment centres. When the East London CHOC house received their new transport vans last month, Akhona couldn't wait to show off her artistic skills and say thanks!



Who wouldn't want to ride in such a fun-looking van?



Akhona
13 years old



THANK YOU

Akhona Mbheduka



"Keeping more than hope alive"

WE SUPPORT CHILDREN AND TEENAGERS WITH CANCER AS WELL AS THEIR FAMILIES

CHOC is a non-profit organisation that advocates for the health and well-being of children and teenagers diagnosed with cancer or life-threatening blood disorders and their families. We offer transport assistance, accommodation, nutritional support as well as psychosocial and emotional support as we augment the different medical fraternities.



"Keeping more than hope alive"



To refer a **CHILD** or **TEENAGER** please
visit our website www.choc.org.za





The birth of a star

Photo by NASA

This new image snapped by the James Webb Space Telescope captured the birth of a star! Here, a protostar (which is basically a mass of gas on its way to becoming a star) called L1527 is growing bigger and bigger by collecting material and shooting it outward. This lights up the cosmic dust and gas around it in infrared light. L1527 is only about 100 000 years old, and is still in the very early stages of becoming a star. In comparison, our sun is about 4.6 billion years old! Clouds like these, also called nebulae, are the perfect breeding ground for stars to be born.

Ludwig van Beethoven

The composer who defied deafness

Ludwig van Beethoven was born in December 1770, in Germany.

At the age of 28, Beethoven started having problems with his hearing. The condition was worsened by tinnitus, a ringing in the ear.

Having made music for three decades of his life, Beethoven knew how instruments and voices worked together.

He started playing the keyboard at the extremely young age of five, under the strict and harsh teachings of his father, Johann.

By 1819, Beethoven had become completely deaf. From then on, he no longer performed much in public, and spent most of his time composing music.

He used this to imagine what his compositions would sound like, and was able to keep composing.

Ludwig's father wanted to promote him as the next child prodigy. When his first public performance was held, Johann said that his son was six instead of seven years old!

Throughout his life, Beethoven composed 722 works, including 9 symphonies, 35 piano sonatas and 16 string quartets.

He published his first musical work at the age of 13!

At 21, he moved to Vienna to further study the art of composition with Joseph Haydn.

Two centuries later, his music is still being performed.

In 1795, Beethoven made his long-awaited public debut in Vienna.

Today, Beethoven is thought by many to be the greatest classical composer who ever lived.

GIVING GIFTS AROUND THE WORLD

Giving gifts is a tradition that has been part of our society for thousands of years – even neanderthals from 35 000 years ago exchanged symbolic objects! Gift-giving has become part of our world, and many nations have developed interesting traditions around it!

Illustrations by Alexandra Botha-Green

Be careful of the types of gifts you give to the Chinese – many gifts are associated with symbols in their culture! Avoid knives, scissors or letter openers as these symbolise cutting the relationship. Clocks are also a no-no! In many Chinese dialects, the phrase "give clock" sounds similar to "see off into death". Instead, you could give money in a red envelope. This is considered to be lucky and prosperous in China.



In Korea, it is extremely rude to give or receive a gift using only one hand – and especially the left hand! Always use both hands. You'll have to wait until later to open your gift, as wrapped gifts are never opened in the presence of the giver. Also, avoid giving gifts that come in sets of four as they symbolize death!

In Kenya, the Maasai people spit on a gift before giving it to someone. This is considered a sign of blessing and that they wish you great fortune!

The History of Glasses

Words by Monique van der Walt
Illustration by Kai Neilson

Glasses are worn by millions of people around the world – either to improve sight or as a fashion statement. We often forget how much they have changed lives!



Reading with stones

The Romans first discovered that they could use glass to see small text. They created glass spheres filled with water and placed them on the pages of books to enlarge the words for readers. These were called 'reading stones'.



Simple Sunnies

The first sunglasses were simply made from tinted lenses. They were invented in China during the 12th century. At this time, the lenses were not used to protect eyes from the sun. Instead, they were used to keep people from being able to see the expression in the eyes of Chinese judges during court cases. Now, tinted glasses are used more and more for both style and light protection for those with sensitive eyes.



The first glasses

The oldest glasses are from Italy. Made in the 13th century, they were mostly worn by monks.

Monks were some of the only people allowed to learn to read and write at the time.

The glasses were made from thick curved glass lenses that were held in leather or wooden frames. The glasses were held in front of the face or balanced on the nose, which was very uncomfortable to wear. So, monks and wealthy nobles that could afford glasses looked for ways to improve the design and make glasses bigger, better and more comfortable to wear.



?! Get this!

Roman Emperor, Nero, wore the most expensive sunglasses of all time! At the Colosseum, Nero used a lens made of emerald which has more value than a diamond!

?! Get this!

In the 1400s, the printing press was invented. This made reading more accessible and increased the demand for glasses.

?! Get this!

While glasses are much more accessible now, there are still millions of people around the world who need them, but can't afford them.



Electronic Waste

Words by Sulé Poetgieter
Layout by Meaghan Koen

Life before electricity sounds unimaginable, right? From having to boil your water over a fire to doing your homework in candlelight, electronics have made life so much easier. Unfortunately, with the comfort of electronics comes the dilemma of e-waste.

What is e-waste?

E-waste, or electronic waste, is what we call old, used electronics that we throw away when they have been used up. This can be anything from our mobile phones to televisions and electric kettles. Once the electronic appliance has been used up, we throw it away and it goes to landfills, where all other solid waste goes.

?! Get this!

The dangerous chemicals people are exposed because of e-waste include lead, mercury, cadmium, barium, lithium, and arsenic.

What does it do?

The consequences of e-waste, however, is much more concerning than anyone could imagine. When we just send the e-waste to landfills, dangerous chemicals leak and seep into the environment. These nasty chemicals can do some serious harm to people who work near or in the landfill, but it is especially harmful towards children. It can cause cancer, neurological defects, miscarriages, and it can lower your IQ.

How can we help?

Instead of just upgrading your devices whenever an upgrade is available, use your electronics for as long as possible. When you buy new electronics, look for labels that tell you it is environmentally friendly. Recycle your electronic devices; there are companies that take the electronics apart and recycle the glass, metal, and plastic that was in the device, and then they have different processes to eliminate the dangerous chemicals safely.

?! Get this!

Recycling companies sometimes use acid baths to recover certain materials from old electronic devices.

Beekeeper



Hi, I am Cindy Lynne Pottas!
I am an apiarist, also known as a beekeeper. I love my job and I have an incredible family who help out in my apiary. Growing up, I spent a lot of time outdoors where my love for nature and creatures developed.

Why are beekeepers important?

Beekeepers help keep the bee population healthy by managing pests and diseases in their apiaries. We are responsible for keeping a diverse gene pool and teaching the public about the importance of bees.

What does a typical day look like for you?

A beekeeper's day is different depending on the season. During swarming season (spring and summer), days are filled with collecting and removing feral swarms, or doing swarm prevention in your apiary. The winter months are quieter, which is when I feed the bees and have some extra time to repair old hives or make new ones.

What is the most interesting part of your job?

No two days are the same! So many new studies are being done to improve the health of honey bees, which I love to read about and try to get involved in. When I inspect my hives, I still get excited to see a new fuzzy bee chew through the capping of her cell to join the hive.



Do you need qualifications to do your job?

At the moment, there is no specific qualification just for beekeeping, but studying entomology will help you understand insects very well! Finding a mentor and joining local organisations is a good place to start. However, if you want to keep bees in South Africa, you need to register with DAFF (Department of Agriculture, Forestry and Fisheries) every year.



What are some challenges of your job?

Some bee removals can be quite a challenge, as bees like living in protected, small spaces like chimneys or gaps in walls. You need to be strong and comfortable with heights. Another challenge is the 'colony collapse disorder' that is causing a huge decline in the honey bee population.

C Cindy's advice

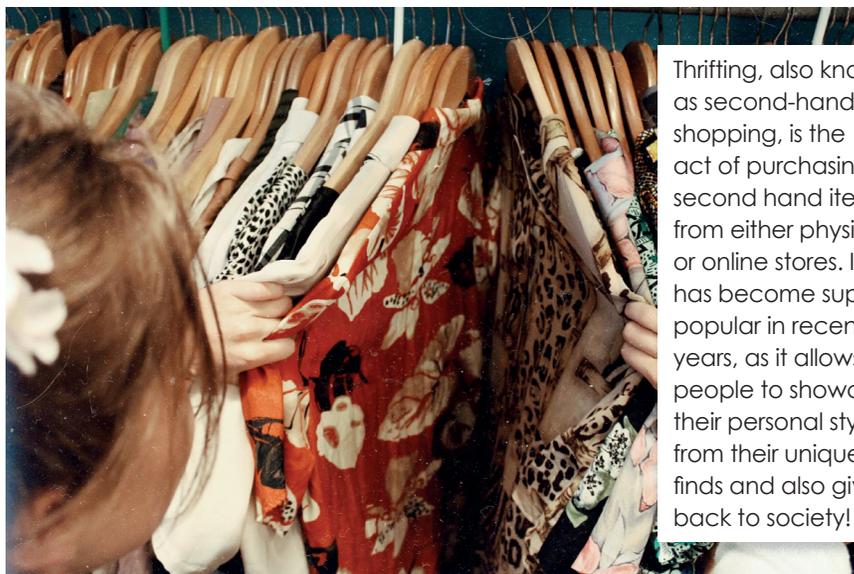
Spend time in the field with an experienced apiarist. Plant bee-friendly gardens (including winter flowering plants) and observe all the pollinators that come to visit!

Thrifting

The art of bargain hunting

Words by Oratile Kgofelo

Love the excitement of a treasure hunt, having variety to choose from, and saving money? Thrifting is just the thing for you!



Thrifting, also known as second-hand shopping, is the act of purchasing second hand items from either physical or online stores. It has become super popular in recent years, as it allows people to showcase their personal style from their unique finds and also gives back to society!

Thrifting has a ton of benefits! Here are some reasons you should start thrifting:

- **Save money:** The same items that you would find at regular stores are now discounted!
- **Be unique and original:** You're likely to only find one of each item at a thrift store, meaning that each piece comes from a different background and is original and unique.
- **Help the planet:** Thrifting clothes instead of buying fast fashion reduces your carbon footprint and eliminates waste from items that are thrown away.
- **Help others:** Many second-hand shops donate the money you spend to charity to help the less fortunate. You can also donate items you no longer want so they can have a second life in another home!



! Get this!

You can also join in the fun and shop at thrift stores near you! Check out:

- Garage sales
- Hospice/charity stores
- Thrift stores
- Online platforms like Facebook Marketplace

! Get this!

What kind of things can you thrift?

- Clothing
- Furniture
- Jewellery
- Art
- Appliances
- Books
- Other vintage items



Santorini

Greece



Words by Andrea Vermaak



I've always wanted to visit the Greek island of Santorini!

Who wouldn't want to experience its breath-taking views of the Aegean Sea and its traditional villages of whitewashed houses with pops of cobalt blue?

It's so much more than that, though! Let me tell you a bit more about my trip...



A volcanic archipelago

Santorini is a small circular archipelago (a group of islands) southeast of Greece. A large volcanic eruption, the Minoan eruption, caused a single volcanic island to collapse in the centre when large amounts of magma erupted over a short amount of time. This happened about 3 600 years ago. It left a caldera (a crater-like structure) about 12km long and 7km wide. Today, the caldera is filled with sea water.



Photo by Lucian Boica

One of the most famous beaches is the Red Beach, near the archaeological site of Akrotiri. Crushed volcanic rock gives this beach its unique red colour. It's also a top snorkelling site!



Photo by George Spanoudakis

The largest inhabited islands are Thira (or Thera in ancient Greek) and Therasia. The smaller, uninhabited islands include Nea Kameni, Palea Kameni and Aspronisi.

Colourful beaches

I visited a few of Santorini's famous red, black, and white beaches. There are many black sand and pebble beaches, including Perivolos, Perissa, Kamari and Vlychada (also known as Moon Beach because of its moon-like landscape and massive cliffs).

White Beach is not what I expected! It has black sand, but it gets its name from the enormous white cliffs that overlook it.

Ancient sites

I love learning about the history of all the places I visit, so I couldn't miss the ruins of ancient Thera and Akrotiri. People lived in the ancient city of Thera from about the 9th century BC. Spartans founded the city, but you can now see the ruins of three empires, including the Minoans, Hellenists and Romans. In 726 AD, the city was abandoned after a volcanic eruption covered it in a layer of pumice (a spongy form of volcanic glass). The city was lost until a German archaeologist, Friedrich Hiller von Gaertringen, discovered it in 1895.

Akrotiri is the oldest and most well-preserved Bronze Age city on Thira Island. It was a Minoan settlement. Guess what? A volcanic eruption destroyed it in 1600 BC, burying it in pumice and ash. This helped to preserve the city though, much like Pompeii in Italy.



Photo by Jeet Dhanoa

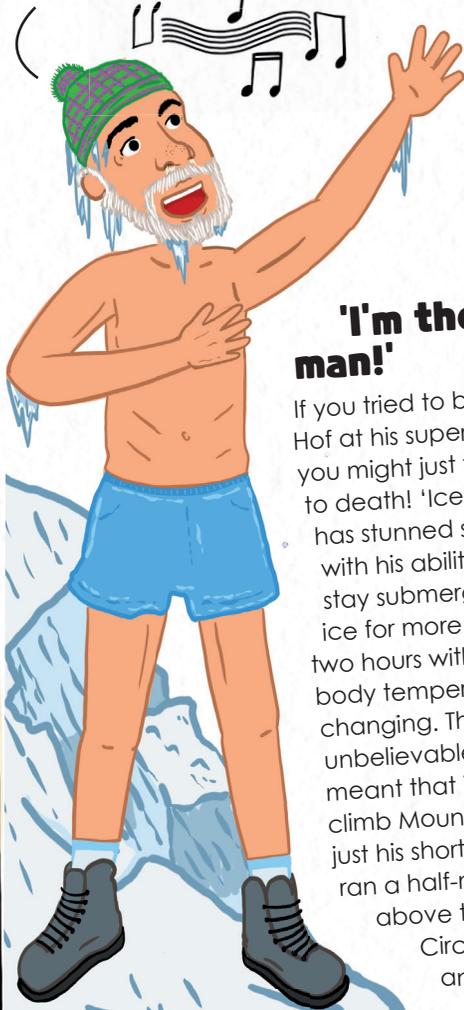
The iconic whitewashed buildings of Santorini are instantly recognised as Greek. But why? One reason is because it made the houses cooler! White paint absorbs less heat than darker colours, making the hot Greek summers more bearable.

Words by Oratile Kgofelo
Illustrations by Benoît Knox

SUPER SKILLS

The proper definition of a skill is the ability to do something well. While everyone has things that they are good at, these super skills are way out there!

THE COLD NEVER BOTHERED ME ANYWAY...



'I'm the ice man!'

If you tried to beat Wim Hof at his super skill, you might just freeze to death! 'Ice man' has stunned scientists with his ability to stay submerged in ice for more than two hours without his body temperature changing. This unbelievable ability meant that Wim could climb Mount Everest in just his shorts! He also ran a half-marathon above the Arctic Circle without any shoes.

I DIDN'T FEEL ANY PAIN WHEN I GAVE BIRTH. YOU'LL BE FINE!



WELL I DIDN'T INHERIT THAT GENE FROM YOU GRANNY!

'I never feel any pain'

72-year-old Joanne Cameron doesn't feel any pain at all! She has had broken bones, cuts and burns, given birth and undergone operations all without feeling a thing. Doctors discovered Joanne's gene mutation after her baffling recovery from a surgical operation. Along with Joanne's inability to feel pain, she also never panics! This discovery has boosted hope that new treatments can be found for people suffering from chronic pain.

'I can run forever'

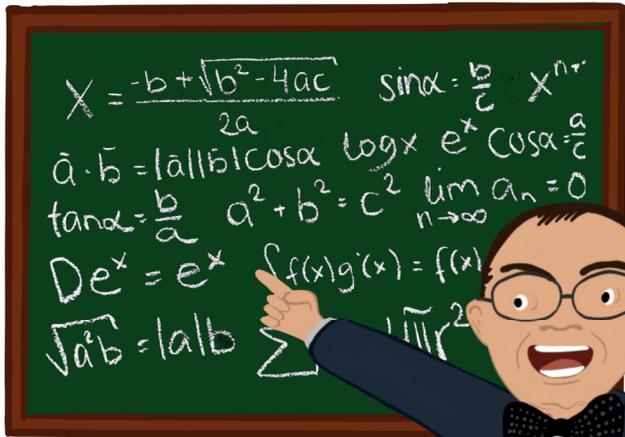
After running over 560km in 50 marathons across 50 US states, over 50 days, scientists concluded that Dean Karnazes could literally run until he died of old age. This American ultramarathon runner's body does not exhibit signs of physical exhaustion. Ever!

I WONDER WHAT HE IS RUNNING TOWARDS?



MAYBE HE IS RUNNING FROM SOMETHING!





...AND THAT, KIDS,
IS HOW WE PROVE
THAT $1+1=2!$

'I'm the fastest human calculator'

If you tell Scott Flansburg about a special day in your life 10 years ago, he can tell you exactly what day of the week it was that day! Scott does complex multiplications all day, every day – he loves all things arithmetic, sums and numbers! He has held the Guinness World Record for being the 'fastest human calculator' for over 20 years now! He was only nine years old when he discovered his super math skills, and now inspires kids to engage with math by coming up with new and exciting ways to solve basic math problems.

... THE COLD NEVER
BOTHERED ME ANYWAY...



'I can play any piece of music I've ever heard'

Derek Paravicini has spent his life surrounded by music. Not having use of his eyes means that he depends a lot more on his ears and ability to hear. His love of music and ability to play many instruments means that he can listen to a piece and copy it straight away, less than half a second behind!



'I can remember everything'

Imagine being able to tell scenes from when you were just 12 days old! Rebecca Sharrock's super memory means that she is able to recall every part of her life in vivid detail. Her unusual memory is called HSAM (Highly Superior Autobiographical Memory). Only around 60 people around the world have HSAM.

WAS IT A BIRD?
WAS IT A PLANE?



IT WAS
MEMORY
GIRL!



GRAND GARDENS AROUND THE WORLD

Kirstenbosch Botanical Gardens

The Kirstenbosch Botanical Gardens only grow indigenous South African plants and covers a massive 528 hectares of land! This makes it one of the world's largest botanical gardens, and the first botanical garden in the world to be devoted to a country's indigenous flora. It sits against the eastern slopes of Table Mountain and is known for its beautiful, diverse flora. There are more than 7 000 plant species in Kirstenbosch. These gardens are one of the Cape's best known tourist attractions. The people who live near the gardens also love to go there for a nice picnic.



Gardens of the Palace of Versailles, France

Photo by Armand Khoury



Designed by the famous André Le Nôtre, this magnificent garden took over 40 years to complete. In the late 1600s, the strong smell of the flowers made visitors feel sick and it drove them away! #takeawhiffofthat #tookthelongenough



Gardens by the Bay, Singapore

Photo by André Distel



The Supertree Grove is part of the Gardens by the Bay, and it has the most beautiful vertical gardens. The supertrees have massive canopies and colourfully light up at night. #atlastiseethelights #light'emup #notarealtree #couldn'tfoolme



Keukenhof Gardens, Netherlands

Photo by Anton Ivanov



Believe it or not, the Keukenhof Gardens have more than 800 varieties of the Dutch tulip! It also has a petting zoo with giant rabbits, miniature pigs, and alpacas. #puckerupyourtvolips



Northumberlandia (Lady of the North), England

Photo by Graeme Peacock



This is the largest human form on the planet! Charles Jencks' beautiful garden had 25 000 visitors in its first few weeks after opening. #ohshe'sgorgeous #mightwanttocoverupalittle



Jardin Majorelle, Morocco

Photo by Svetlana Sewell



This colourful garden contains 300 species of plants from five continents. And, obviously, it is Morocco's most visited tourist attraction! #soelectric #ibegyourgarden #yougrowgirl



Miracle Garden, Dubai

Photo by Guinness World Information



The Miracle Garden contains extravagant sculptures covered in over 150 million blooming flowers! #wouldn'twanttoflyinthat #houstonwehaveaproblem #i'mjustpollenyourleg



Southern Ground Hornbill

Photo by Mana

Found only in Africa, the Southern Ground Hornbill is actually an endangered species. The main reason for this is loss of habitat, but also because they are very slow breeders. A pair will only produce one brood of two chicks every nine years, and only one of these chicks survives each time. The call of the Southern Ground-Hornbill can be heard over 3km away! They amplify their voice by inflating the red balloon-like wattle that hangs below their bill. These omnivores have a super strong beak to help them catch food and snap up most things in their path, such as snakes, rodents, small birds, eggs, chameleons and even tortoises.



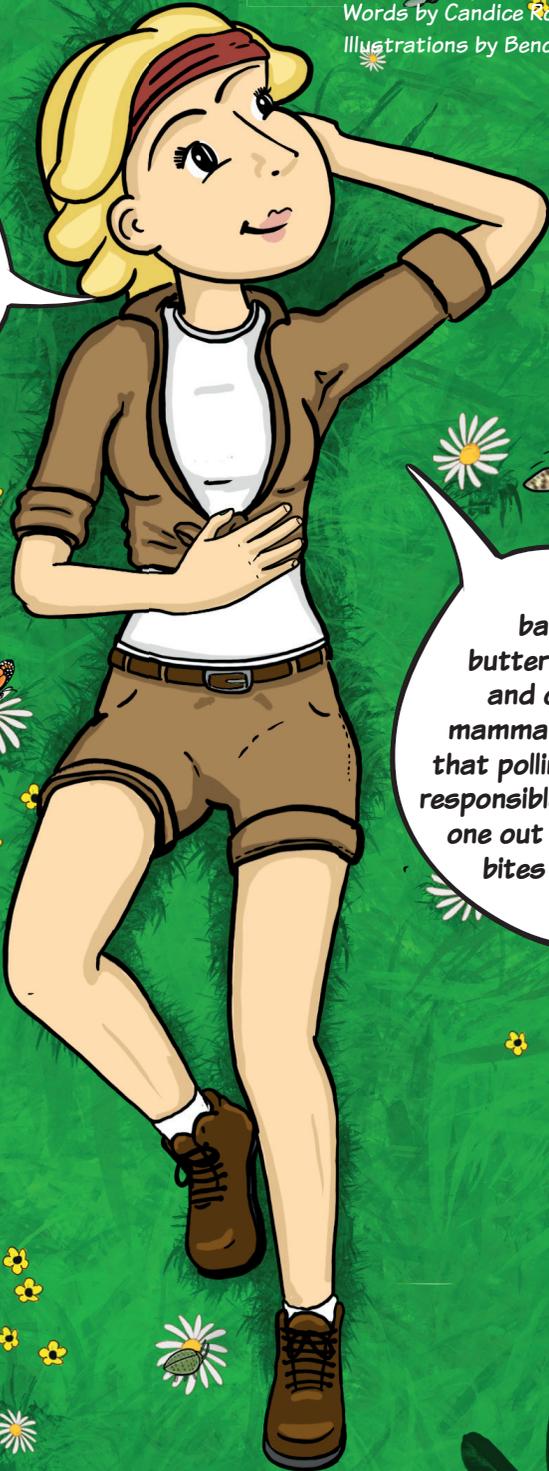


Bees

& other pollinators

Words by Candice Robertson

Illustrations by Benoît Knox & Monique van der Walt



Imagine a world without yummy fruit and vegetables to eat, and beautiful flowers to see!

Without pollinators, this would be our reality.

Birds, bats, bees, butterflies, beetles and other small mammals and insects that pollinate plants are responsible for bringing us one out of every three bites of food we eat!

?! Get this!

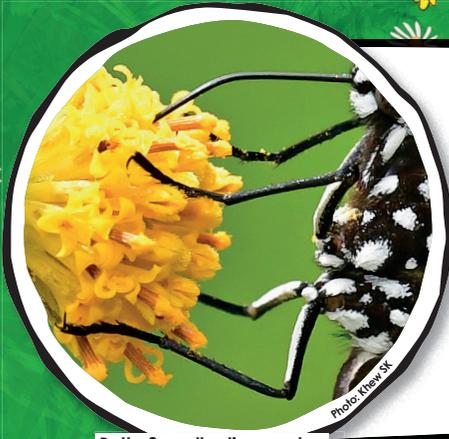
Most plants (around 70%) depend on insects, birds, bats and other animals to transport pollen.

What is pollination?

Pollination is a very important part of the life cycle of plants. It is also the process that allows plants to reproduce! Flowering plants (plants with seeds) create pollen to transfer to other plants, and use this process to exchange genetic information. The pollen is created by the male reproductive system of the plant, and is moved to the female reproductive system in order for it to be fertilised and create new seeds.



Sunflowers have both male and female reproductive organs in their middle disc floret. This means they can self-pollinate or take pollen transported by insects or wind.



Butterfly collecting nectar.

Pollen is moved between plants through wind or rain, or through pollinators! When an insect, like a bee, lands on a flower, small particles of pollen stick to its legs. As the bee flies to the next flower, it transfers the pollen with it. Plants rely on bees and other insects to make this happen.

?! Get this!

Some plants can self-pollinate and don't need the help of pollinators. In these cases, the plant transfers its own pollen. Very few plants are self-pollinating, so pollinators are super important!

The most well-known pollinator

Bees and butterflies are the most well-known pollinators. Honey bees alone pollinate over 80% of all flowering plants, including more than 130 types of fruits and vegetables! They are also specially adapted for gathering pollen. Bees use their long snouts to suck up nectar from inside flowers. As they go further inside the flower, branched hairs on their bodies collect tiny pollen particles. They also have combs of bristles called pollen baskets on their legs. This helps them transfer pollen to the next flower it collects nectar from.



Photo: iStockphoto



Photo: iStockphoto



Photo: iStockphoto

?! Get this!

The bright colours, wonderful smells and interesting shapes of plants are not just for us humans to enjoy! These characteristics help attract birds, insects and other animals to help with the pollination process.

?! Get this!

Honey bees communicate with each other using special dances, which can lead to entire colonies visiting certain kinds of fruitful flowers.

?! Get this!

One bee colony can pollinate up to 20 million flowers a day.

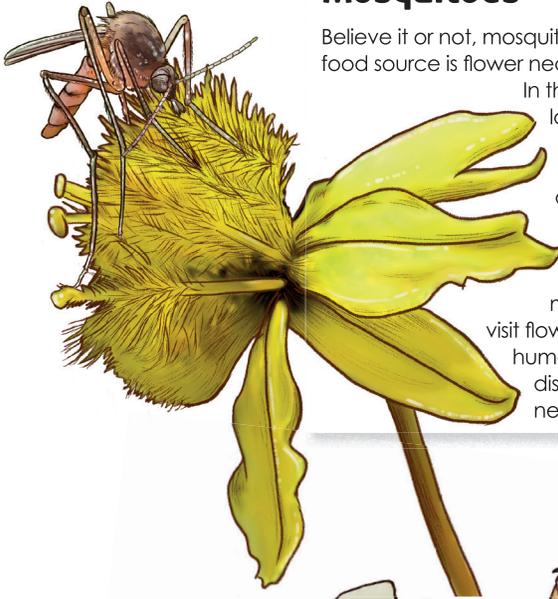
Pollinators you didn't know

Plant pollination is serious work! Here are some of the other species that help make it happen.

Mosquitoes

Believe it or not, mosquitoes' primary food source is flower nectar, not blood!

In the process of looking for nectar, mosquitoes pollinate many of the flowers they visit. Their pollination is hard to see, as most mosquitoes visit flowers at dusk and human presence disturbs them from nearby flowers.



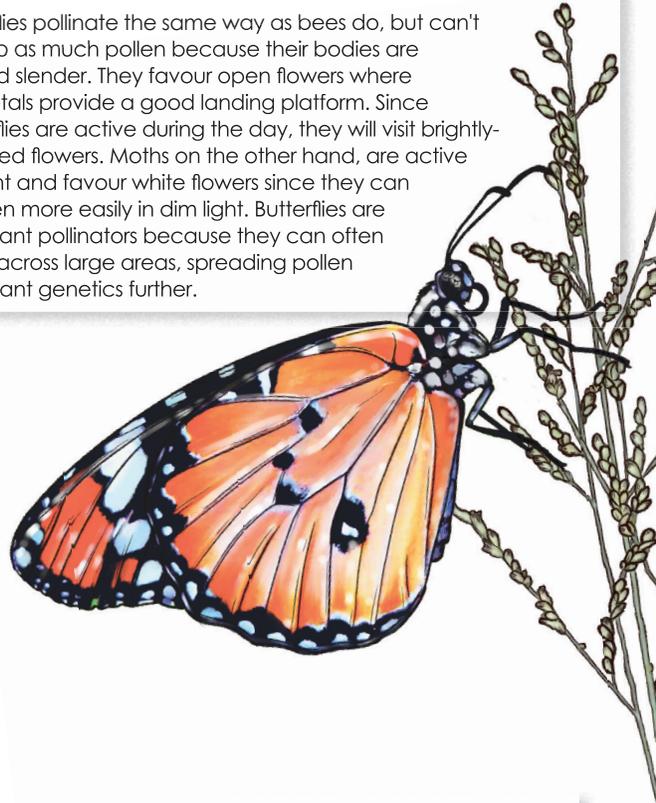
Bats

Bats visit flowers that are typically open at night, and that are large in size and pale in colour. Often, these flowers also give off a strong, fermenting or fruit-like smell! Their elongated snouts and tongues, as well as their small teeth allow them to collect nectar quickly. Bats also feed on insects in the flowers. 500 plant species rely on bats for pollination, including mango, banana, guava and agave.



Butterflies & moths

Butterflies pollinate the same way as bees do, but can't pick up as much pollen because their bodies are tall and slender. They favour open flowers where the petals provide a good landing platform. Since butterflies are active during the day, they will visit brightly-coloured flowers. Moths on the other hand, are active at night and favour white flowers since they can be seen more easily in dim light. Butterflies are important pollinators because they can often travel across large areas, spreading pollen and plant genetics further.



Beetles

Beetles have been evolving for roughly 250 million years, and are recognized as the first pollinating insects! Since beetles do not have long snouts to collect pollen in trumpet-shaped flowers, or the ability to hover like bees, they are limited to pollinating flowers with shapes that work for them. Beetles are considered 'dirty' pollinators because they eat flower petals and defecate on flowers. This has earned them the nickname of 'mess and soil' pollinators. Yet, they are still an important pollinator worldwide!





Sugarbird

The sugarbird gets its nutrients from Protea flowers, and uses its long beak to gather nectar. As it sips nectar from a bloom, the feathers on its forehead are dusted with pollen, some of which is dislodged when the bird visits the next flower. While the Protea provides nectar for the birds, it also attracts other insects, which the birds capture and feed to their chicks.

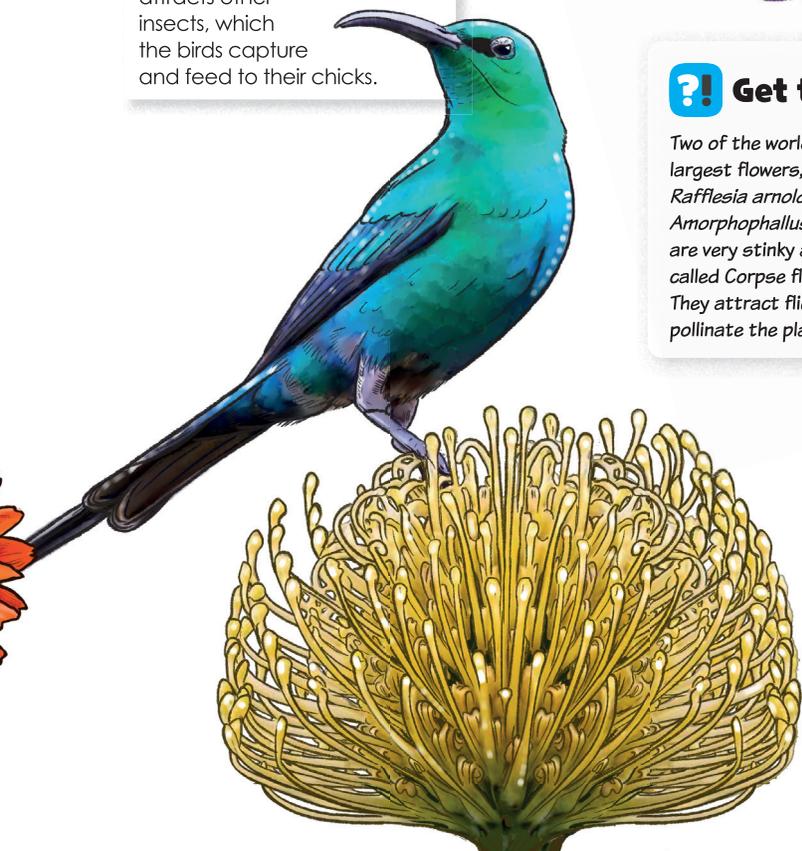
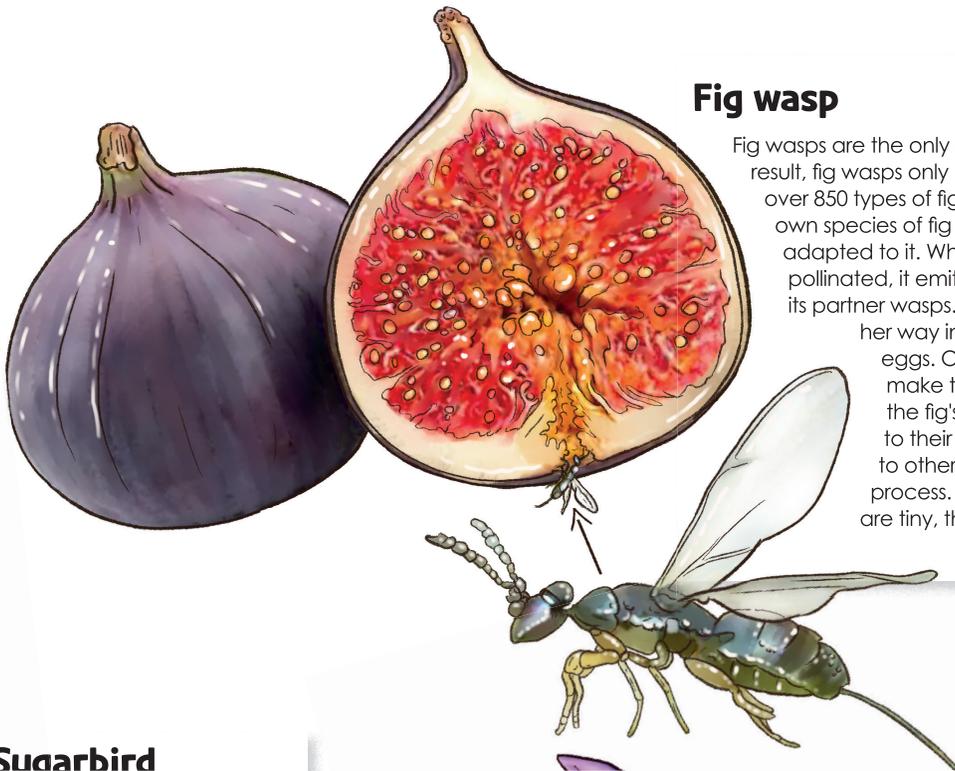


Fig wasp

Fig wasps are the only pollinators for fig trees. As a result, fig wasps only breed inside figs! There are over 850 types of fig plants, and each has their own species of fig wasp which is uniquely adapted to it. When a fig is ready to be pollinated, it emits a scent that only attracts its partner wasps. A female wasp will tunnel her way inside the fig and lay her eggs. Once the eggs hatch, they make their way out of the fig, and the fig's pollen becomes fixed to their bodies, which is spread to other figs through the same process. Even though fig wasps are tiny, they travel further than any other known pollinator.



?! Get this!

Two of the world's largest flowers, *Rafflesia arnoldii* and *Amorphophallus titanum* are very stinky and are called Corpse flowers. They attract flies that pollinate the plants.

Flies

Many people view flies as pests, but many don't know that flies are the second most important pollinating insect, after bees! They have several aspects that make them good pollinators: some flies forage earlier and later in the day, they tolerate a wider range of temperatures and are active when it's too cool for some pollinators, and they'll be out and about even in wet and windy weather that keeps insects like bees at home. Flies also live everywhere on Earth! They are responsible for pollinating many fruits and vegetables, including pears, apples, strawberries, cherries, plums, peaches, parsley, carrots, coriander, blackberries and more! And, if you love chocolate, then you'll love flies. They are essential for pollinating the flowers of the cocoa tree.

Threats

Shrinking habitats mean that pollinators lose food and nesting sites they need to survive. Early harvesting by farmers also mean that food sources that pollinators depend on are scarce. Pesticides also threaten pollinators. While these help control pests and invasive species, they can harm pollinators.



Most significantly, climate change is a big threat to pollinators. Flowers are blooming earlier as temperatures rise, which can cost pollinators the opportunity to feed. Since some pollinator species only feed on specific plants, if these bloom before they arrive, pollinators go hungry and fewer plants are pollinated. Other climate change effects like flooding, fire and the spread of invasive species also directly affect pollinators as native plants are overtaken. This reduces food and shelter for pollinators, and can also cause disease to spread.



Air pollution makes it harder for pollinators to find flowers.

Also, since flowers are so important to the pollination process, damaging or picking of flowers also threaten pollinators! Remember that wild flowers are protected by South African law and it's illegal to pick them.



Life without pollinators

Pollinators are essential to a balanced and healthy ecosystem. Without them, we simply could not survive. No pollinators means we would lose most of the crops, fruits and vegetables that we depend on, resulting in a worldwide famine. It would also affect all of the animals that eat those plants, and so on up the food chain, leading to the extinction of many species. As pollinators are already threatened, this has already resulted in less biodiversity in flowering plants, smaller quantities in harvests, and decreased quality of crops.



To help pollinators continue their great work, make sure to plant colorful, wildlife-friendly gardens that are full of nectar-rich flowers!

! Get this!

Some researchers have started suggesting ways to better plan our cities in order to help pollinators!

Make a Bee House

Now that it is summer, we all want our gardens to bloom! Make a buzzing bee house with some recycled materials to super-pollinate your garden!

What you need:

- An old food can
- Straws or a few sheets of paper
- Paint and a paintbrush
- Plastic bottle
- Scissors
- String
- Marker



1 Paint the can yellow and add black stripes to make the bee's body.



2 Draw and cut out a stinger and wings, and stick them onto the bee.



3 Roll pieces of A6 paper into straws, gluing the edge of the paper down.



4 Stack the paper straws into the can until it is filled up.



5 Tie string around the front and back of the can.



6 Hang your bee house outside for some solitary bees and insects to come find their new home!

Warning

Ask a grown-up to help you cut off the lid of the can and clean it out.

EXPERIMENT

SCIENTISTS

Words by Sulé Potgieter

Illustrations by Benoît Knox and Kai Neilson

Experiments are often the only way to test whether your ideas and theories are correct or not! Many scientists test their life's work with experiments. But, what about when the experiment can cost you your life? Experimenting on yourself can either go extremely wrong, or extremely right, but you never know until you test it... These scientists put their lives on the line in the name of science. So, strap on those safety goggles, because the term 'mad scientist' is going to take on a whole new meaning after this!

?! Get this!

David Pritchard, a biologist, injected 50 hookworms under the skin in his arm to test whether the worms would help fight allergies and other autoimmune illnesses in his body.

?! Get this!

To test whether yellow fever was actually contagious, Stubbins Ffirth used sick people's black vomit to try and infect himself.



TAL

Nathaniel Kleitman Sleep researcher

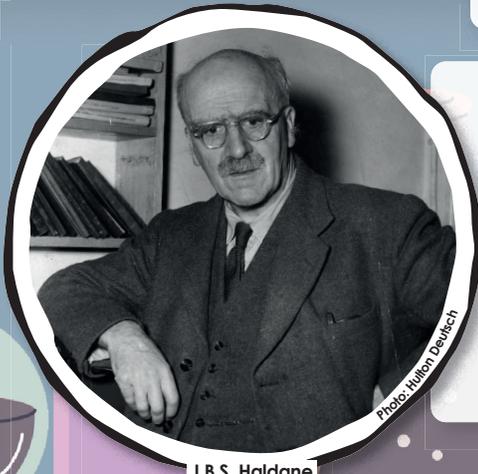
The father of modern sleep research, Nathaniel Kleitman, would stay up for 100-180 hours at a time! Nathaniel and his assistant isolated themselves in an underground cave to test whether humans could get used to a six-day week with 28 hours in each day. While Nathaniel could not get used to this cycle, his assistant did so fairly quickly. The results told Nathaniel that everyone's sleep cycles are different and depends on their activities. This means that some people would be able to get used to a 28-hour day, while others would not.



Nathaniel Kleitman and his assistant during their time in the caves

?! Get this!

Isaac Newton inserted a sewing needle into the back of his eye because he wanted to test whether colour and light existed inside or outside the eye.



J.B.S. Haldane

Sanderson & Haldane Father and son scientists

John Scott Haldane and his son, John Burdon Sanderson Haldane, experimented on themselves to test the effects of poisonous gases. J.B.S. was curious about the effects of diving on your lungs, so he repeatedly put himself in a decompression chamber to test it out! As a result, his eardrums burst, and he started suffering regular seizures. He also drank hydrochloric acid, until he almost passed out, and measured the pressure of carbon dioxide on his lungs.

?! Get this!

Project Cyborg was an experiment where a scientist implanted a silicone transmitter into his arm so he could operate automatic light switches, doors, and computers!

John Paul Stapp Test pilot

Believe it or not, the title of the 'fastest man on Earth' doesn't belong to an athlete! It belongs to Air Force officer, John Paul Stapp, who experimented on himself and broke a fair amount of bones in the process. John wanted to know how many G's the human body could handle, so he decided to test it out on himself. He had someone strap him to a rocket and was shot forward multiple times at nearly the same speed as sound! After being jerked around far too long and temporarily losing his sight, John established that a pilot could withstand up to 4.5 G's in a crash.



Photo: Getty

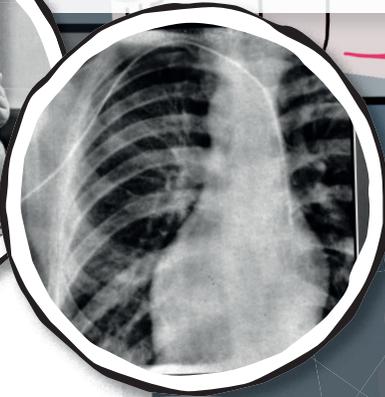
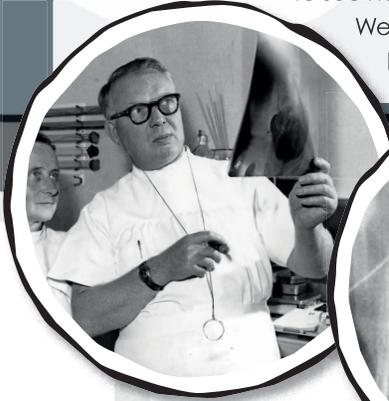


Photo: Getty

Doctor Werner Forßmann Physician

Doctor Werner Forßmann is known for inserting a catheter through a vein in his arm and into his heart. He wanted to test whether or not it would be possible to get a tube to the heart in order to treat a bunch of different heart problems. After what must have been a few rather painful attempts, Werner's experiment was a success, and it changed the way cardiologists treated hearts. This was a much safer technique to see how well your heart is working.

Werner later went on to win the Nobel Prize for his ingenious discovery!



?! Vocab

A catheter is a soft tube that is inserted into your bladder to empty it when you cannot do it on your own.

August Bier Surgeon

August Bier was the very first man to perform spinal anaesthetic on a human. He tested it on himself by injecting a very strong drug, cocaine, into the cerebrospinal fluid. During the experiment, his assistant used the wrong size needle, and this caused a leak in August's spine. He then decided to test it out on his assistant rather than himself. When he thought his assistant was numb, he kicked, burned, and hit him with heavy objects. Although his experiment was very cruel, it had a massive influence on surgery and anaesthesia today! Now, anaesthesia is used to make people feel comfortable when they're having surgery, stitches, or other things that might be painful.



?! Vocab

Cerebrospinal fluid is the clear fluid that floats around your brain and spinal cord.





Evan O'Neill Kane Doctor

Doctor Evan O'Neill Kane was a surgeon who performed over 4 000 appendix removals (appendectomies)! Evan wanted to prove that it wasn't necessary to put a patient to sleep when removing their appendix. So, when it was time to remove his own infected appendix, Evan propped himself up on pillows, injected the area with local anaesthetic (which contained adrenaline and cocaine) and started removing his appendix. The surgery was successful, and he helped us understand how we can eliminate the dangers of general anaesthesia!

Santorio Santorio 17th century doctor

Santorio Santorio was obsessed with weighing himself. He built a massive chair to monitor his weight as accurately as possible. He used this to see how much weight he lost as he digested his food. He weighed himself in between meals and going to the bathroom, and he was struck dumb by his results. He could not understand how he would lose weight before going to the bathroom. He theorised that we breathe and sweat out some of the food we digest, which wasn't too far off, and has helped us understand how the metabolism works today.



William Stark 18th century physician

William Stark wanted to prove that a diet with a large variety of foods is just as healthy as a much more restricted, basic diet. He started his experiments with a 31-day diet, where he ate only bread, water, and a little bit of sugar. He then started adding other foods to his diet. He did not, however, include citrus fruit or any vegetables. After a while his gums started bleeding, and he showed symptoms of scurvy. At only 29 years old, William passed away due to malnutrition. Ultimately, his experiment showed researchers that a super restrictive diet is not sustainable for humans.



?! Get this!

Not knowing how bad radiation is for the human body, Elizabeth Ascheim did multiple x-rays on herself without any protection, and ultimately became extremely ill before passing away.

With the wonders of modern medicine today, it's easy to forget that there used to be so much we didn't know about the human body! The bravery (and recklessness) of some of these scientists means that we now have access to life-saving medical information and treatments. All because they dared to 'try it at home'!

Journey up the Nile River

Words by Sulé Potgieter
Illustrations by Kai Neilson

Known best by the Egyptians, stretching from Lake Victoria and spilling over into the Mediterranean Sea, flows the enormous Nile River. The longest river in the world is both fascinating and intimidating in its rich history. Follow along as we learn all about the reach, resources and the ancient gods of the mysterious Nile River.



Ancient Egyptian boat

?! Get this!

The Nile River flows through 11 different African countries: Tanzania, Uganda, Rwanda, Burundi, the Democratic Republic of the Congo, Kenya, Ethiopia, Eritrea, South Sudan, Sudan, and Egypt.



Photo by Bernard DuPont

Lake Victoria



Photo by Gerhard Huber

Lake Tana



?! Get this!

The Nile River starts at the White Nile in Lake Victoria and ends where it flows into the Mediterranean Sea, 6 650km later!

?! Vocab

Tributaries are streams that flow from a smaller river or lake into the Nile.

The Nile has two main tributaries, the White Nile and the Blue Nile. The White Nile starts at Lake Victoria, Africa's largest lake, and borders three different countries: Kenya, Tanzania, and Uganda. Its name comes from the light-coloured clay that forms at the bottom of the river, which makes it appear light grey. The Blue Nile starts in Lake Tana in Ethiopia and connects with the White Nile in Sudan.

Just west of the Nile is the Sahara Desert, the largest desert in the world. To the east of the Nile is the Red Sea along with more desert. The deserts surrounding the Nile protected Egypt from being invaded, because it was too hot and there was no real source of drinkable water, other than the Nile.

?! Get this!

The Nile was called the Black River because of the black silt (clay) that forms along the riverbanks.

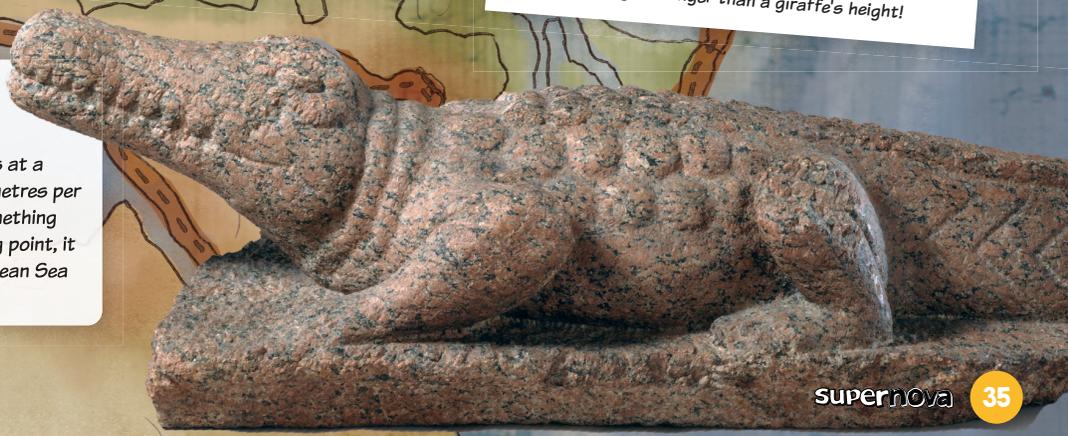
The area around the Nile also has animals like hippos, buffaloes, antelopes, and smaller critters like soft-shelled turtles, snakes, and lizards!



The Nile River is known for its ginormous crocodiles, which are recorded as the largest crocs in the whole world. Some grow longer than a giraffe's height!

?! Get this!

The Nile River's water moves at a speed of 300 million cubic metres per day. So, if you dropped something into the river at its starting point, it would reach the Mediterranean Sea three months later.



Life on the Nile

Egypt is known as the 'gift of the Nile', because without the Nile, Egypt would have been too hot and dry for people to settle down.

Once a year, the Nile River would flood. This means that its nutrient-rich waters would soak into the area around the river and create fertile soil.

Egyptians would celebrate the floods by bringing their colourful boats to the river, and they would sing and praise their gods for the gifts of the river.

Most Egyptians lived close to the Nile and about 95% of Egyptians still live within a few kilometres of the river.

Since the river flows northward for 6 650km, it was also the perfect means for transportation. The river allowed Egyptians to trade their goods and transport items to the various sections of the Egyptian kingdom.

Thickets of papyrus plants grew in marshes near the river.

Papyrus needs a large amount of water, which make marshes near the Nile the perfect place for it to grow. Ancient Egyptians used papyrus for paper and tied them together to build boats.

?! Get this!

The Nile River didn't only help with growing and establishing Egypt, it is also responsible for the rise of multiple kingdoms all the way to Sudan.

?! Vocab

Marshes are areas of land mostly submerged in water.

?! Get this!

The Nile flooded Egypt every single year, until the Aswan High Dam was built in 1970.

?! Get this!

The centre of Egyptian pyramids required granite, a stone that could only be brought up from the South along the Nile.

The Nile River played a massive role in the ancient Egyptians' everyday life, so naturally the Nile would become part of their religion. They believed that the Nile was a pathway that people followed from life into death, and then eventually into the afterlife. Here are some of the important deities of the Nile:

?! Get this!

While Hapi controlled the water of the Nile, the gods Khnum, Anuket, and Satet guarded the source of the Nile, and they were responsible for the amount of silt (nutrient-filled residue) left by the water.



HAPI

Hapi controlled the water of the Nile and was responsible for the annual flooding. He was often portrayed with the head of a man and the body of a woman, dressed as a servant.



OSIRIS

Known by Egyptians as the god of the underworld, Osiris symbolized death, resurrection and the cycle of the Nile River floods. He is portrayed as a mummified king with wrappings that covered his whole body and only left his green hands and face uncovered.

KHNUM

Known as the Egyptian god of fertility, Khnum was associated with water and procreation. He was seen as a man with a ram's head. Ancient Egyptians believed that he created humankind from clay on his potter's wheel.



SOBEK

Sobek, the lord of the crocodiles, was believed to be the creator of the Nile and brought order to the universe when he arose from the Dark Water (the Nile River). Sobek was seen as a man with a crocodile's head.



Kleilat

Words by Sulé Potgieter

Chances are, if your parents grew up in South Africa, they played kleilat as children! And, they might even have gotten into trouble over it a few times... Whether you're short, tall, fast, or slow, everyone can play this game – and most certainly everyone will want to!

To play kleilat, you have to get down and dirty, so get ready to be a muddy mess when you are done!

Preparing To Play Kleilat

1. Find some muddy clay. It shouldn't be too watery or too sandy, and it especially should not have any little rocks or pebbles in it!

2. Pick out a nice stick that is about the same length as your arm. Try to make sure it is bendable, but strong, so it doesn't break on your first throw.

3. Wet the tip of the stick, so the ball of clay flies off easily.

4. Grab a handful of the clay and gently squeeze it around the tip of the stick—if you squeeze it too hard, it won't fly off at all.

5. Finally, challenge your friends and family to some target practice. Pick out a nice big rock as a target, pull back your kleilat to take aim and swipe it towards the rock.

!! Warning

Don't go near dangerous rivers and always make sure you have adult supervision.

You won't always have access to this kind of clay, so when you do come across it, don't let the opportunity just woosh by!
That's it – super, simple, dirty fun!

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THINGS TO DO
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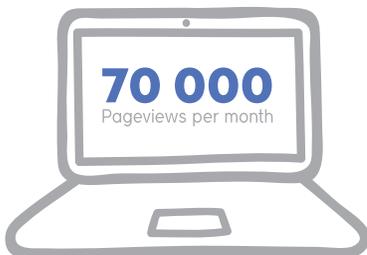
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EXPLOSIVE EXPERIMENTS

Illustrations by
Danielle Enslin



How to play

Scientists run all sorts of experiments in their labs. During one of these experiments, there was a big explosion! Can you find all the test tubes in the lab before and after the explosion?



Hint

There are 28 test tubes in total. Look closely!



Now that you have found all of the test tubes, unscramble the letters to reveal a secret message left for the professor before the explosion. Use the test tube colours to help you unscramble each word.

Find the answer on page 3



Losing a friend



It's never easy to lose a friend, but, believe it or not, lots of people go through it. Even though it can feel very lonely, you're not alone!

Sandile 13 years old

My friend moved to a new school this year. We've been best friends since grade 1, and saw each other almost every day! I'm sad that I've lost my friend, and feel lonely when I sit alone at lunch. What should I do?

It's hard to be the friend who is left behind. Sometimes, you might feel sad, abandoned or like you really have lost a friend. But, just because your friend has moved away does not mean that they have stopped being your friend.

You can still send your friend messages, emails, and possibly even meet up in the school holidays!

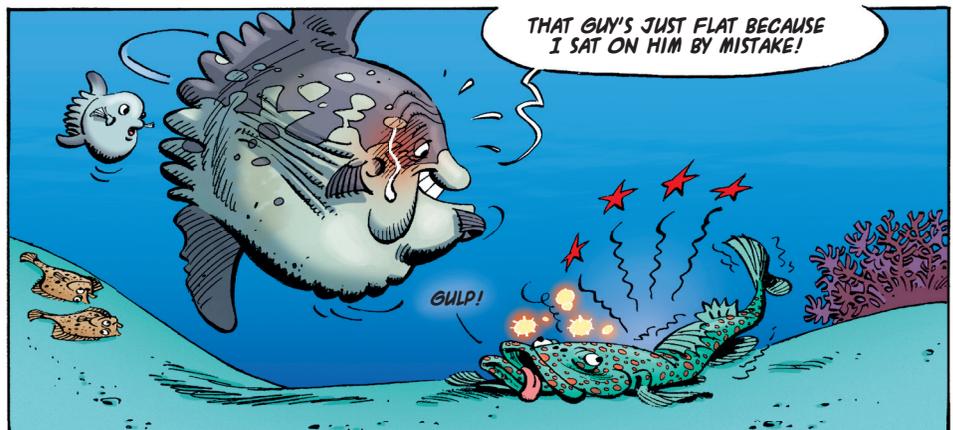
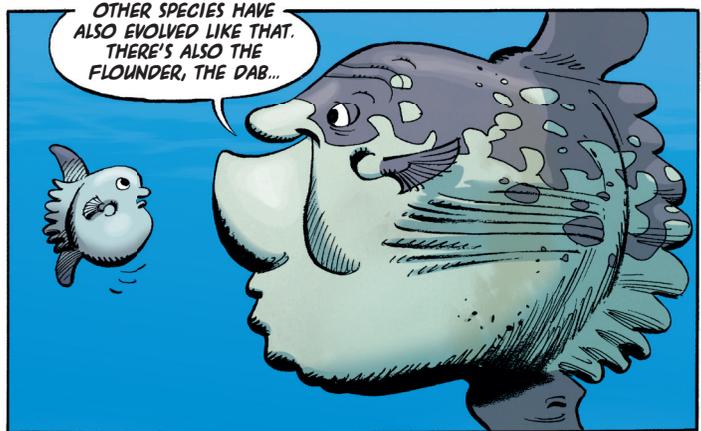
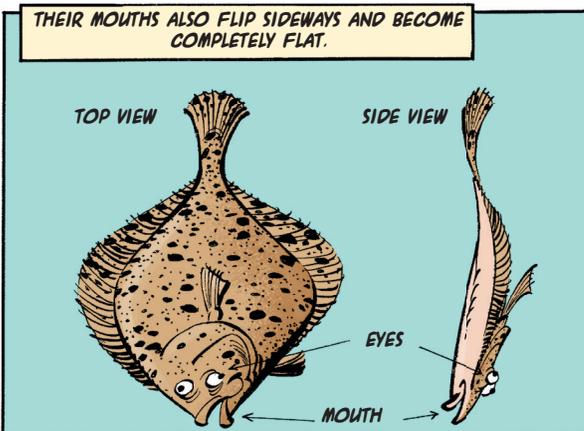
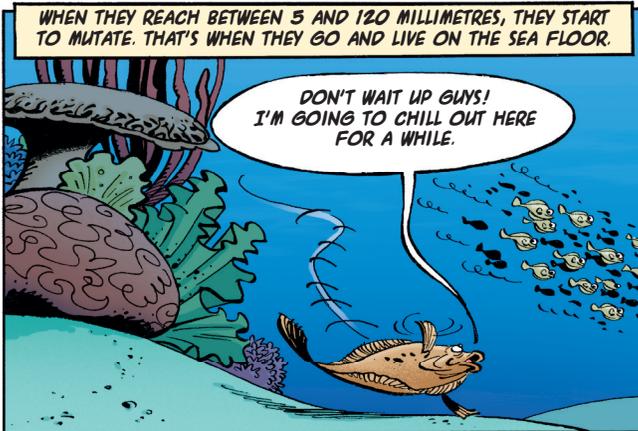
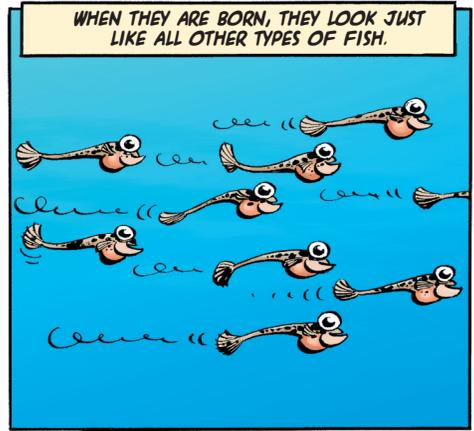
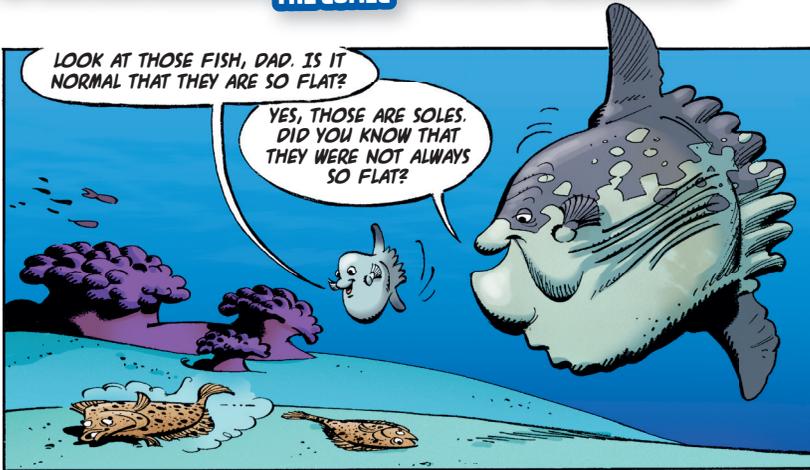
While it can be scary to

approach new people and make new friends, now is an opportunity for you to find more people you click with and who have similar interests. Why not join a new club or try a different sport?

Most of all, remember that while change can be scary, you are strong and brave, and things will get better!

Have a question for Candice?

Do you have a burning issue on your mind? Need advice? Send your questions to supernova@bkpublishing.co.za and Candice could give you advice next!



DOCTOR RIP EXPLAINS



RICIN IS ONE OF THE MOST VIOLENT POISONS AROUND.

WHAT RAISON?

NOT 'RAISON', I SAID RICIN!

RICIN IS NATURALLY DERIVED FROM THE GRAINS OF CASTOR BEANS (WHICH ALSO PRODUCE CASTOR OIL). IT IS EXTREMELY TOXIC!

IT IS 6000 TIMES MORE TOXIC THAN CYANIDE.

JUST A FEW DROPS CAN SLAY A HUMAN.

DEATH RESULTS AFTER 3 TO 5 DAYS. THERE IS NO KNOWN ANTIDOTE FOR RICIN POISONING.

TIK! TAK! TIK!

GEORGI MARKOV, A BULGARIAN POLITICAL DETRATOR, DIED ON THE 11TH OF SEPTEMBER 1978, AT THE AGE OF 49.

HE HAD BEEN ASSASSINATED BY THE BULGARIAN SECRET POLICE AND THE RUSSIAN KGB. HE WAS INJECTED WITH THE POISON AT A BUS STOP IN LONDON THROUGH AN ALTERED UMBRELLA.