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FROM SPACE**



**NATURAL
DISASTERS**

**WILD
WEATHER
AND PLANET
POWER**



ANIMALS: WHAT DO THEY KNOW?

**PLUS FUN ACTIVITIES,
PUZZLES AND GAMES!**

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Wild Weather and Planet Power!

Natural disasters cause great damage, affecting humans and wildlife! As well as being dangerous, these events shape our planet and affect where and how we live.

When disasters strike!

We often tell you about the harm that people do to our planet, but humans are not **always** to blame. Sometimes, natural forces, such as weather, cause disasters, too. Sometimes, they're caused by huge pieces of the Earth's crust moving. We call these **natural disasters**. People hardly have any control over them at all. They take lives, destroy property, and leave many homeless and hungry. But they don't **just** affect humans...

They affect other species, too!

Natural disasters also have an impact on **animals and nature**. Our first thoughts are always about how the local people

will cope in a disaster. But have you ever wondered what happens to **animals** in an area hit by a massive tsunami? Or how **birds** cope with a swirling hurricane? Or even how natural disasters might affect **plants** and the **ecosystem**?

Their worst effects aren't on the animals themselves, but on their habitat.

Their dwelling places and food sources get destroyed, leaving them hungry and unprotected. Some disasters are so huge that animals can't escape them, so they also cause deaths. A flood can result in hundreds of animals fighting for their lives.

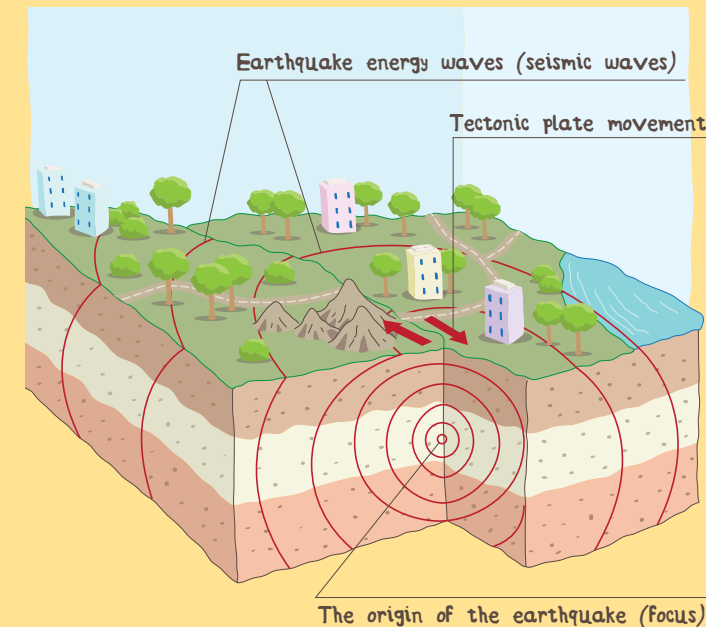
Let's look at some of the worst kinds of natural disasters...



EARTHQUAKES!

When the earth shakes!

Earthquakes are often the most powerful and deadly natural disasters. It's not the



Earth's surface rumbling and rolling that kills people. It's when the quake causes buildings to fall, and people are trapped in them. But what **causes** earthquakes?

The **crust** is one of the Earth's four layers. It's broken into pieces called **tectonic plates**. Sometimes, these plates slide up against each other and get stuck. When they eventually slide apart, they can release vast amounts of energy. That's what makes the Earth ripple and shake.

In September 2017, Mexico had its strongest earthquake in a **century**. It destroyed hundreds of homes. Some areas looked as though they'd been bombed! It happened because one slab of the Earth's crust, called the **Cocos Plate**, slid under another. The Cocos Plate lies beneath the Pacific Ocean, in what's known as the **Ring of Fire**. Over **80%** of the world's large earthquakes happen there! (You'll read more about it in our volcanoes feature.)

Earthquakes cause tsunamis!

If Earth's tectonic plates grind against each other under the ocean, the action can move lots of water suddenly. That causes a **tsunami** where waves hit the coast. (It's pronounced "soo-nar-me".) Some are huge! And they travel at enormous speed!



Albatross chick, a lonely survivor after a tsunami has passed

A tsunami's monster waves batter the shore with great force. They keep moving inland for miles, destroying everything in their path. They kill hundreds or thousands of people. They also change the landscape, uprooting plants and trees, and destroying animal habitats. If they wash all the vegetation away, that's a problem for some plant-eating species.

The seawater might leave lots of **silt and sediment** behind. That makes the area's lagoons and creeks much shallower. Bad news for creatures who live there – but good news for wading birds. They'll have new places to nest!

Vocabulary

Silt and sediment: Material carried by running water, such as clay and broken-up rock.



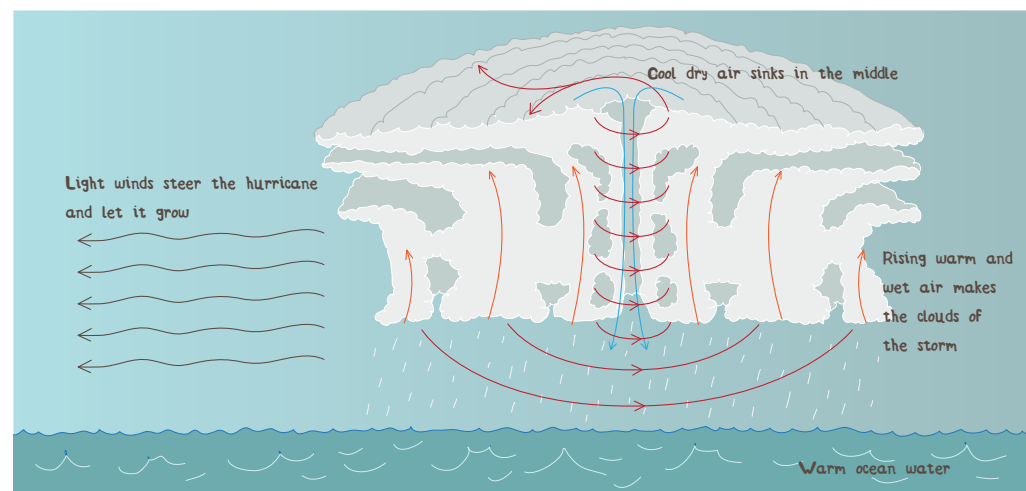
HURRICANES!

Swirling storms!

A hurricane is one of the worst **weather disasters**. These big, swirling storms can cause winds of up to 252km per hour!

They start as tropical storms over warm ocean water. As the wind passes over the warm ocean, water evaporates and rises. The surrounding cooler air then swirls in to take its place. That cooler air then warms and rises, too. As the warm, wet air rises, it cools off and makes large clouds

and rain. The released heat feeds the storm with energy. The storm converts that energy into powerful winds and waves. Soon those winds make the storm start swirling, faster and faster. That's the recipe for a **hurricane**. They can last up to three weeks!



Two recent hurricanes

Hurricanes have been in the news a lot, lately. In August 2017, **Hurricane Harvey** slammed Texas, USA. It dumped lots of rain, causing floods. Over a million people had to leave their homes!

In September, **Hurricane Irma** flattened a chain of Caribbean islands. Then it brought its full force and fury to Florida, USA. Its winds were strong enough to snap trees and power poles. It even ripped the roofs off buildings. Hundreds of thousands of people had to flee its path. It was the biggest **evacuation** in American history!



Hurricane Harvey, seen from the International Space Station

Hurricanes also affect wildlife!

They blow **birds** off course, pushing them away from their homes. Seabirds and waterfowl are at most risk. At least woodland birds can ride out the storm inside tree holes!



A dove takes shelter from Hurricane Harvey under a tree canopy in Houston, Texas



An alligator in search of higher ground after Hurricane Harvey

Hurricanes also dump seawater into freshwater lakes and streams. That kills lots of **fish**. The storms flood ecosystems and damage forests. But some wildlife does well after a hurricane...

Some **frogs and toads** use the heavy rainfall to breed. **Black bears** and **ground birds** benefit from more ground shelter, created by the falling trees. Some **plants** use the strong winds to spread their seeds.

Do we make natural disasters worse?

Natural disasters are just that: natural! Humans aren't to blame. But we might make some of them **worse**.

When we burn fossil fuels, we release carbon dioxide into the air. That contributes to **global warming**. This increases the temperatures of our oceans and atmosphere. Remember: **hurricanes** start with hot air. Warm ocean water keeps them fuelled. With global ice cover melting, sea levels have risen. That gives hurricanes extra water to work with. So we might be making hurricanes worse.

Also, when we remove forests from the planet, there may not be enough trees to help soak up the water from a flood. And more trees might reduce the water's flow across the land.

Vocabulary

Evacuation: When people leave a place of danger for a safer place.



Natural disasters have shaped our world...

After all, if that giant asteroid hadn't hit our planet 66 million years ago, dinosaurs might still be in charge. Mankind may never have evolved!

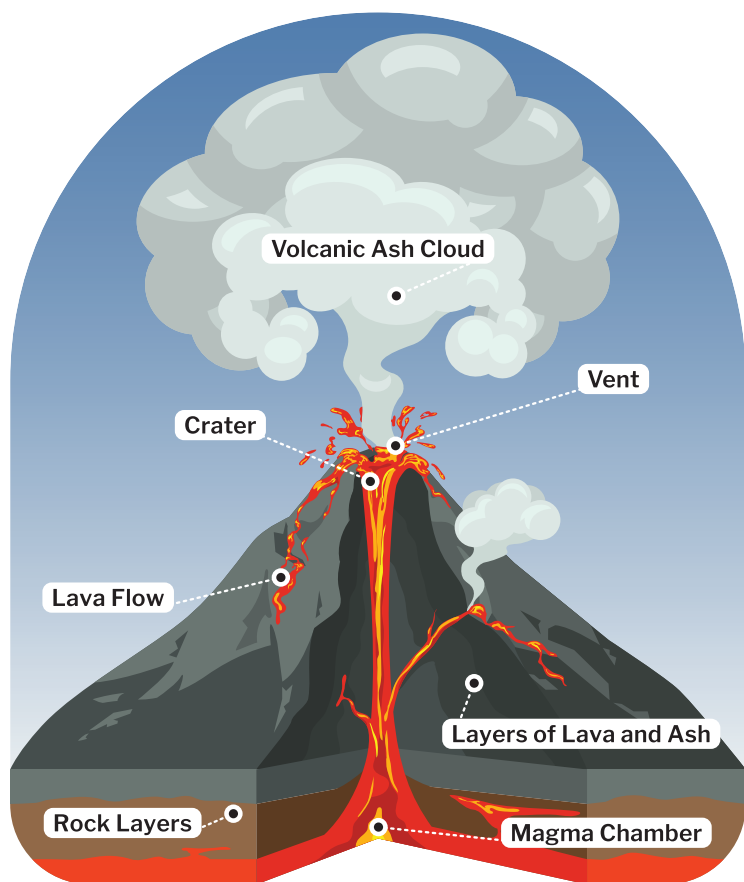
Yes, they're scary, but remember: we don't face them alone. There are lots of people who work to keep us safe in disasters, and who help communities to recover. Animals also adapt well to natural disasters. Wildlife usually bounces back after a disaster hits!

VOLCANOES!

SIMON'S REPORT!

Let's 'ask' some questions...

So what is a volcano? It's a mountain that opens downwards to a pool of **magma** below the earth. And what's magma? **Red-hot liquid rock!** Heat turned this underground rock into liquid. As pressure builds, it escapes upwards. The hot liquid gushes out through a **vent** as lava and ash. (Lava is the same as magma. It just changes its name when it's no longer underground!) When the lava cools, it forms rock. Over the years, that rock builds up... and up... to make a **volcano!**



Volcanoes are more than just mountains with a bad case of the hiccups! Read my report if you're a lava lover!



VOLCANO TYPES:

ACTIVE: Watch out, it can still erupt!

DORMANT: Not active right now, but it *might* erupt again.

EXTINCT: These volcanoes will *never* erupt again. Phew!

The Ring of Fire!

About 90% of the world's volcanoes are on the **Ring of Fire**. That's actually a **horseshoe-shaped** part of the Pacific Ocean. It's where **tectonic plates** meet underground. These are massive slabs of moving rock that fit together like a jigsaw puzzle! As the plates slide past each other, they create heat. When they pull apart, hot magma rises and fills up the spaces between them. In time, it rises to the Earth's surface. Those plates cause **earthquakes**, too!



Vocabulary

Vent: An opening in the rock that lets air, gas or liquid pass out.

THE WORLD'S MOST FAMOUS VOLCANOES!



Mount Tambora, Indonesia

In 1815, Mount Tambora gave us the **biggest volcanic eruption** in recorded history. It killed thousands of people, and even changed the world's climate! It created a colossal dust cloud, which moved across the planet, blotting out the sun. People called 1816 'The Year Without a Summer'. There was snow in June, a freezing July, and killer frosts in August. Lots of crops failed, creating a food shortage. All because of Mount Tambora!

Krakatoa, Indonesia

When Krakatoa exploded in 1883, it made the **loudest sound** ever recorded. People heard it nearly 5,000km away! The explosion had 13,000 times the power of an atomic bomb, and the pressure waves circled the planet three or four times. The volcano killed over 36,000 people and blew itself apart, but a new island has formed at the site. It still spits out lava sometimes!



Mount Pelée, Martinique

Mount Pelée erupted in 1902. It was the 20th century's **worst volcanic disaster**. Its boiling red river of lava destroyed an entire port city. It killed about 30,000 people almost instantly. A witness said it was like watching "a hurricane of fire". Good news: it's not active at the moment.



Fun Fact

If lava pours into seawater, it creates **massive explosions** called **tephra jets**. They make lava fountains!



SUPERVOLCANOES!

Yellowstone National Park

Have you heard of this huge park in America? It's even bigger than some American states! This magnificent park is home to lots of wildlife, including grizzly bears, moose, wolverines, elk, fierce wolves and mountain lions. But did you know that the park lies on a giant, active **supervolcano**?

Supervolcanoes

Supervolcanoes are huge volcanoes. So huge that if they erupt, they'll have a big effect on the world's climate. There are lots of clues to Yellowstone's supervolcano. The wild park is filled with hot springs, gushing geysers and boiling mud pools! They're powered by the same volcanic energy that powered Yellowstone's last eruption, about **640,000 years ago**.

Could the Yellowstone Park supervolcano erupt again?

Yes, it could! Some people got worried earlier this year, when 450 earthquakes hit the park in one week. If the Yellowstone supervolcano did erupt, it would spew ash for thousands of kilometres across the USA, causing lots of damage. Grey dirt would clog the rivers and streams. The released gases would create acid rain. The climate change could cause harsh frosts and destroy crops. But scientists think Yellowstone won't erupt in the next 1,000 years.



Great Fountain Geyser

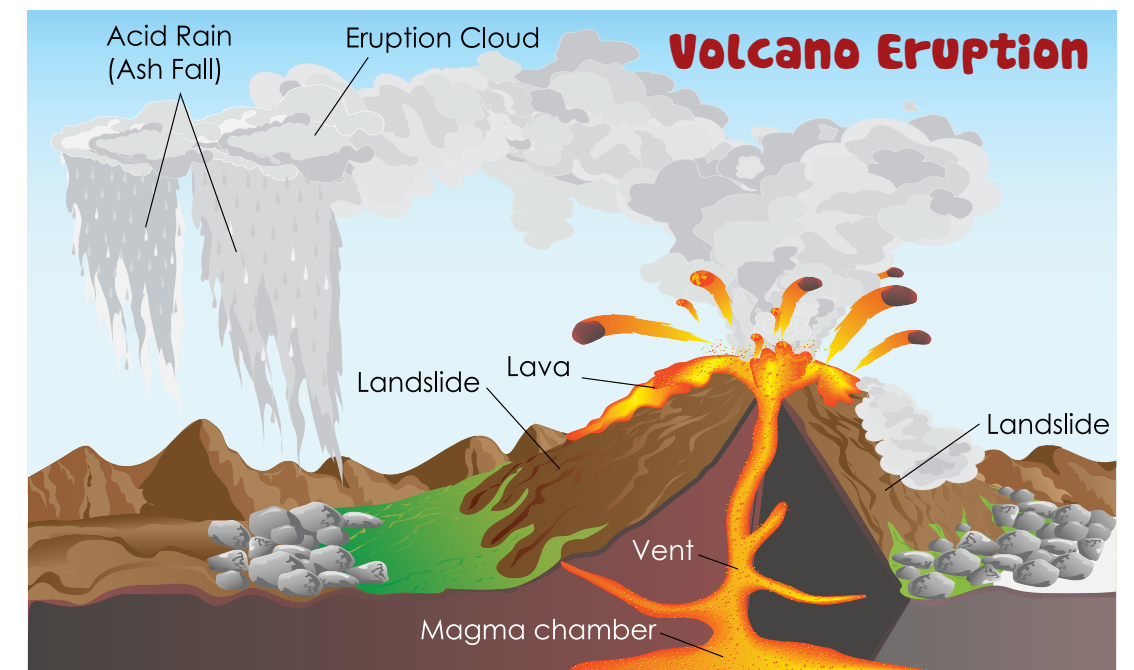
Would you still go to your local park if it were on an active supervolcano?

Fun Fact

There are lots of undersea volcanoes, too – some are over 3,000 metres high!

Volcanoes are deadly!

Many lives can be lost when volcanoes erupt. Volcanic eruptions have even been linked to our planet's **mass extinctions**. That's when a large number of species get wiped out.



About 250 million years ago, there was a **massive volcanic eruption** in Siberia. Over seven million square kilometres of lava spewed out! But it wasn't the lakes of fire or geysers of boiling liquid rock that wiped out species – it was the volcanic gases that were released. Lots of carbon dioxide! Those global warming gases could have caused the **greatest mass extinction in history**. 96% of all species on Earth were wiped off the face of the planet! It happened very slowly, though – the eruptions started about 300,000 years before the species started dying out.

Another mass extinction!

About 200 million years ago, volcanic activity may have wiped out at least **half of all the species alive** at the time. This happened over 600,000 years. It opened the way for dinosaurs to command the planet for the next 135 million years! Scientists have now linked volcanoes to **all five** of our planet's mass extinctions!



Fun Fact

Earth isn't the most volcanically active place in our solar system. That's **Io**, one of Jupiter's moons. Lava flows there all the time!

Can volcanoes also create life?

We thought that life on our planet began at the bottom of the deep sea. But did it really begin in **hot volcanic springs** on land? Recently, a team of researchers found fossils in Australia which may prove that it did. They found them in a layer of rock created by hot springs from an extinct volcano. They're nearly 3.5 billion years old! The mix of substances (like minerals) in those ancient hot springs may have created life first. Then those early life forms might have made their way to the sea, *not* the other way round!

3.5-billion-year-old rocks in an extinct volcano, Western Australia



If volcanoes did create life on our planet, should we forgive them for some of the bad things they do?



Gladstone, The Black Kite



Today, I'm in the Australian outback to meet a black kite called **Gladstone**. I want to talk to him about the recent bushfire that swept across the Australian outback. Firefighters reported seeing black kites flying around with flaming sticks, starting new fires. This sounds too incredible to be true. Here's Gladstone now... What a magnificent raptor!

Charlie: Hi Gladstone, great to meet you! You must have quite a view from high up there! I imagine flying is a crucial skill to have when you want to escape a fire.

Gladstone: **ESCAPE** a fire? Why on Earth would I want to do that? If I see fire, I fly towards it at top speed!

Charlie: Eek – that sounds seriously dangerous!

Gladstone: Fire is an opportunity not to be missed. All those creatures that get caught by the flames or overcome by smoke are rich pickings for **scavengers** like us. And what could be more delicious than a freshly cooked koala?

Charlie: Oh no! Poor koalas. I guess they're not built to run, being tree-dwellers...

Gladstone: Bah! Down low, too slow... Too bad!

Charlie: Ahhh, it sounds like the rumours I heard are true – you use fire to your advantage! Do you really **pick up burning sticks from one fire to start another**?

Gladstone: Ha, ha! Yes, a cunning trick, isn't it? If there's not enough food for all us raptors in one place, we simply create an opportunity for more.

Charlie: That's super-smart, I've got to admit, but aren't you *'playing with fire'* a bit? I mean, surely it's bad for the environment?

Gladstone: Actually, Charlie, fire has been part of the Australian landscape for thousands of years, and animals, plants and trees have adapted to it very well. Some actually **NEED** it.

Charlie: Is this how the forest over there managed to **withstand** the fire?



Gladstone: Precisely. Those are **eucalyptus trees** – their bark is so oily that the oil burns in the fire rather than the tree itself. The damaged bark sheds and the tree doesn't catch fire.

Charlie: Wow!

Gladstone: Certain plants, such as **acacia**, have **evolved** to rely on the heat from fire to open their seedpods.

Charlie: Incredible! But this land looks so scorched and bare, covered in ash... How can anything grow here?

Gladstone: Oh, don't be fooled. This ash acts like fertiliser to the soil, and even the harshest of fires don't stop the re-growth of plants. Fire gets rid of old foliage, a bit like humans pruning an overgrown garden to encourage new life.

Charlie: I see. So fire is good for plants – but, surely, many animals must have died in the fire?

Gladstone: Fewer than you'd imagine. Larger birds (like me) flew away quickly, and big animals, such as **emus, wallabies and kangaroos**, were speedy enough to escape. I saw lots of **lizards and insects** hiding under rocks.

Charlie: Good! What about small animals, such as wombats?

Gladstone: Don't worry – they basically stayed in their underground burrows, safe from the flames above.

Charlie: Wow, it sounds as though animals here are well adapted to fires as well...

Gladstone: Look, fire burns **almost half of Northern Australia** – it's known as 'a landscape of fire' – but it has to be managed properly. We black kites can't do it on our own!

Charlie: I don't understand...

Gladstone: Creating lots of **controlled**, small fires means fewer big, **rampaging** fires. I must admit, big fires can be very destructive!

Charlie: But who can control a fire?

Gladstone: The indigenous people, the Aboriginals, that's who. They've been looking after this vast country for 40,000 years. They understand and respect the power of fire, and use it to get the best out of the land. Now, I must go. I've talked long enough...

Charlie: You've taught me so much – thank you, Gladstone. Goodbye!

Gladstone: So long, Charlie!

Vocabulary

Gladstone: An Old English name meaning 'kite stone'.

Rampaging: Going through an area and causing a lot of damage.

Scavenger: A bird or animal that feeds on dead animals that it has not killed itself.

Withstand: To stand or hold out against.



Can animals predict NATURAL DISASTERS?



What makes **chickens** stop laying eggs or **bees** evacuate their hives? Why do **elephants** suddenly stampede towards higher ground or **catfish** make strange, violent movements in the water? What causes **dogs** to bark for what seems to be no reason and refuse to go in a certain direction? All these extreme animal reactions occur just before some terrible natural disaster strikes!

Do they know something we humans don't? Do they have some kind of sixth sense for danger – or is it all a big coincidence?

My name is Amy, and I'm going to investigate this **bizarre** behaviour. Can I find the **science** behind what looks like '**animal magic**'?



The stories

Pretty much as soon as people began recording historical events, there have been tales of animals possessing the power to predict **floods, earthquakes, hurricanes, tsunamis and erupting volcanoes.**

Helike, Greece, 373 BC

Huge numbers of **snakes** (as well as rats and weasels) were seen fleeing the city before it was destroyed by a huge tsunami. The animal **exodus** was enough to convince officials to **evacuate** Helike, saving approximately 150,000 lives.

Sichuan, China, 2008

The streets were covered with **toads** three days before a giant quake killed 2,000 people there.

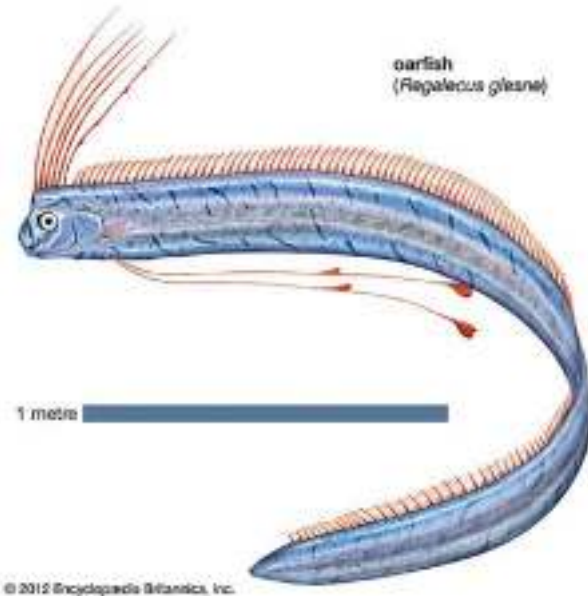


Vocabulary

Bizarre: Strange, unusual.
Exodus: Mass exit.

Japan, 2011

Oarfish are five-metre-long, scary-looking but harmless fish that dwell



in the deepest parts of the ocean. Twenty of them washed up on a beach just before a colossal 9.1 **magnitude** underwater earthquake devastated the country. Almost 16,000 people were killed.

East coast, USA, 2011

Sixty-four **flamingos** in a zoo huddled together, while 200 **ducks** fled for water – just before a 5.8 **magnitude** earthquake struck.

Germany, 2013

Ants fled their mounds in the middle of the night before a massive earthquake erupted.

The list of stories goes on, but what about some **hard facts**?

HOW did these animals know to escape?

Animals are far more in tune with the natural world than us humans; they have **adapted** to their environment in many varied and complex ways, in order to survive. This often means that they have what I call '**super-senses**'!

Sound

Sounds are vibrations that can travel through different materials. The pitch of a sound is how high or low it is. Humans can only hear sounds between 20 and 20,000 hertz (that's the word we use to measure sound frequency). But many animals can detect sounds that we don't hear.

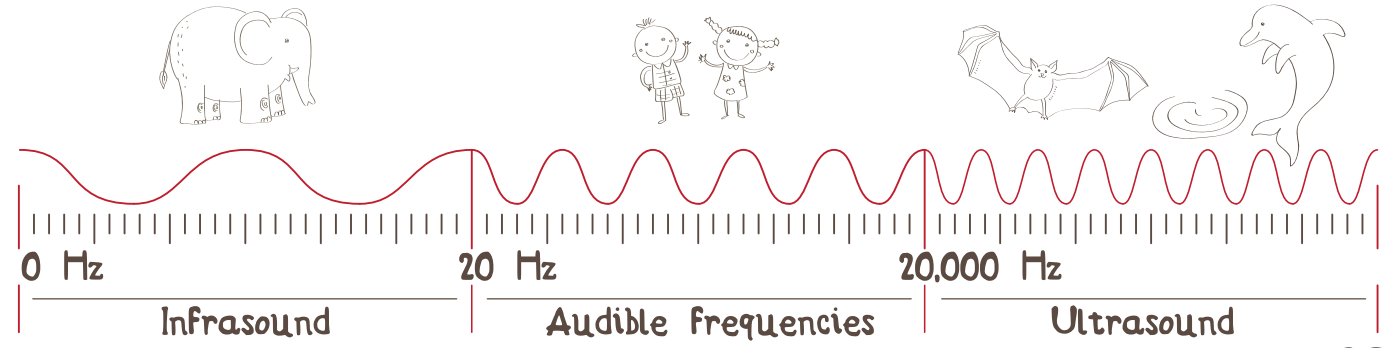
Dogs can hear sounds up to **45,000Hz** (that's the shortened form of hertz), and **fish** can hear up to an astonishing **200,000Hz!**

On the opposite end of the scale, **elephants and whales** communicate and

navigate using **infrasonic** sound – that's **sound below 20Hz.**



So when **earthquakes, volcanic eruptions, avalanches, lightning, meteors and even icebergs** make **infrasonic sound waves**, these animals react by moving away from the **hazard.**



Light

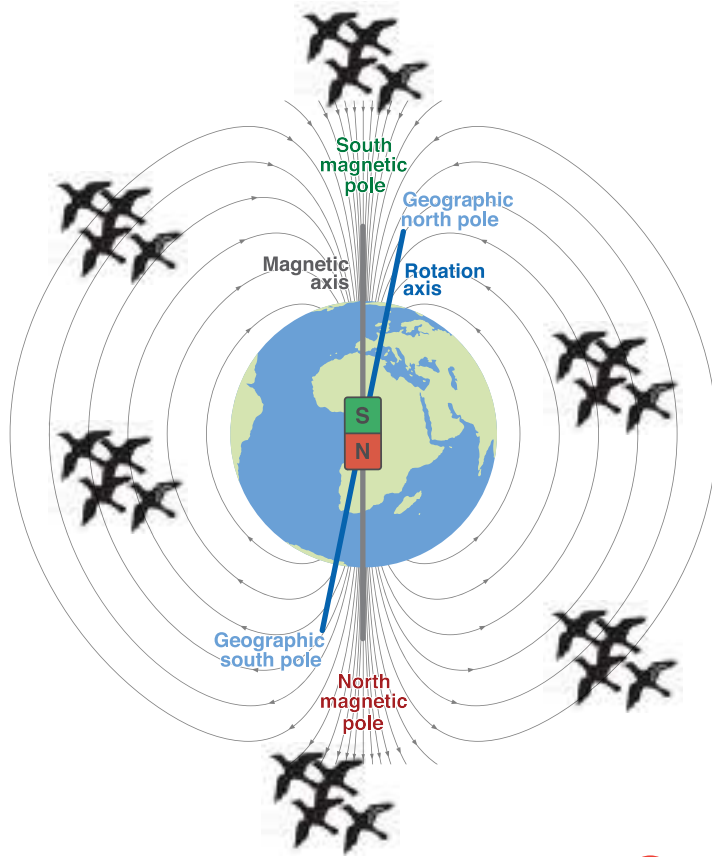
Yup, there's a whole range of **colours** we can't see, either!

Many **birds, insects and lizards** can detect **ultraviolet light** – so bright, it's **invisible** to the human eye. Snakes, fish and mosquitoes can see **infrared light**, meaning they can 'see' heat. Once again, signs of danger that are invisible to us can be detected by animals.

Gases & electricity

Migratory birds and turtles can 'see' Earth's **magnetic fields** (the electric charges surrounding the planet) and use them to **navigate long journeys**. They're hypersensitive to pressure changes. Storm approaching? They change direction!

Likewise, **ants** can sense differences in the air before a **storm**, fleeing their mounds to avoid the oncoming **danger**.



Vocabulary

Hazard: Danger.

Instinct: Intuition or sixth sense.

Magnitude: Size.



Catfish

Taste & smell

Humans have a tongue full of taste buds – but the **entire body of a catfish** is **covered in them**, making the catfish **super-sensitive** to minute alterations in the water. No wonder they **act weird** when trouble rumbles in the deep!

Sensors

Pacinian corpuscles are the sensors that cover the skin of all mammals. They are particularly plentiful on **elephants' paws** (and in cats' guts). So, if the Earth vibrates, however **subtly**, they feel it through the soles of their feet!



Elephants' paws

Just imagine all the noises, colours, vibrations, tastes and smells that we're missing! They're **full of information** about our environment. When you think about it, it makes perfect sense that animals react to danger in ways that seem mysterious to us. They are merely **reacting to signals**.

What appears to be **instinct** or intuition is, in fact, an animal's built-in skill set.

But can we use their super-skills to predict and protect us against natural disasters, like the Ancient Greeks did? Well, that's a whole new question, and one that continues to baffle scientists!

2017 October

Create and place
your bat here

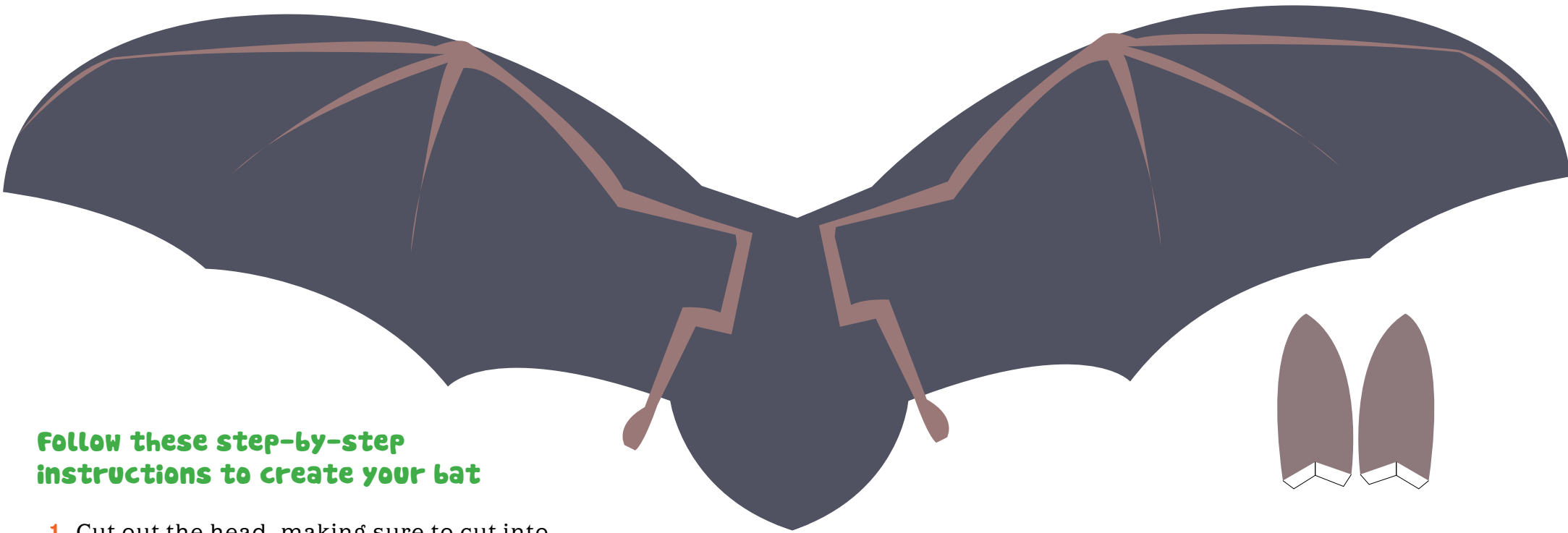
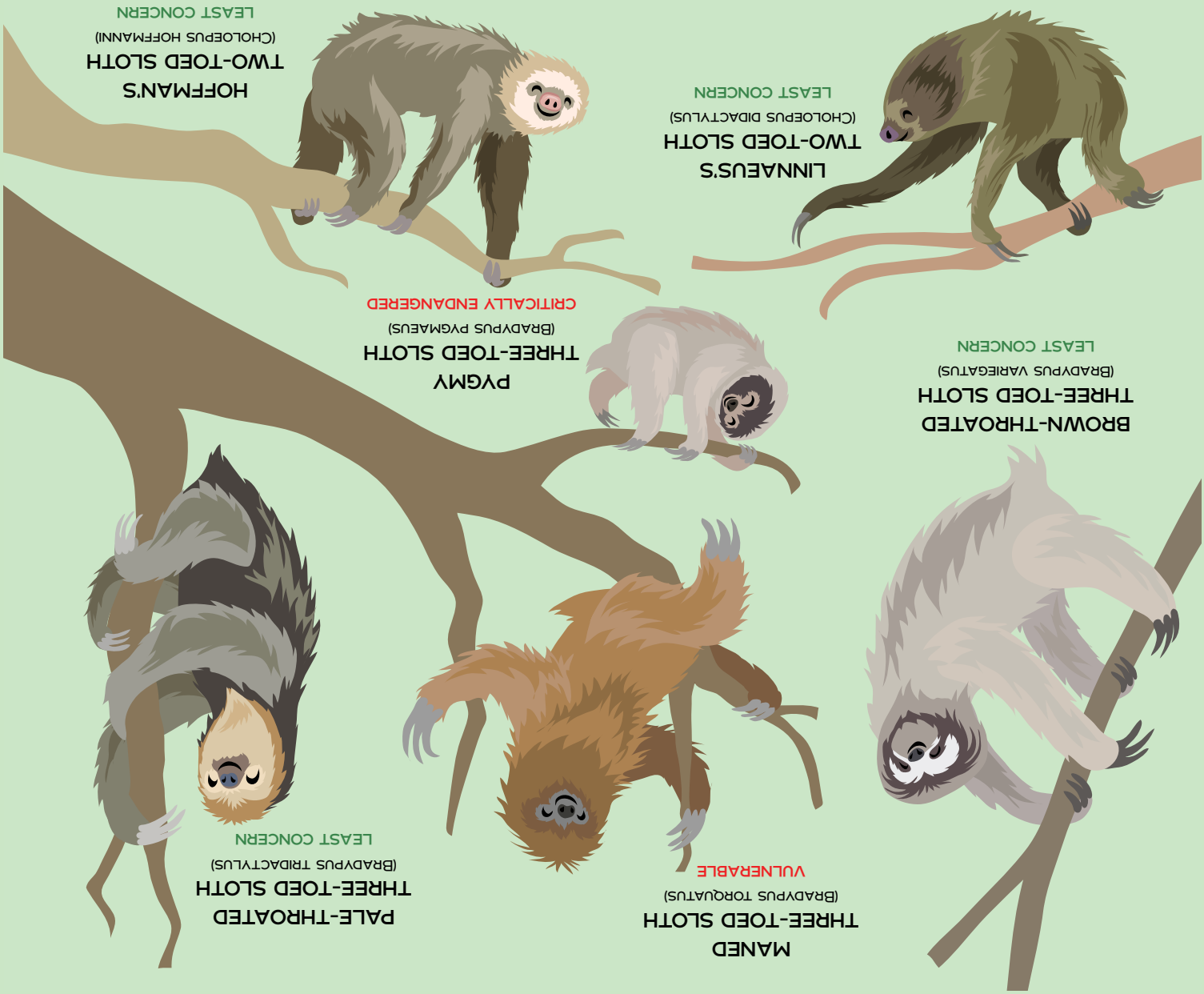
Important dates	
Bat Appreciation Month	
2 nd October – World Habitat Day	
8 th October – World Octopus Day	
18 th October – World Okapi Day	
20 th October – International Sloth Day	
21 st October – Reptile and Amphibians Awareness Day	

2017 October

Mon	Tue	Wed	Thu	Fri	Sat	Sun
25	26	27	28	29	30	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	1	2	3	4	5

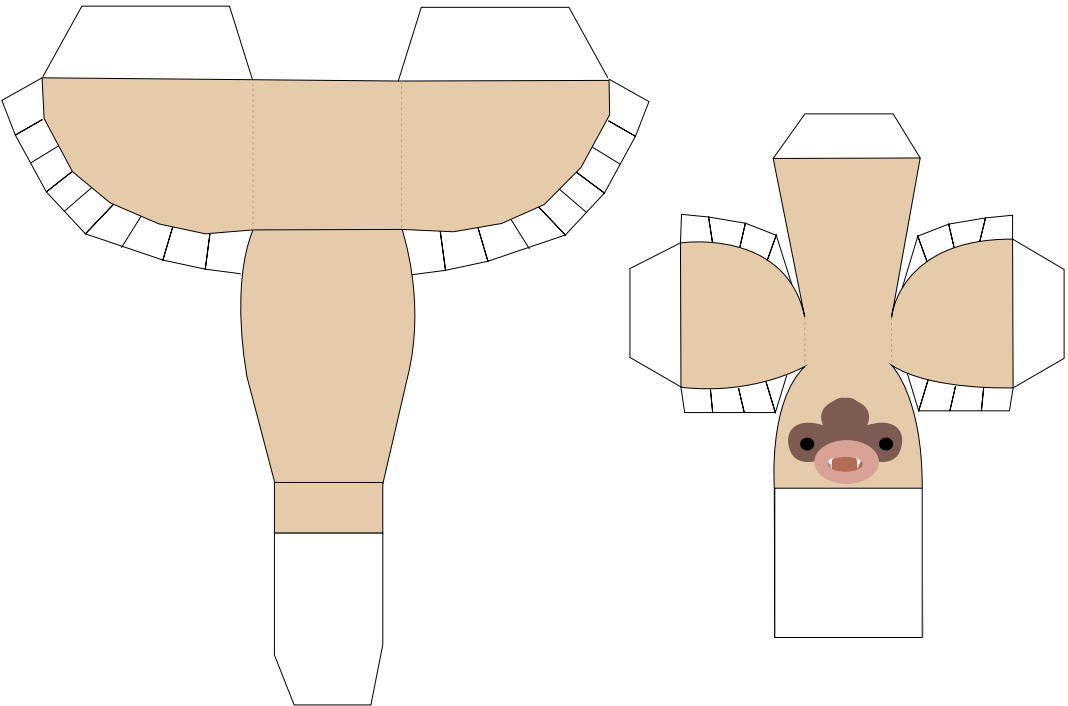


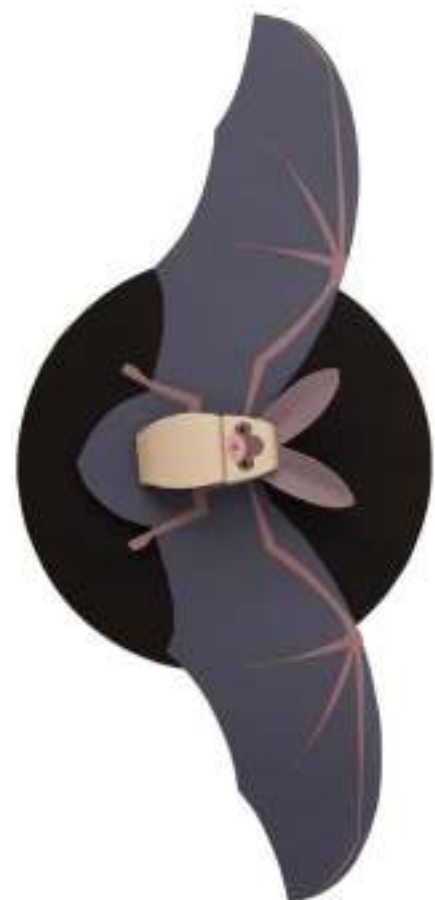
KNOW YOUR SLOTHS



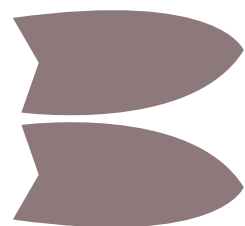
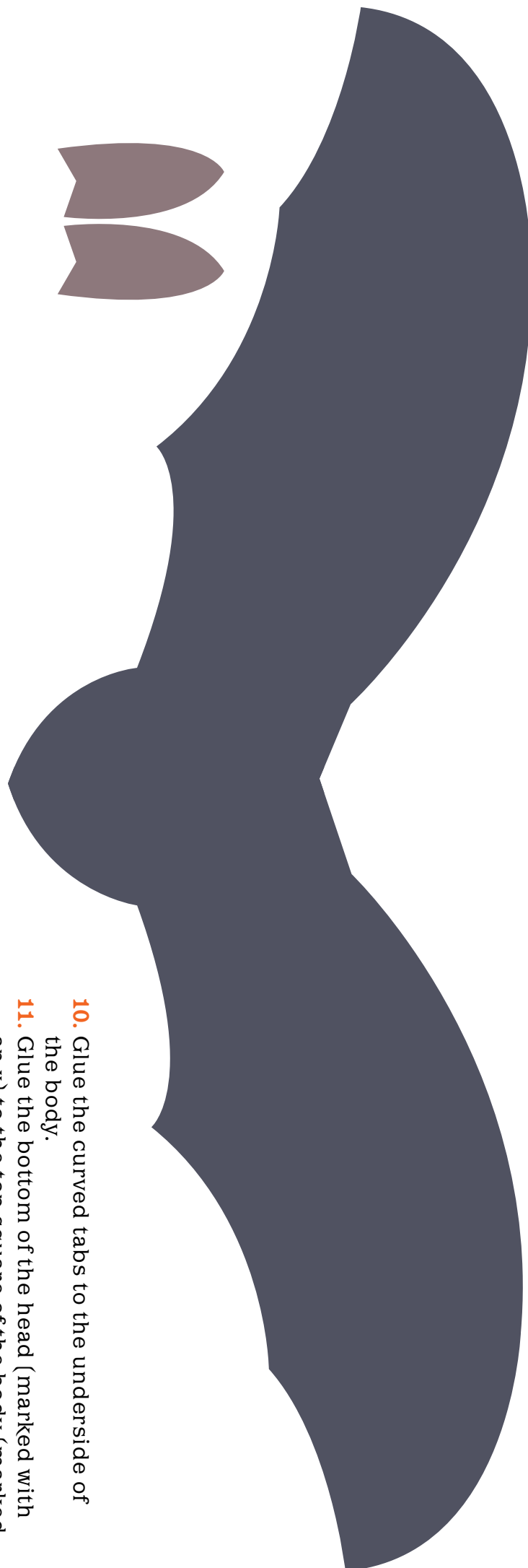
Follow these step-by-step instructions to create your bat

1. Cut out the head, making sure to cut into the white tab lines.
2. Bend all the white tabs backwards.
3. Glue the tabs on either side of the face and hold them sticking behind the face until they dry.
4. Do the same with the tabs for the back of the head.
5. Close the head shape by gluing the three tabs to the bottom square.
6. Cut out the bat's ears. Curve the ears with your fingers and bend the white tabs backwards.
7. Glue the bottom tabs of the ears and stick them either side of the top of the head.
8. Cut out the body shape, making sure to cut the lines into the tabs around the curves.
9. Bend all the tabs backwards, as well as the lines inside the body.





10. Glue the curved tabs to the underside of the body.
11. Glue the bottom of the head (marked with an x) to the top square of the body (marked with an x).
12. Cut out the wings and bend however you like.
13. Glue the body on to the middle of the wings with the tabs that have the red + signs.



Tornado in a Bottle

Science Experiment

This simple, yet really cool experiment enables you to watch a tornado in action!

What you need:

1. Two empty water bottles (make sure they are the same size)
2. Water
3. Duct tape
4. A metal washer
5. Food colouring (optional)



3. Put the empty bottle upside down on top of the bottle of water.
4. Align the openings of the two bottles. Use the duct tape to connect the bottles together.
5. Turn the bottles over so that the one filled with water is on top. Set them on a table and start moving the top bottle in a circular motion.
6. A twister will form and water will start spiralling into the lower bottle. It looks just like a tornado!

How to do it:

1. Fill one bottle two-thirds full with water. Add a drop or two of food colouring. (This will make your experiment more vivid.)
2. Place a metal washer on top of the bottle filled with water.



How does it work?

Swirling the water in a bottle while pouring it out creates a water vortex. The vortex pulls air into its empty centre and allows the water to pour out faster. If you do not swirl the water and just allow it to flow out on its own, the air and water have to take turns passing through the mouth of the bottle!

DANGERS FROM SPACE

Not all natural disasters come from our planet. Some of the biggest threats to life on Earth come from space. I'm with some astronomers, searching the skies for danger out among the stars.

SOLAR STORM!

Our local star, the Sun, is a life-giver, but it's anything but predictable. Fearsome nuclear-fusion reactions in the Sun's core make its magnetic field twist and writhe like a trapped snake. This causes raging storms on the surface that throw showers of deadly radiation and dangerous particles out into space.



A solar flare erupts on the far-right side of the Sun

Greetings, Earthlings! Once again, I'm tracking down trouble. But this month, my investigations are really far out!



CASE NOTES

Carrington Event, 1859

The **largest solar storm** on record happened in the 19th century. People in Cuba were amazed to see the northern lights dancing in the night skies. And telegraph operators reported electric shocks and sparks jumping from their equipment.

If we were hit by one of these **humdingers** today, it would fry satellites, knock out power grids, cripple computers and bring down mobile networks!



When they hit Earth, these showers cause the northern (and southern) lights high in the atmosphere at the poles. The biggest solar storms, however, could knock out the **power grid**. Life in a large city without power would be grim. As well as the lights, food would go off, tap water would not be clean, and essential hospital equipment would switch off.

DANGER RATING: 4

NASA/SDO/Goddard Space Flight Observatory

GAMMA RAY BURST!

The most powerful explosions in the galaxy were once a mystery to our astronomer friends. They are super-high-energy beams from outer space, which shine hundreds of times brighter than most **supernovas**. They come from any direction and only last for a few seconds. Even so, **gamma ray bursts** (GRBs) could blast open the ozone layer, leaving life exposed to the Sun's damaging UV radiation.

A GRB's high-energy gamma rays carry more energy than the Sun puts out in its whole life.



DANGER RATING: 8

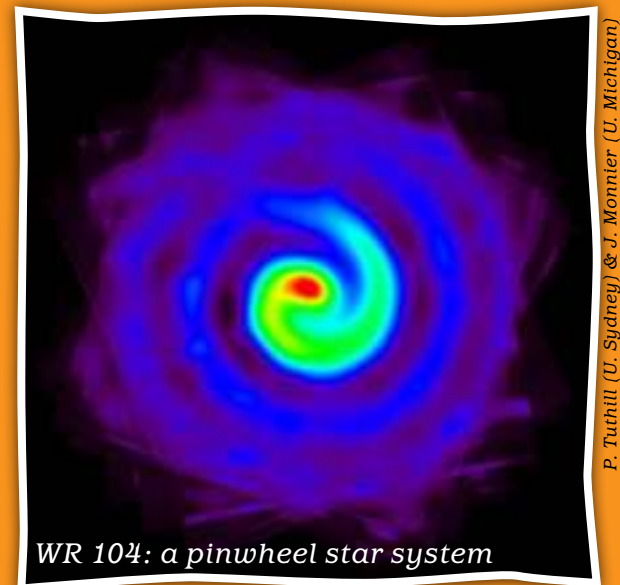
A gamma-ray burst explodes from a giant star at the end of its life



CASE NOTES

WR 104

WR 104 is a star system about 7,500 light years away from Earth. One of its twin stars could emit a GRB at the end of its life. Even at this enormous distance, we are **not far enough away** to be safe. Luckily, the tightly focussed beam could easily miss us entirely.



WR 104: a pinwheel star system

P. Tuthill (U. Sydney) & J. Monnier (U. Michigan)

NASA / SkyWorks Digital

EXPLODING STARS!

Giant stars like to go out with a bang! These gargantuan, ginormous, gigantic explosions, called **supernovas**, happen when a large star reaches the end of its life. They happen all the time, too – the most recent one in our galaxy was only 140 years ago. Astronomers reckon that a supernova would need to be within 30 light years from Earth for it to be devastating to the planet. There are not many stars that close.

NASA, ESA, NRAO/AUI/NSF and G. Dubner



Crab Nebula, a supernova remnant

CASE NOTES

Betelgeuse

This red super-giant star in the constellation of Orion is nearing the end of its life. It could go supernova any time in the next million years. Thankfully, it is 640 light years away.



If a star exploded close to us, we would be in serious trouble. Sizzling X-rays and gamma rays would be fatal for life on the planet.



DANGER RATING: 6

Large rocks have a very bad history with our planet. The most famous asteroid impact killed off the dinosaurs, 65 million years ago. Another extremely large collision with a Mars-sized object knocked a chunk off the planet, which became the Moon. **NASA** keeps a close eye on all space objects that could hit Earth in the next 100 years.

CASE NOTES

Comet Swift-Tuttle

It's often called the most dangerous thing in space. This comet blazes past Earth once every 133 years. The next time it will visit is in 2126. Astronomers have calculated its path for the next 2,000 years, and they think that Earth is safe until 4497. However, there is every chance that the comet's path could change if it gets a 'nudge' from the gravity of large planets. This cute comet could turn into the Bringer of Doom.

Did you know?

In 2022, space scientists will attempt to deflect an asteroid from its path, to test ways to avoid the end of the world.

Triple trouble

Dinosaurs reigned supreme on Earth for 100 million years – more than three times longer than humans have been around. They died out suddenly, 65 million years ago. Scientists think that their world was rocked by a triple whammy. First, Earth was struck by a **monster asteroid**, 10km across, releasing more energy than millions of hydrogen bombs. Then, the explosion would have **ignited wildfires** around the world. Finally, dust and debris thrown into the air by the blast blocked out sunlight, **chilling the planet** for years and causing plants to die off.



If an asteroid that was 5–10km wide collided with our planet, it would be curtains for the human race. Scientists calculate that one of these objects hits Earth about once every 100 million years.



DANGER RATING: 9

Vocabulary

Humdinger: Something remarkable or outstanding.

NASA: The National Aeronautics and Space Administration, the USA's space agency.

Supernova: The explosion of a star at the end of its life.

SPACE ROCKS!

Space is full of **flying rocks**. Most of the time, they keep to their zones – a belt between the orbits of Mars and Jupiter for **asteroids**, and out beyond Neptune for **comets**. But, every now and again, a disturbance sends one hurtling towards the Sun. The problem is that our planet lies between these rocks and the Sun. If the lump of rock that we live on comes into contact with another one, it's KABLAM!



An asteroid collision, in the belt between Mars and Jupiter

NASA/JPL-Caltech

Tardigrade (water bear)

©Eye of Science/Science Photo Library

Super-tough tardigrades

There is one creature that would survive a global catastrophe for sure. Water bears, aka **tardigrades**, are smaller than a poppy seed but are one of the planet's toughest creatures. These indestructible invertebrates have a 'freeze-dried' survival mode when life gets tough. They can stay in this state for 100 years, weathering punishing temperatures close to absolute zero (-273°C) and baking 150°C heat. Add a little water and they magically reanimate.

Dusty Death of a Massive Star

NASA/JPL-Caltech/UC Berkeley

A supernova remnant is made up of the messy bits and pieces of a massive star that exploded, or went supernova.

NATURE AGAINST NATURE



Earlier this year, the worst monsoon rains for 10 years flooded areas of Nepal, Bangladesh and India. **Hurricane Harvey** dumped 33 **trillion** gallons of water over the US. **Hurricane Irma** crashed through the Caribbean islands, flattening buildings, beaches and cars. It then continued on to Florida in the US, **battering** and flooding towns and cities. Scary.

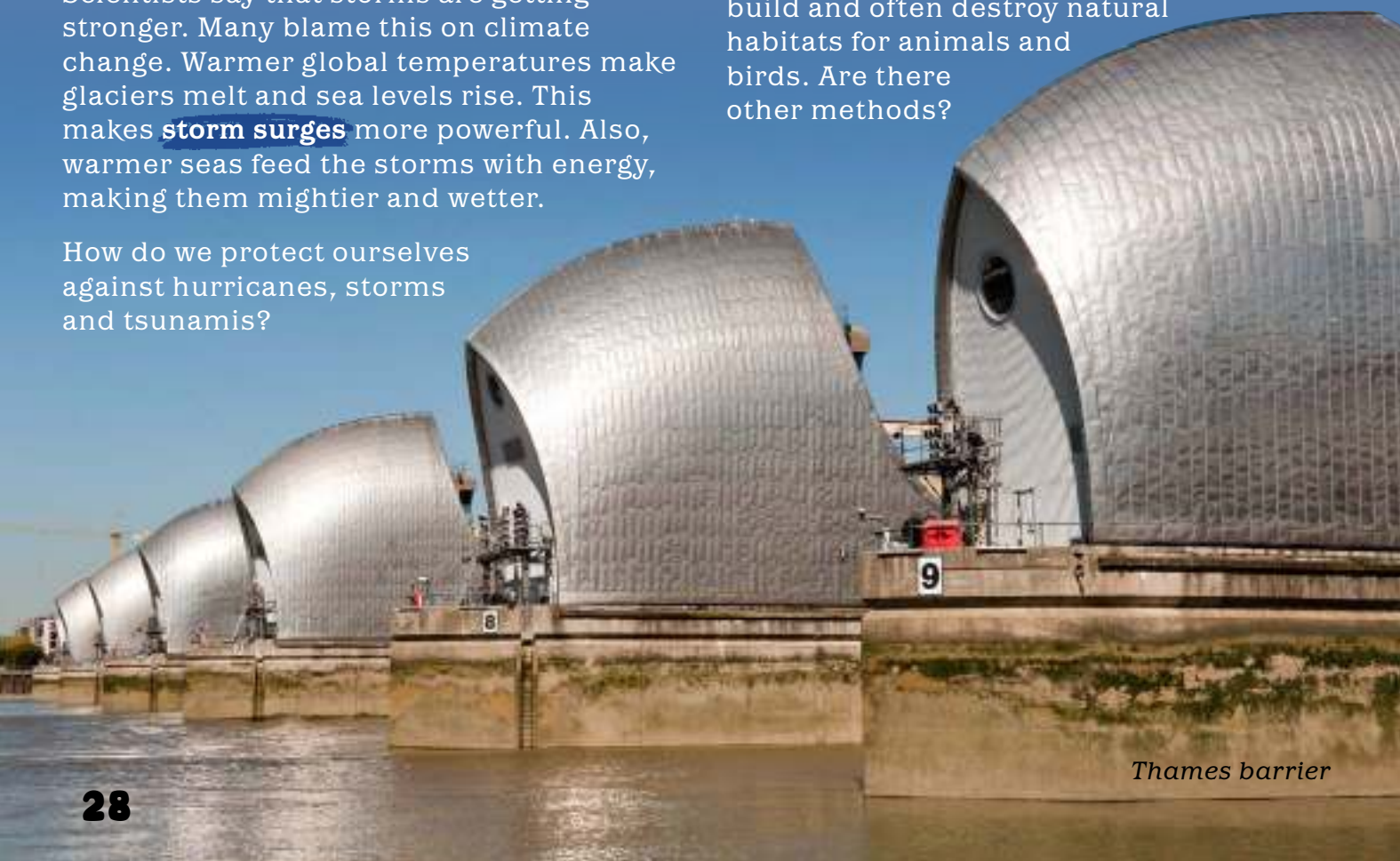
Scientists say that storms are getting stronger. Many blame this on climate change. Warmer global temperatures make glaciers melt and sea levels rise. This makes **storm surges** more powerful. Also, warmer seas feed the storms with energy, making them mightier and wetter.

How do we protect ourselves against hurricanes, storms and tsunamis?

Walls and dams

For many years, people have built sea walls and barriers to protect coastal areas. You might have visited the Thames Barrier, which protects London against high tides.

But higher sea levels and stronger storms mean that we need to build bigger dams and higher walls. They are expensive to build and often destroy natural habitats for animals and birds. Are there other methods?



Thames barrier



Mangroves are tropical trees, found near water. Their twisted roots grow partly above the ground.

Nature's solutions

Mangroves, coral reefs and sand dunes also help to protect us from waves, storms and floods. Look at how effective they can be:

Thirteen years ago, the island of Sri Lanka was hit by giant waves in a tsunami. In a coastal village with dense mangrove and scrub forest, two people died. In a village without mangroves, 6,000 people were killed!

THIS IS BECAUSE MANGROVES CAN ABSORB AROUND THREE QUARTERS OF THE ENERGY FROM A NORMAL WAVE.

Unfortunately, many mangrove forests have been cleared to build prawn farms and holiday resorts. They are also cut down for firewood, timber and charcoal. Mangroves are disappearing fast and we need to protect them. The Matang Forest Reserve in Malaysia is conserving its mangrove forest by controlling the amount used for fishing and wood. It is a great example to follow.

Coral reefs

These beautiful ecosystems support millions of species and are wonderful places to visit. They also break up the waves to protect us. Reefs slow down the flow of water, so reduce wave energy. And they are most likely to have formed where an ocean's currents and waves are most powerful. Unlike a sea wall, they gradually grow, giving us even more protection.

RESEARCH ESTIMATES THAT CORAL REEFS PROTECT 200 MILLION PEOPLE FROM STORMS AND RISING SEA LEVELS!

Coral reefs need protecting because global warming and human activity are destroying them. It would be much



cheaper to protect and restore our reefs than to build new sea walls!

Sand dunes

Storm surges and high waves are also stopped in their tracks by sand dunes. These sandy beach hills can prevent or delay flooding inland. The dunes are held together by beach grass, which helps to trap and hold the sand in place. It is important that the grass isn't trampled or driven on. Damaged grass means damaged dunes. Weak spots in the dunes can become floodwater channels during coastal storms. In many places, environmental groups have built bridges for people to walk over the dunes. Local people can also help by planting beach grass.

So, it seems that we can use **nature against nature**. If we protect mangroves, coral reefs and sand dunes, they can help to protect us from hurricanes and flooding. If storms are getting stronger and sea levels are rising, this is more important than ever.



Vocabulary

Batter: Hit something with force many times.

Storm surge: The rise in seawater level caused by a storm.

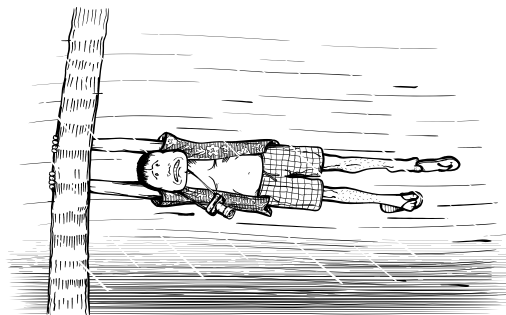
Trillion: One thousand million.

Eco Kids Quiz Planet

CROSSWORD EXPLOSION

Across

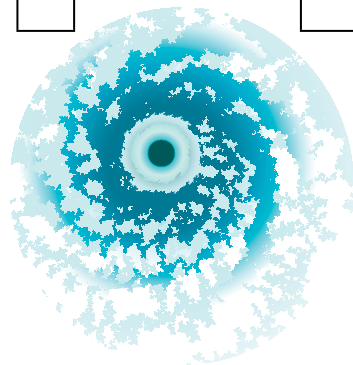
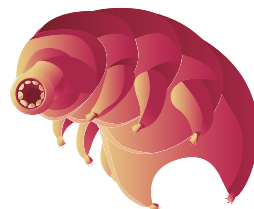
1. An opening in a volcano that lets the lava out (4)
3. A sleeping volcano (7)
6. Sixth sense (8)
8. Red-hot liquid rock (5)
11. The explosion of a star at the end of its life (9)
12. A strong tropical storm (9)



13. The most volcanically active place in our solar system (2)
14. A monster wave (7)
16. _____ of Fire (4)
17. Elephants can hear it, but humans can't (10)
18. A space rock (8)

Down

2. A violent shaking in the Earth (10)
4. What we call magma when it's no longer underground (4)
5. A tropical tree, with its tangled roots above the ground (8)
7. The American space agency (4)
9. To hold out against (9)
10. A teeny-tiny, tough animal (10)
15. It was formed after a collision between Earth and a Mars-sized object (4)



WEATHER CHEF

Match each 'ingredient' to the correct natural disaster

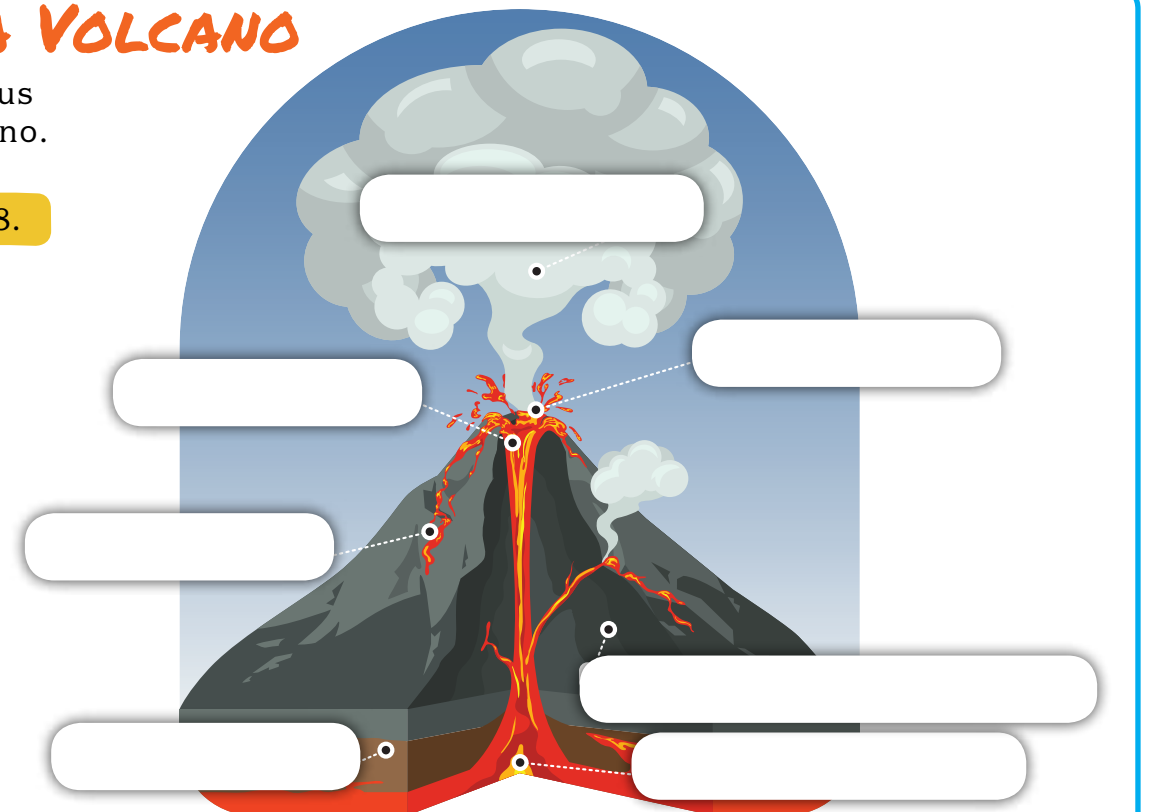
- _____ 1. Warm tropical ocean
- _____ 2. A sudden movement of tectonic plates
- _____ 3. Magma
- _____ 4. Lightning strike
- _____ 5. Severe monsoon rains
- _____ 6. An earthquake under the ocean

- a. Flood
- b. Hurricane
- c. Tsunami
- d. Earthquake
- e. Wildfire
- f. Volcano eruption

INSIDE A VOLCANO

Label the various parts of a volcano.

Hint: see page 8.



JOKE CORNER

Q: What does a cloud wear under his raincoat?
A: Thunderwear!

Q: What's a tornado's favourite game?
A: Twister!

Q: Why do hurricanes travel so fast?
A: Because if they travelled slowly, we'd have to call them slow-canes.

Q: Why do mother kangaroos hate rainy days?
A: Because the children have to play inside.

Q: What do you call a cute volcano?
A: Lava-ble



Pompeii kids

Competitions and Letters

In our July/August issue, we asked you to have some messy fun creating faces using mud and different things you find in nature. Thank you to all who sent us their photos and letters!



Owl
Amali, age 10,
Lostwithiel

I hope you like my mud face, it is an owl. I wanted to make it a bit different so I did an owl. I love owls. I love Eco Kids planet magazine. This competition was such fun!



Harrison, age 7,
Australia



The Woodland Wanderer Mudface
Dominic, age 11, Leeds



Keira, age 6,
Edwinstowe



Olivia
Harriet, age 10,
Garshilton



Arlo, age 8,
St. Osyth



Leila, age 7,
New Malden



Drew, age 9,
St. Osyth



Sophë, age 8,
Haida Gwaii

We loved receiving all of your letters! We don't have room to print all the amazing entries, so we've put more on our website at ecokidsplanet.co.uk/mud-face-competition.

MONTHLY COMPETITION

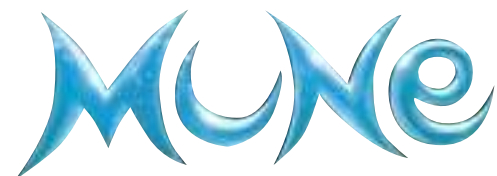
Recipe for Disaster

For this month's competition, we'd like you to create a recipe for a natural disaster!

Come up with a list of ingredients and make up a recipe. This can include a list of natural events, possible locations, weather conditions, human activities and anything else you might think of. It could be either scary or funny, on Earth or in space – the choice is yours. We'll publish the most imaginative creations in our upcoming issue of Eco Kids Planet!

WIN!

FIVE talented creators will win this fabulous new DVD!



Guardian of the Moon

In a land far away, the Sun and Moon shine only thanks to heroic Guardians. But when the most unlikely little creature, Mune, is chosen to be the new Guardian of the Moon, a series of unfortunate events occur, leading the Sun to fall into the hands of a disgraced Guardian seeking revenge. Teaming up with Sohone, the swaggering new Guardian of the Sun, and Glim, a fragile yet witty girl, Mune and his friends must embark on a magnificent adventure to rescue the Sun and save their world. If he succeeds, Mune will be a legend forever more.

Mune is available on DVD and digital download from 2nd October 2017.

To see a trailer, go to <https://youtu.be/CkJb6X0e0bk>

How to submit your competition entries:

Send a letter to Eco Kids Planet, 41 Claremont Road, Barnet, EN4 0HR or email hello@ecokidsplanet.co.uk before 15th November. Please be sure to include your full name, age and address, so we know how to reach you.

Explore the Earth's most wondrous places and fascinating creatures in the previous issues of Eco Kids Planet!

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IN THE NEXT ISSUE OF ECO KIDS PLANET

Issue 37

THE HEADWATERS OF THE AMAZON

Where does the Amazon River begin?

The boiling water of an Amazonian river

Who made the Nazca lines?

THE SACRED ANIMALS OF THE INCAS



Spider mysteries in the Peruvian Amazon

