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Super senses!

Let's take a deep dive into the world of animal senses to discover some of the amazing superpowers animals use each day and night to help them survive and thrive.

You probably know that animals — including us humans — use the senses of touch, sight, hearing, taste and smell to learn about the world around them. Animals that hunt for food use their senses to track and find their prey. Animals that are prey use their senses to spot nearby predators and to stay hidden from them.

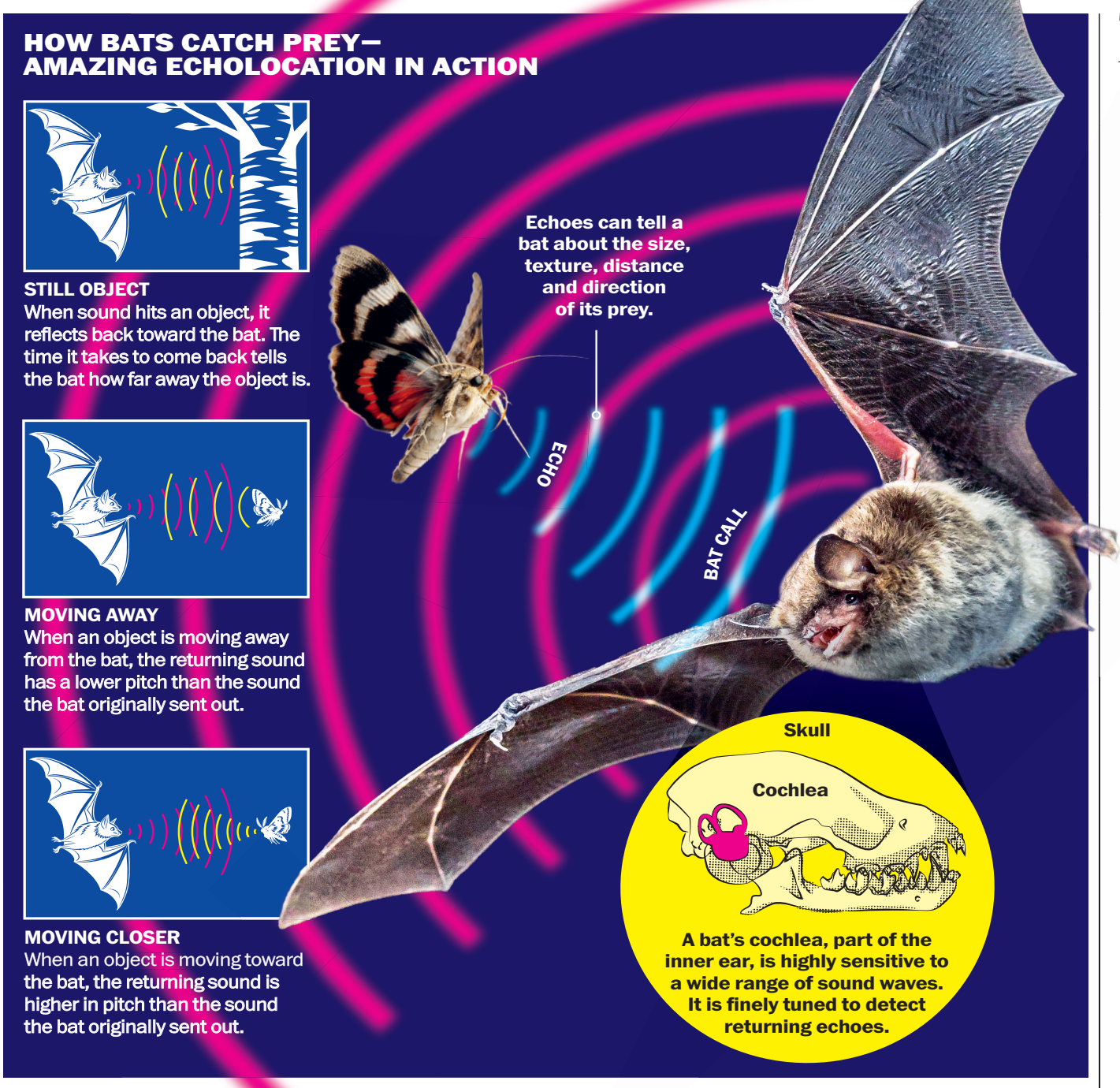
But did you know that many animals have senses beyond our own? Animals can see, hear, smell, taste and feel things that we can't even imagine. Here are some fascinating examples of these animal super senses.

What is echolocation?

One of the most well-known super-hearing powers is echolocation, or the use of sound waves and their echoes to figure out where things are in space without the need for natural light.

How does it work?

If you've ever shouted in an empty room, you know that sounds bounce back as echoes. That's because sound travels in waves. With echolocation, an animal sends out a sound, such as a call or click, then waits for the echoes to return. The time, direction and strength of the echo tell the animal about nearby objects: how far away they are, how big they are and how fast they are moving. Check out the diagram at right to see how bats use echolocation.



Why did it evolve?

Echolocation is especially useful when vision doesn't help much — at night, underground or underwater. Over 1,000 different species — from bats, whales and some shrews to cave-dwelling birds such as oilbirds — have evolved this amazing ability. Many animals that can't see well, live in darkness or are most active at night use echolocation to find food. They may also use it to help them navigate their environment when their vision is limited by darkness or mud.

Thermal vision

What is infrared sensing?

Infrared is a type of light that is outside the visible spectrum, which means we humans are unable to see it. Infrared waves feel like heat to us, but other animals, including certain snakes, sense them with specialized organs. We call this "heat vision" or thermal vision. You may have seen an infrared picture, like the mouse shown below, which mimics what a snake detects. Warmer areas appear brighter than cooler areas, making prey easier to see against cooler surfaces.

How does a snake's thermal vision work?

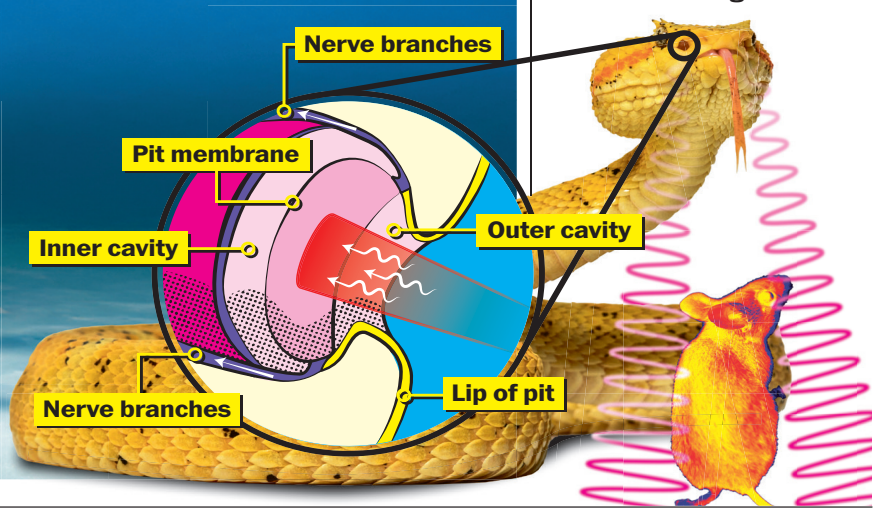
Snakes such as pit vipers have a special organ called a pit organ that enables this sense. In pit vipers, the pit organ is located between the eyes and nostrils, and in boas and pythons it can be found along the lips.

The pit organ has a sensory membrane packed with thousands of cells that respond to infrared radiation. These special cells send messages to the snake's brain about the temperature of nearby objects. The snake's brain combines heat signals with vision signals to build a single picture of its environment.

Why did it evolve?

Thermal vision helps animals hunt and navigate using temperature contrasts when sight is limited, such as in low-light environments — and detect predators and prey. Vampire bats, mosquitoes and some frogs use thermal vision.

A special organ called the pit organ allows this snake to see its prey with both regular vision and heat vision. Inside the snake's brain, heat signals from the mouse and visual information combine to form a single enhanced image.



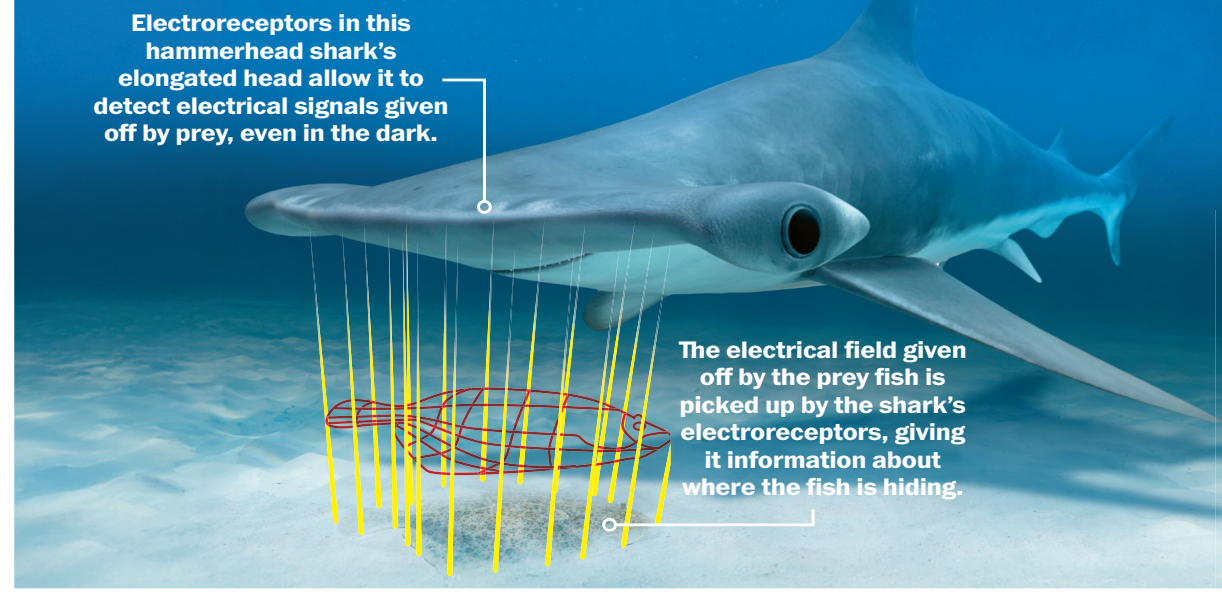
Electroreception

Electroreception is the sense that lets some animals detect electrical signals. They use these signals to find prey and figure out where they are. Some animals use electroreception for communication. Electroreception can be a powerful tool for animals that have low or reduced vision or live in dark or muddy places where it is difficult to see. Relying on this electrical sense — as bats rely on their hearing — helps these animals live and find food without having to depend on their sense of sight.

How does it work?

All animals — including you! — produce weak electrical fields from nerve and muscle activity. Some animals can detect these fields. This is what is called passive electroreception. "Passive" means sensing what's already there, without making extra signals. Others send out their own electrical signals with special organs, then sense changes in that field. This is called active electroreception, because the animal creates a signal first and then spots distortions around objects.

Most animals that use electroreception, such as sharks and rays, live in salt water, which is a much better conductor of electricity than fresh water or air. This makes weak electrical signals carry better and stand out to them.



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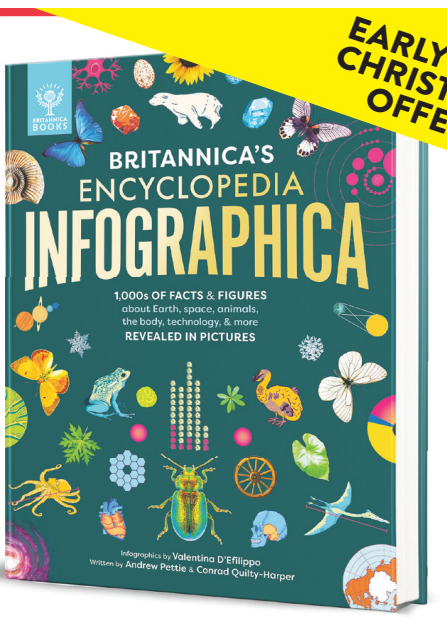

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