

THE ENERGY

Questions & Answers BOOK



Electricity
& Magnetism



Light



Wind



Heat



Sound



THE GOOD AND THE BEAUTIFUL LIBRARY

Written by Anthony Klemm

Question

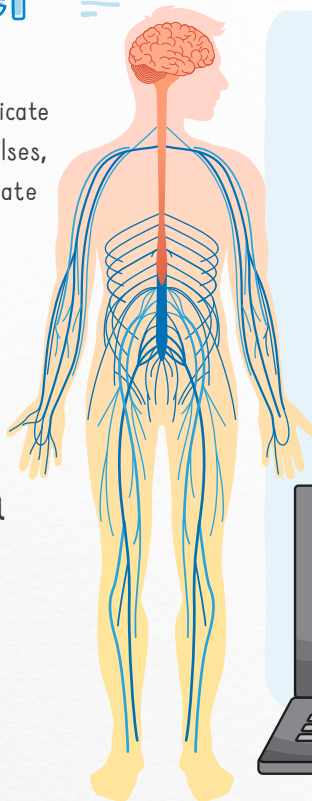
Does your body
produce electricity?

Answer

Yes. Your nerves communicate through tiny electric impulses, and electrical signals regulate your heartbeats.

CNS = Central Nervous System

PNS = Peripheral Nervous System



God created your brain as a low-voltage supercomputer that can outperform any human-made computer!



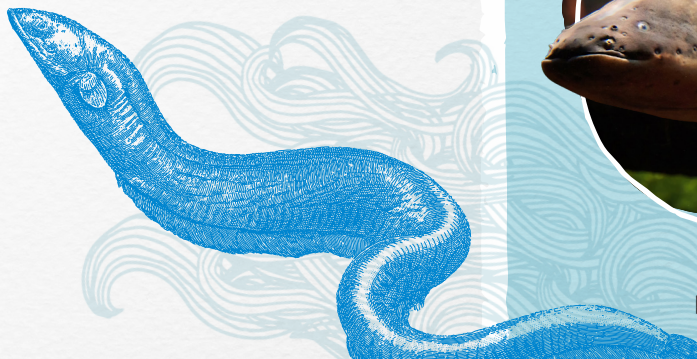
Answer

Electric eels are a type of freshwater fish that routinely grow more than six feet long. They aren't real eels but are more closely related to catfish. Another surprising feature of electric eels is that they breathe air and must take multiple trips to the surface to survive.

These fascinating creatures are expert hunters. They prey on other fish, crustaceans, amphibians, and even small mammals and birds. To compensate for their poor eyesight, they have specialized organs that build up and discharge high-voltage electric pulses to shock and stun nearby prey.

Under most circumstances underneath the water, the shock from an electric

eel isn't strong enough to injure a person, although it's possible to feel an uncomfortable sensation. That's because the electric shock is dissipated in all directions by the water. However, there have been documented cases of electric eels reaching out of the water to shock potential predators. The shock outside the water concentrates the voltage and has the potential to injure humans.



Question

Can you be shocked by an electric eel?



Question

Can light reach
the floor of all
oceans?

650 ft.



305 ft.

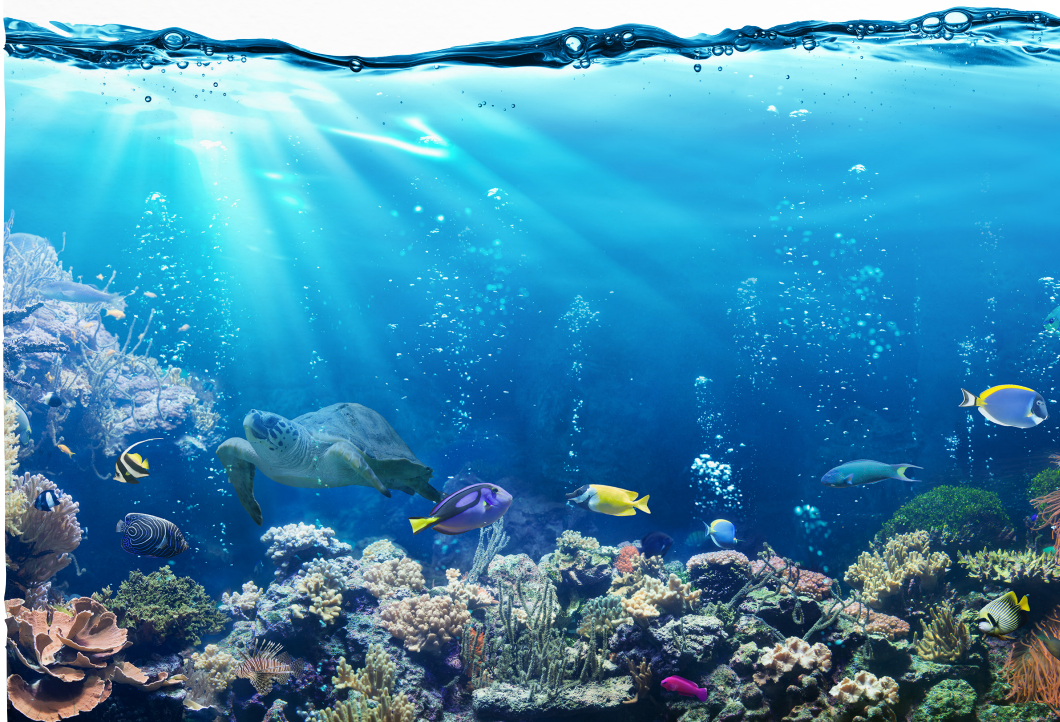


305 ft.

0 ft.

Answer

No. In most cases sunlight doesn't reach down much deeper than about 650 feet in the ocean. That means the majority of the ocean is completely dark!



Answer

Eyes are one of God's most complex and amazing creations. The eye of a hawk may be sharper than that of an owl, but an owl can see much more clearly in the dark. An animal's eyes are created for the type of environment in which it lives. Eyes have special cells called **receptors** that are sensitive to certain wavelengths of light.

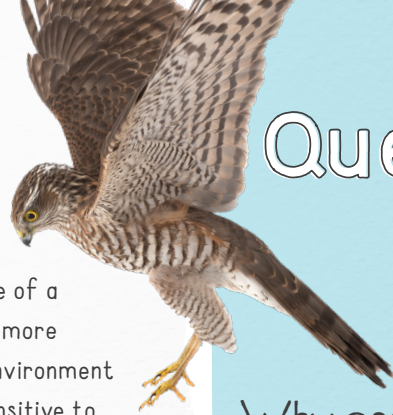


Humans have three color receptors that allow us to see a color range from red to violet. Our eyes can't see light with a wavelength larger than red (called infrared, greater than ~700 nanometers) or smaller than violet (called ultraviolet, less than 400 nanometers). Birds, however, have an extra receptor that detects ultraviolet (UV) light. This gives them an advantage for finding food while gliding high in the clouds.

Frogs have special proteins in their bulging eyes that allow them to see in the dark. This super ability to see infrared light allows them to both hunt prey and evade predators in pitch-black darkness.

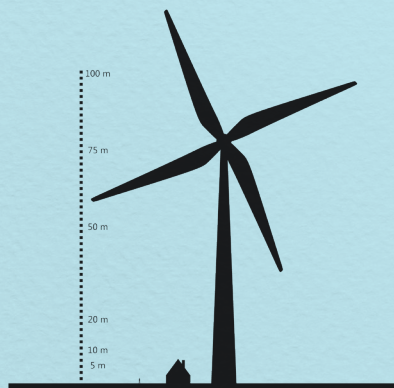
Question

Why can birds see ultraviolet light and frogs see infrared, but humans can see neither?



Question

Can wind turbines be damaged by high winds?



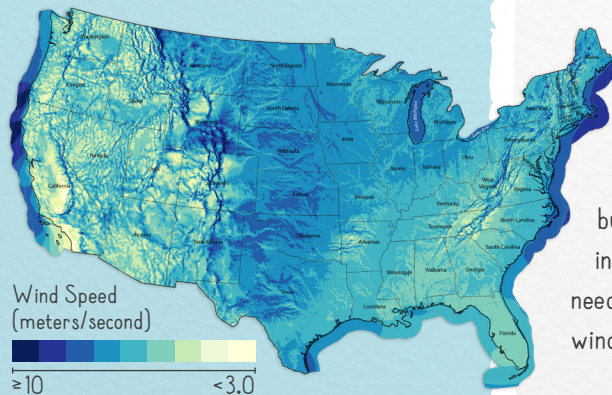
Answer

Yes. Strong sustained winds can cause wind turbines to spin too quickly, which can damage the blades and internal electricity-generating machinery. To prevent being damaged by strong winds, wind turbines will stop spinning by feathering, or turning, their blades to allow wind to flow past freely. The blades can also be locked down.



Question

Where are the best places to build wind farms?



Answer

Having the right ingredients is essential in baking. The same goes for finding the best places for a wind farm. The most crucial ingredient for a wind farm is wind. Wind farms are usually built in windy locations, such as the tops of hills, mountain passes, open plains, or along the coasts of oceans and large lakes.

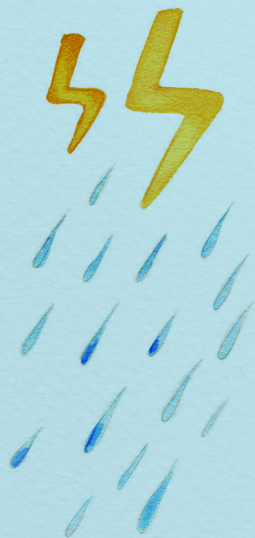
Another essential ingredient for a wind farm is open land. There can't be any windbreaks, such as tall hills or nearby buildings, that could block the wind in a particular direction. There also needs to be enough room to space the wind turbines apart correctly. You

don't want one turbine blocking the wind of another directly behind it!

Yet another critical factor to consider is the impact on wildlife, especially birds. Areas near endangered bird habitats are not the best places to build large wind farms. Migrating birds typically fly the same path year after year. Understanding where those migration lanes are is vital to being good stewards of God's beautiful creations.

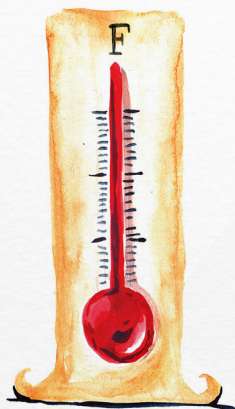
Question

How hot is lightning?



Answer

A lightning strike can heat the air so it is more than **50,000°F**. The surface of the sun is about 10,000°F, so that's five times hotter!



5
times
hotter

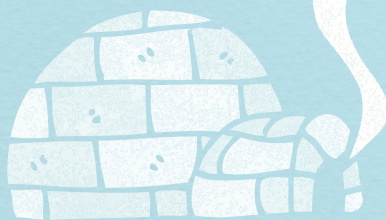
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Question

How do igloos keep you warm?

Comfy & cozy!



Answer

It's hard for most of us to imagine living year-round in the Arctic, but that's what some people, such as the Inuit, have been doing for thousands of years. They learned long ago how to create shelters out of blocks of snow to keep themselves warm. Animals living in cold climates do this too. Polar bears, grouse, and arctic weasels all create burrows in the snow to keep warm and for protection from the frigid, icy weather.

Igloos work because the blocks of snow have enough air in them to be excellent **insulators**. A substance is an insulator if it does not readily transfer heat. Some common insulators you use at home include wood, wool, plastic, and a fluffy and airy substance called fiberglass.

Inside an igloo, the radiant body heat you lose to the air around you is trapped inside the structure. Very little heat is transferred by conduction through the igloo walls to the outside, preserving your body heat and keeping you warm.



Question

Does sound travel faster through water or air?

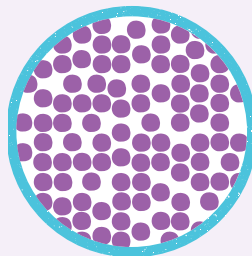


Answer

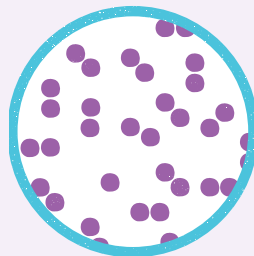


Sound travels about four times faster in water than it does in air. Sound waves can also travel farther in water than in air. This is one reason why whales can communicate with each other over such long distances in the water.

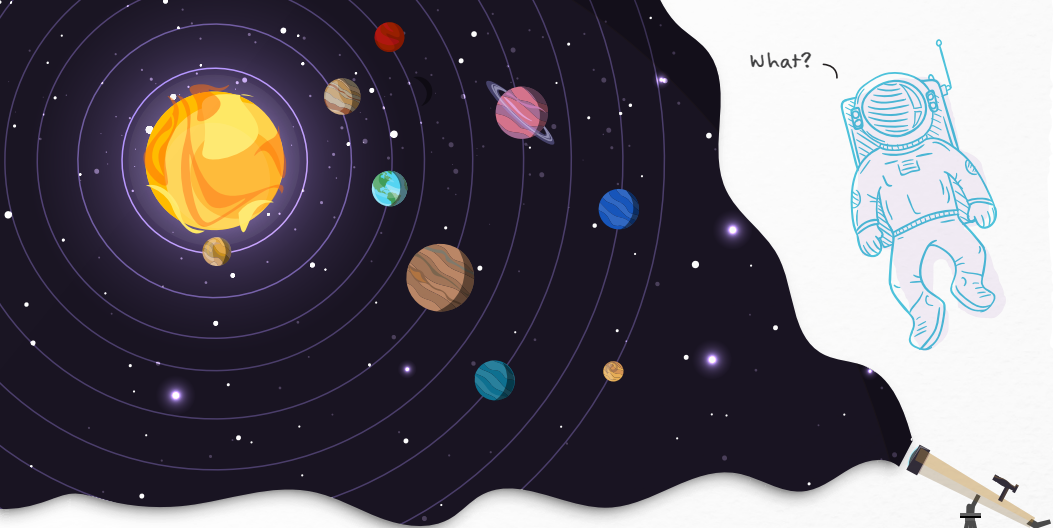
Water molecules are more compact than air molecules. Sound travels by vibrating particles. The closer the particles are to each other, the easier it is for them to bump into each other and pass on the vibration.



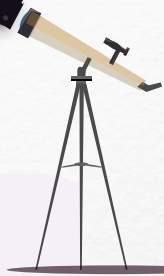
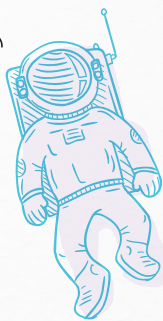
Water Molecule



Air Molecule



What?

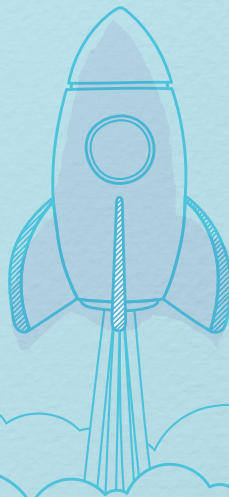


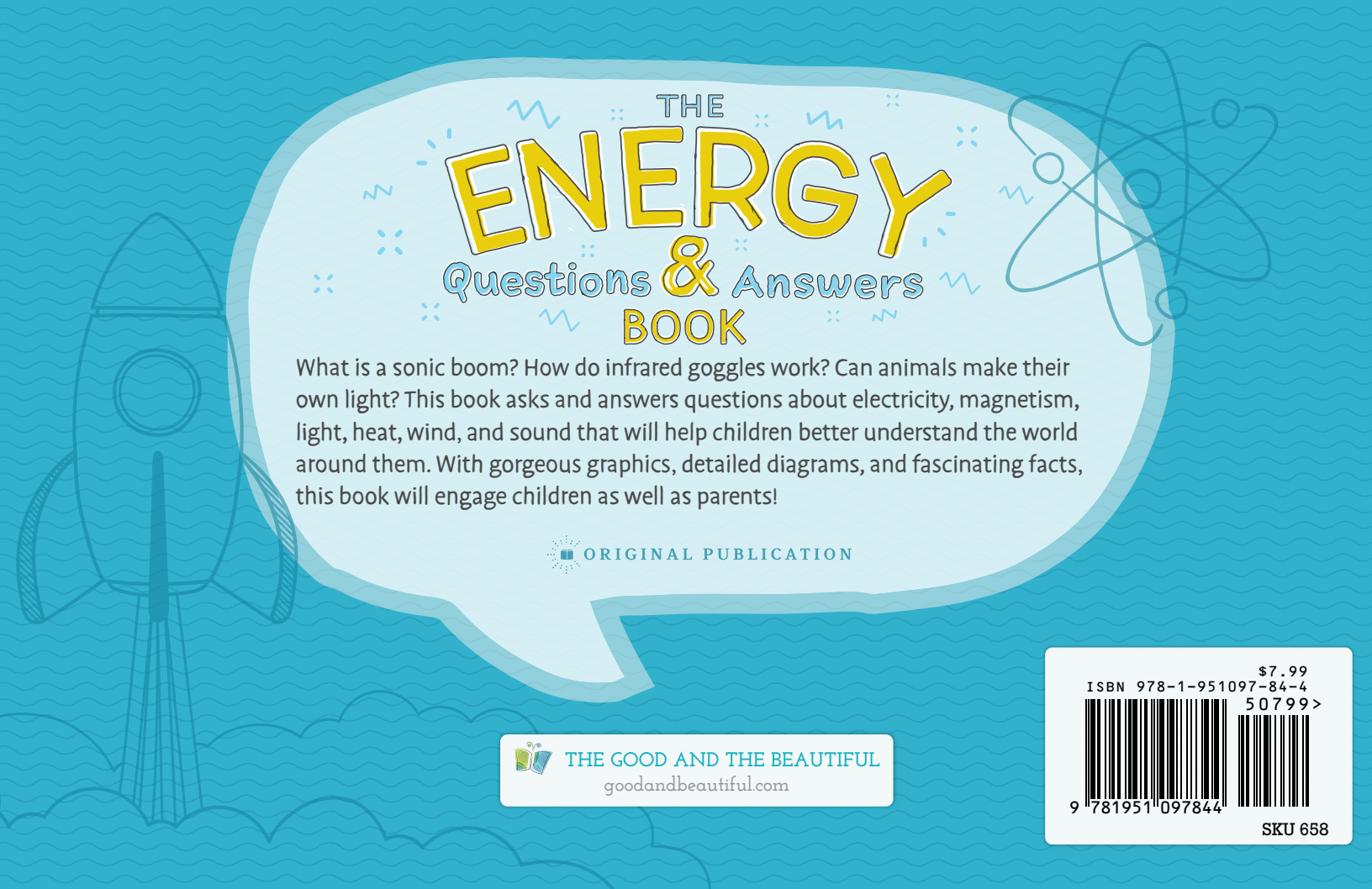
Answer

Nope! In order for sound to travel, it has to have something to travel through. On Earth, sound can travel through air molecules, but outer space does not have air molecules.

Question

Is there sound in outer space?





THE ENERGY

Questions & Answers BOOK

What is a sonic boom? How do infrared goggles work? Can animals make their own light? This book asks and answers questions about electricity, magnetism, light, heat, wind, and sound that will help children better understand the world around them. With gorgeous graphics, detailed diagrams, and fascinating facts, this book will engage children as well as parents!



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