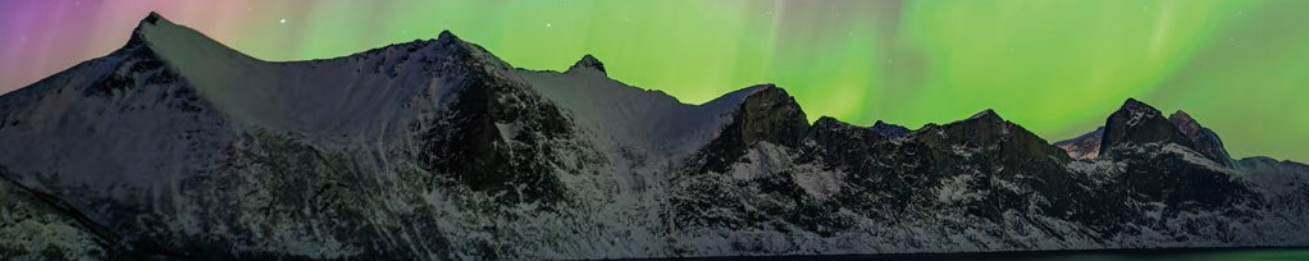


THAT'S SHOCKING!

ELECTRICITY IN NATURE



by Jenny Mason

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INTRODUCTION

NIGHT FLASHES

In 2024, neon green and pink ribbons danced across night skies. You might know these glowing auroras as the Northern Lights. Normally, they appear near Earth's poles. But in 2024 they stretched almost to the equator!



Auroras reveal the electricity that exists everywhere in the universe. It is inside stars, planets, plants, insects, animals, and even you! Discover how the energy that powers your video games is the same juice that pumps your heart!

WHAT'S THE BUZZ ON ELECTRICITY?

What is electricity?

Electricity is a natural force. It can be used to make light and heat or to make machines work.

Where does electricity come from?

Everything in the universe is made of super-tiny building blocks called **atoms**. Each atom has **protons**, **neutrons**, and **electrons**. Sometimes, electrons can move from one atom to the next. That movement creates electricity.

What's the difference between a conductor and an insulator?

Electricity moves through **conductors**. Conductors are materials that help electrons flow easily. Water and certain metals are conductors. **Insulators** slow or stop the flow of electrons. Wood, plastic, and rubber are insulators.

How is electricity measured?

Amps tell you how quickly the electrons are moving. Volts tell you how much pressure there is on the electrons. The energy of electricity can be put to work. The difficulty of the work is measured in watts.

$$\text{Watts} = \text{Amps} \times \text{Volts}$$

FLASH, FLICKER, GLOW

Lightning is probably nature's best-known electric display. But how do storms create electricity?

First, water, dust, and air particles swirl and collide to create **friction**. Normally, magnetism holds protons and electrons together. But this friction pulls them apart, building up an electric charge. Because electrons have the same negative charge, they repel each other.

Air is an insulator. For a while, it traps the electrons. When the charge grows too big for the air to hold, electrons burst out and leap to the nearest protons. The ground is naturally full of protons. The electrons form a bolt of lightning that usually connects to the ground.



FACT

Lightning can also form inside a cloud without escaping to the ground. Or it can pass between clouds as charged protons in one cloud attract charged electrons in another.

The Lightning Stone

Ancient people believed amber was magical. Amber is formed from fossilized tree sap. Rub it on fibers and it sparks. Or it can magnetically attract small objects. Electricity is named after an old word for amber: *elektron*.



Create a Lightning Storm

Make your own thunderstorm at home! You'll need an adult's help for this activity.

Supplies:

- a tack
- a disposable pie tin
- a pencil with an eraser
- a wool sock or cloth
- a Styrofoam plate
- a metal fork
- a light bulb

Steps:

1. Poke the tack up through the center of the pie tin. Press the pencil eraser onto the tack's point. Make sure the pencil stands straight up.
2. Rub the wool over the plate for several minutes to build up a charge. Set the pie tin on the plate. Use the pencil as a handle.
3. Turn off the lights. Slowly bring the fork to the edge of the pie tin. Listen for a zap and watch for the bolt! Next, try using the light bulb instead of the fork.
4. What happens when you rub the plate longer?

