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# Science

## Electricity

Everything electrical is powered by tiny electrons, the mini particles that whirl around atoms. In ancient times, no one really understood electricity or how it could be used. Now we know electricity is created when electrons gather together or zap from place to place. Electricity can help us do all kinds of things, from powering trains to catching criminals.

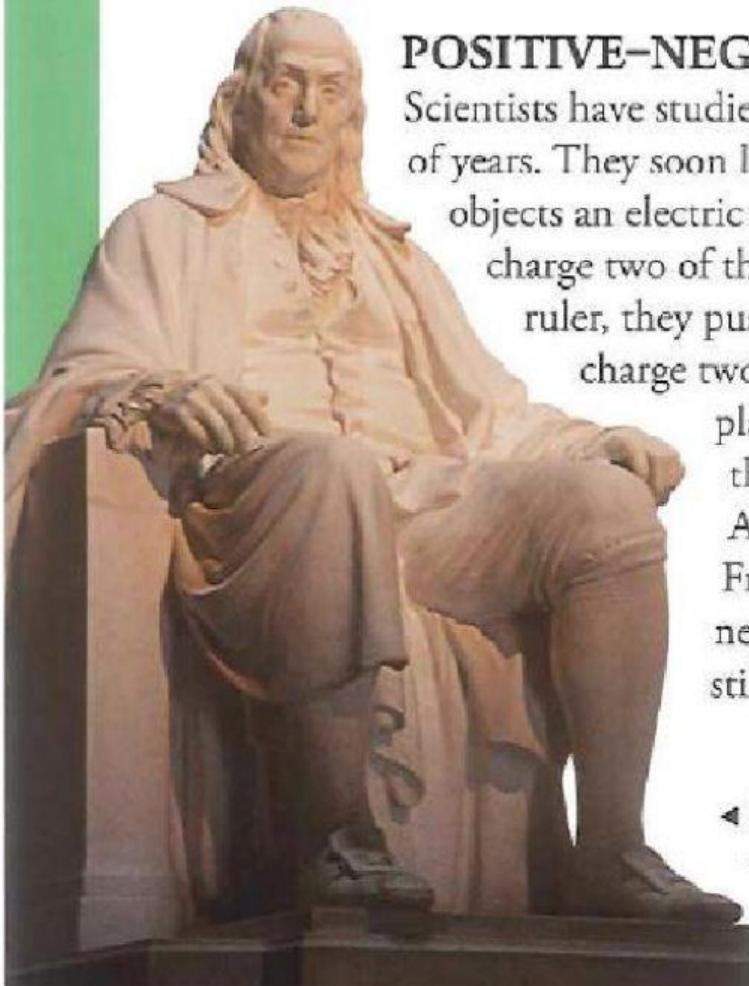
**Everything electrical is powered by tiny \_\_\_\_\_,  
the mini particles that whirl around \_\_\_\_\_.  
Electricity is created when \_\_\_\_\_ gather  
together or \_\_\_\_\_ from place to place.**

### WHAT IS ELECTRICITY?

Electricity is energy caused by electrons. When electrons gather in one place, they make static electricity (the kind that crackles in your jumper when you take it off). When electrons move about, they make current electricity. This is what powers things like vacuum cleaners and torches.



**In your own words – what do you think is electricity?**



## POSITIVE-NEGATIVE

Scientists have studied electricity for hundreds of years. They soon learned that you could give some objects an electric charge by rubbing them. If you charge two of the same object, such as a plastic ruler, they push away from each other. If you charge two different objects, such as a plastic ruler and a glass ruler, they pull towards each other. American scientist Benjamin Franklin called this positive and negative electrical charge, and we still use those labels today.

◀ BENJAMIN FRANKLIN *This American scientist studied electricity in the 18th century and made several important discoveries.*

## What is positive and negative electrical charge?

### CONDUCTORS AND INSULATORS

We use copper to make electrical wires because metals such as copper carry electricity very well. They are good conductors, which means electricity can go through them easily. Other materials, such as rubber and plastic, stop electricity going through. These are called insulators. Electrical wires are made of good conductors, but often have insulators wrapped around them to protect us from electric shocks. Semiconductors are substances that can conduct or block electricity at different times, making them useful in electronics.



Insulator



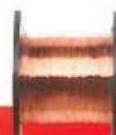
Wood



Semiconductor



Water

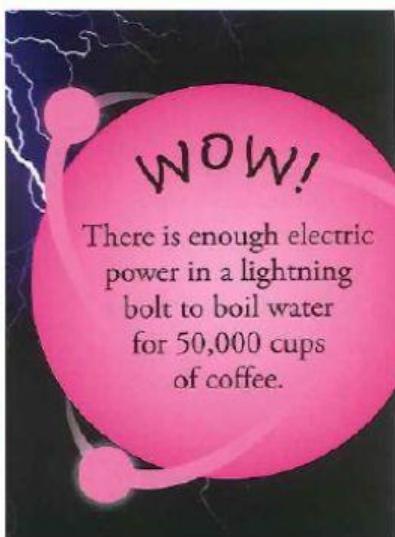


Conductor

## What is an insulator?

## What is a conductor?

## What is a semiconductor?



There is enough electric power in a lightning bolt to boil water for 50,000 cups of coffee.

### ELECTRIC FINGERPRINTS

When criminals leave fingerprints, they also leave electricity. Fingerprints contain proteins that have a positive electric charge. Detectives can find prints by sprinkling them with gold dust, which has a negative electric charge. The opposite charges attract, the gold sticks to the proteins, and the hidden fingerprints become visible.



► DUSTING FOR PRINTS *Forensic scientists (people who apply scientific knowledge to solve crimes) use the power of static electricity to find fingerprints hidden on everyday objects.*

## What do you remember?

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