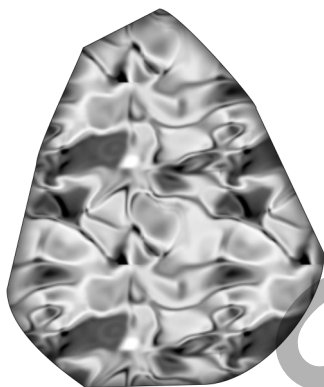
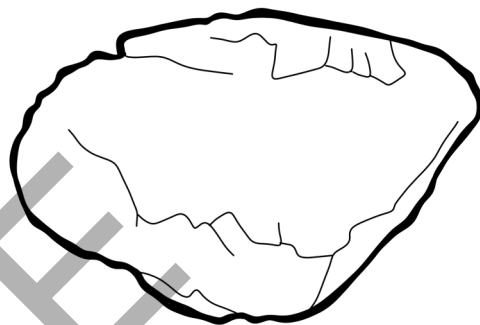


Electricity, Circuits & Safety

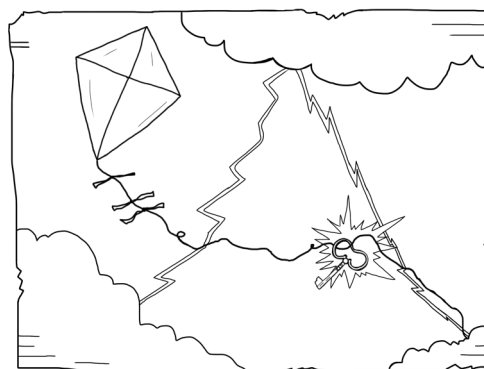
We're going to take a closer look at electricity in this unit, but before we get started, there's something we have to talk about. Electricity is a lot of fun to learn about, and I can't wait to dive in. But real electricity is very serious business. It's dangerous, and it can very easily hurt you or someone else if you don't handle it properly. It's very important that you never play with or experiment with electricity or anything that uses electricity without a parent or teacher telling you what is safe.

Are you ready to dive in? In order to learn about electricity, we need to learn about a few people who were key to helping us understand what electricity is and find ways to use it. When you think of people who taught us about electricity, you might think of Thomas Edison because of the incandescent light bulb. But people were learning about electricity as far back as ancient Greece. The Greek philosopher Thales, in the 500s BC, observed that if you rubbed a piece of amber with a cloth, it attracted small pieces of straw. What he was observing is what we call "static electricity" today.



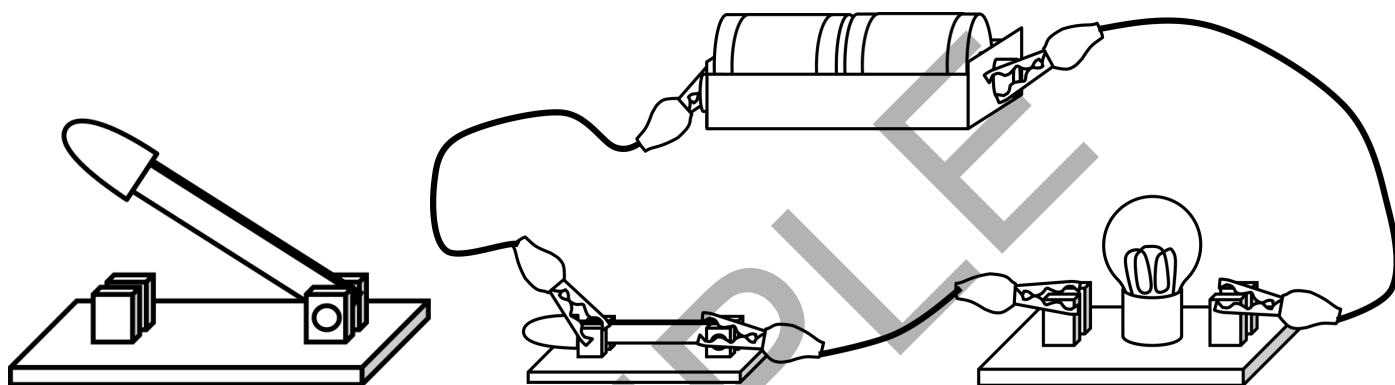
In 1551, Jerome Cardan, an Italian mathematician, observed that while amber attracted a variety of lightweight objects, loadstone, a magnetic black rock, attracted only iron. He was learning about magnetism, which can work with electricity under certain conditions.

Scientists continued to observe and study static electricity and magnetism, but Benjamin Franklin was one of the first scientists to conduct actual experiments with electricity—experiments that nearly killed him at least once. One of his most famous experiments was the one he conducted in 1752 when he flew a kite during a thunderstorm. He wanted to prove lightning was actually electricity, so he tied a key to the end of the kite string, and when the lightning struck wire on the kite, it traveled down the string and caused a spark at the key.



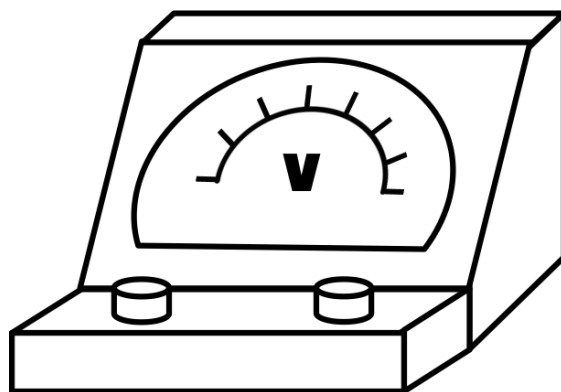
Static electricity is when electrons build up and then discharge (or “jump”) to something with a positive charge. A switch opens and closes a circuit. An open switch or an open circuit means the electricity cannot flow. The power is off. A closed switch or a closed circuit means the electricity can flow and the power is on.

A circuit is made up of at least three parts—a power source, a device, and wires. A series circuit has everything on one loop, so that the power goes the whole way through the circuit or cannot move through it at all. A parallel circuit has branches so that even if the electricity cannot move through the circuit one way, it can still make a complete loop by going another way.



Measuring things is an important part of a scientist’s work because it allows you to record what is happening with numbers that other people can understand. There are four important ways scientists measure electricity: amp, volt, ohm, and watt. There are also ways to control how much electricity can flow through a circuit.

The electrons in an atom form an electric field around the atom. The ability of this field to give energy is measured in **volts**, and a **voltmeter** measures voltage. Another way to explain volts is to say voltage measures the amount of force the electricity is traveling with through the circuit. Think of it as if you could give electricity a push like you would push a ball across the floor. If you push it gently, it has low voltage. If you push it as hard as you can, it has high voltage. Volts were given their name to honor Count Alessandro Volta and the work that he did studying electricity.



Terminology

Using what you learned, define these words in the best way you can. Use the back of the page if you need more room.

Conduct: _____

Voltaic pile: _____

Tesla coil: _____

Electricity: _____

Static electricity: _____

Conductors: _____

Insulators: _____

Electrical circuit: _____

Switch: _____

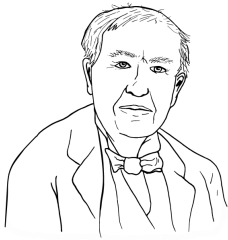
Closed circuit: _____

Open circuit: _____

Series circuit: _____

Parallel circuit: _____

Which of the following scientists discovered the electron? Draw a circle around him.



Thomas Alva Edison

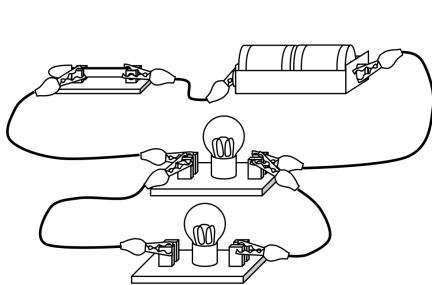


J.J. Thomson

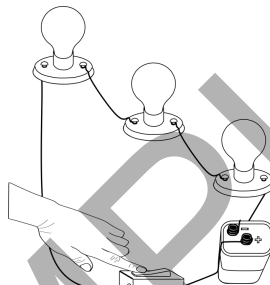


Benjamin Franklin

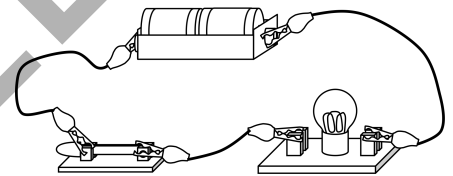
Which of the following is a parallel circuit? Draw a circle around it.



Circuit

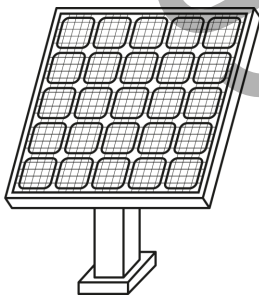


Circuit

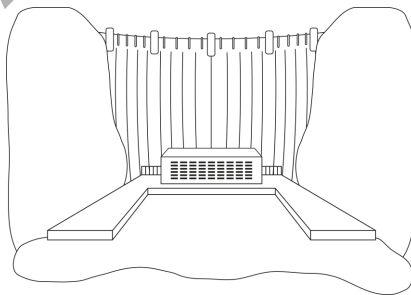


Circuit

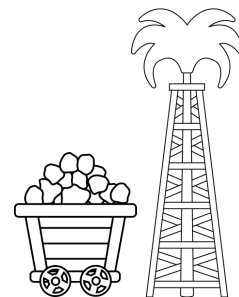
Which of the following ways of generating electricity depends mostly on water? Draw a circle around it.



Solar cell



Hydroelectric



Fossil fuels

What are three things you remember about electrical safety?

Review Answer Key

Draw a circle around the closed circuits. Draw an X over the open circuits.

