

Electricity is created by the flow or exchange of electrons from one atom to another.

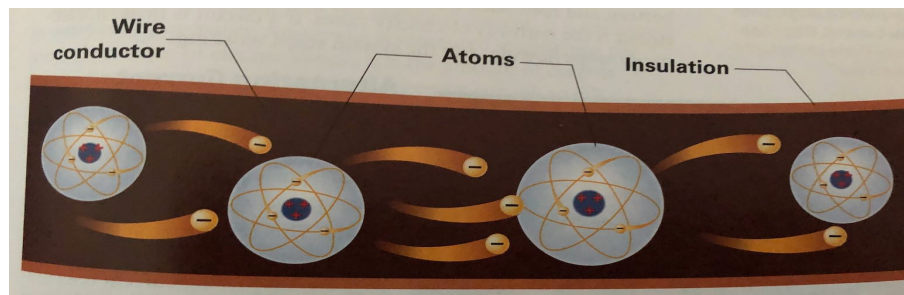
How do we create the electron exchange?

Chemically or mechanically

How do we harness the flow of electron exchange to create electricity?

We use elements that are conductive to the exchange of electrons to continue a flow of energy. Metals like Aluminum, Copper, Gold are good conductors of electricity because they have available electrons to exchange.

Wires are made out of conductive material.



There is a BrainPop assignment in Canvas

Bill Nye the Science Guy - S01E18 Electricity

What do fuel cells, batteries, and solar cells have in common?

They are all sources of direct current

What type electricity comes from an outlet?

alternating current

How does alternating current differ from direct current?

Direct current always flows in the same direction; the direction of an alternating current switches back and forth

How does electricity travel from power plants to your house?

transmission wires

What is the function of every generator on Earth?

Changing mechanical energy into electrical energy

How does a generator create current?

By using an electromagnet

What is the order of events for electricity to reach your homes?

A) Voltage is increased by a transformer; B) Voltage is decreased by a transformer; C) Electrical current enters your home

What resources are used to create mechanical energy?

Fossils fuels, Nuclear Fission, Wind, Moving water (Hydropower), The heat of the Earth (geothermal), Sun,

What is the main function of a turbine?

Spinning *create a mechanical motion*

What is one possible reason why it's a good idea to conserve electricity?

Electricity is often produced by burning fossil fuels, which are a polluting, non-renewable resource.

Electrical Flow- Voltage, Amperage, & Resistance

Georg Ohm- discovered that the current flow of electricity through a conductor is directly proportional to the voltage and inversely proportional to the resistance. This is now known as Ohm's law and the physical unit of electrical resistance is known as an ohm.

Voltage (E or V)- is the amount of potential force in a circuit. It can be thought of as available pressure that move through circuit.

Amperage (A)- Current or flow rate. Amperes are a unit of measure that counts the number of electrons flowing through a circuit per second.

Resistance (R or Ω)- Anything that opposes or slows the flow of electrons (electricity). Resistance comes in the form of a load, where work is done, or through a material that resists the flow of electrons.

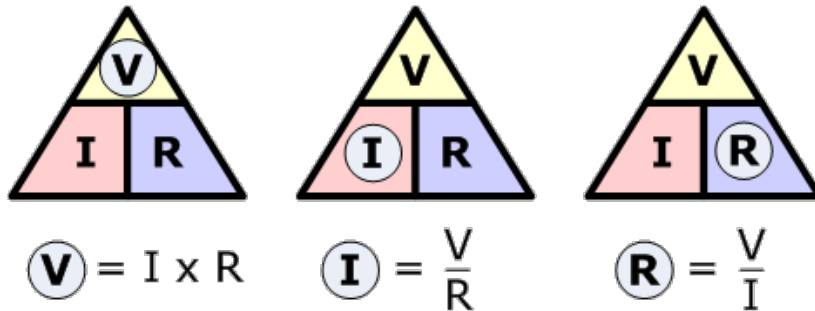
Ohm's Law- is the mathematical formula that is used to determine the Voltage, Amperage, or resistance of an electric circuit.

Current = Voltage / Resistance Voltage = Amps x Resistance

What are the parts of electrical flow? How do we analyze electricity? Who discovered it?

Relationship between Volts, Amps, and resistance is: as Voltage goes up amps go up, If Resistance goes up Amps go down. How else can you phrase this?

Ohm's Law



If you have a 12 volt battery flowing through a circuit at 3 amperes how much resistance is in the circuit?

$$4\Omega R = 12V / 3A$$

If there are 10 Volts across a 5 Ohm resistor, what is the current?

If there are 40 Volts and 5 Amps running through an electrical circuit, what is the resistance of the circuit?

If there are 7 Amps running through a 3 Ohm resistor, what will the voltage be across the resistor?

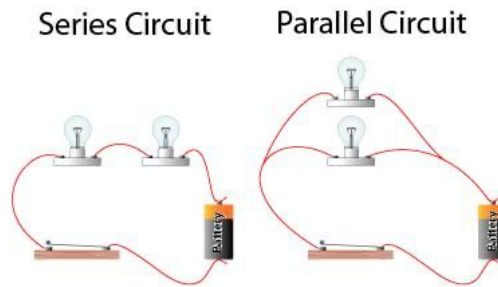
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Electrical Circuits

What is a circuit?

A circuit is the pathway electrons flow through. Going from negative to positive. The circuit consists of a power source, a conductor, and a load.

Series Circuits A single pathway with the load placed along a single electrical path.



Parallel Circuits The loads placed along separate pathways. If one component fails the flow of electrons will continue on the other path.

What is a Series Circuit? Example?

What is a Parallel Circuit? Example?

How is hydroelectric power generated?

When organic material is used as an energy source, it is referred to as?

Which of the following is an example of a renewable resource?

What do we call the act of making better use of energy?

What force causes electrons to flow?

Why is static electricity not useful as a power source?

How does alternating current differ from direct current?

What do fuel cells, batteries, and solar cells have in common?

If there is no battery in a circuit how can power be generated?

Which device is used to open and close an electrical circuit?

What could happen if a live electrical wire is missing an insulator? Example the wire from a television.

A simple circuit consists of a power source, a conductor, and

Which of the following is an example of a load?

In a correctly wired outlet which slot is the "hot" wire connected to (the line where the flow of electrons is coming from)

Inside modern homes how is electricity sent to different appliances (ovens, microwaves, refrigerators... etc.) and rooms?

- What are the two types of energy that are converted to directly electrical energy and how?
- What are the sources of alternative energy?
 - > Give examples of each.
- Why should the world switch to alternative fuels?
- What is the reason for conserving electricity
- What combination of energy generating sources would you use if you were redesigning Long Island's energy grid?
- What is Ohm's law?
 - > What formula states the law mathematically?
 - > Using Ohm's law, calculate the rate of current flow through a 120-volt circuit with a resistance of 20 ohms.
 - > Rewrite the formula to solve for resistance.

Answer the main question and subparts. If you can not make a drawing in this reply then use a google doc or other drawing tool to create the sketches required. You may also sketch on paper capture the image and attach it in the response.

- What is the difference between a series circuit and a parallel circuit?
 - > In the response make a drawing of a series circuit. Show the power source and show one lightbulb in each path of current flow.
 - > In the response make a drawing of a parallel circuit. Show the power source and show one workload in each path of current flow.
- What is electronics?
 - > What are semiconductors and how do they work?
 - > What are the two primary uses of transistors?
- Today's microchips are filled with millions of transistors giving the lots of speed and computing power. They've also continued to get smaller going from room size computers to computers that fit on your wrist.
 - > Will microchips continue to get smaller?
 - > Will they continue to get faster and more powerful?
 - > Which trend will end first and why?
 - > What is the next evolution of computer processors?