Electricity 1 - Electricity

Electricity defines the modern world. Precisely controlling electricity allows for computers to make millions of decisions every second.

Electricity is also one of the only forms of energy that can easily and efficiently be converted into other forms of energy. We can nearly perfectly go between mechanical electrical energy and can perfectly turn electrical energy into heat.

Electricity

Electricity is when we use the free electrons in conductors to do work. Electricity can ONLY flow when there is a complete path, or loop, for the electrons to travel. If at any point there is a non-conductor in the path (such as air) then no electricity can flow in that path.

Voltage is the force that moves electrons. This means that when a voltage is applied to a conductor, electrons move. Voltage is measured in volts, V.

Current is the flow of electrons. When a voltage is applied to a conductor and the electrons move, that is a current. Current is measured in amperes, A (one of the 7 fundamental units of the metric system).

Resistance is a measure of how good a conductor is.

- If a conductor is bad, then for a given voltage only a little current will flow.
- If a conductor is good, then for a given voltage a lot of current will flow.

Resistance is measured in ohms, Ω.

Ohm's Law is the relationship between voltage, current, and resistance.

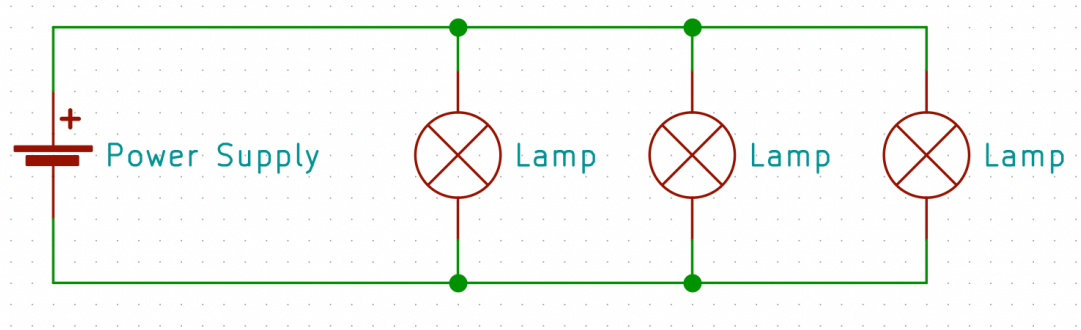
$$\text{Voltage} = \text{Current} \times \text{Resistance}$$

Notes continued on next page.

In general, every circuit can be broken down and analyzed combinations of parallel and series circuits.

Parallel Circuits

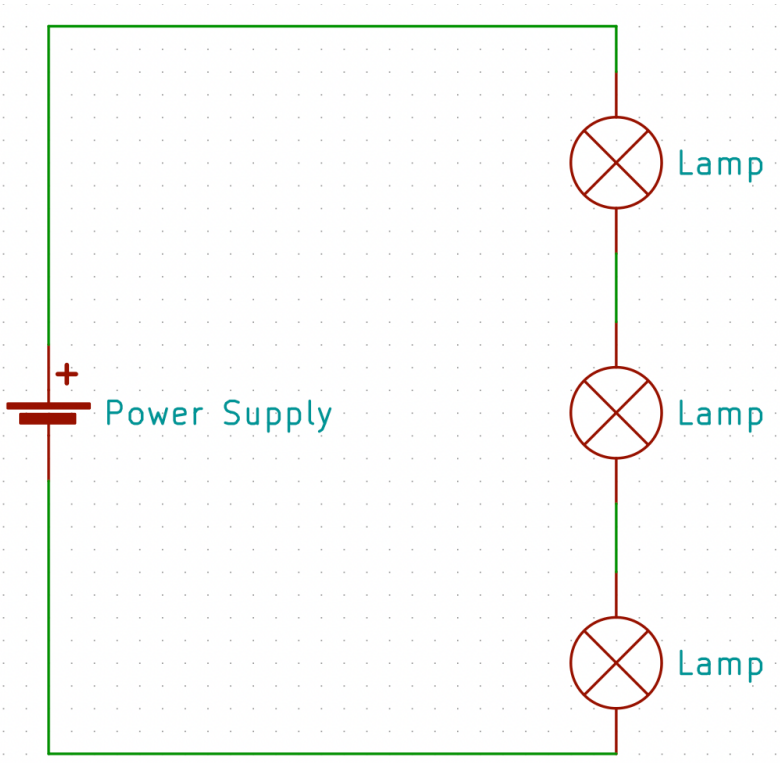
A parallel circuit is when the voltage is constant for all components. This is done because each component has a direct connection to the voltage source.



EACH END of EACH lamp is connected directly back to the power supply.

Series circuits

A series circuit is when the current is constant for all components. This is because the electrons have to flow through every componet.



There is only ONE loop for the electrons to flow, so the current must be constant everywhere in that loop.