

Electrical Resistance

Resistors are electrical devices that restrict the flow of electrons.



Resistors wired into a computer circuit board. Each resistor has a color code that indicates its resistance in ohms.

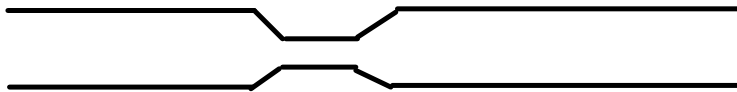
The resistance of a resistor is how much it restricts the flow of electrons.

Water analogy

Think about a tube with water flowing through it. This is like a wire with electrons flowing (i.e. with a current)

A resistor would be a constriction in the tube.

What would this constriction do to the flow of water?



Slows it down.
the water flows at the
same rate across the
entire tube.

This constriction will also cause a pressure differential.
There will be more pressure before the constriction
than after the restriction.



The pressure is what causes the water to flow. The greater the pressure, the greater the current. But also the greater the resistance the greater the change in pressure.

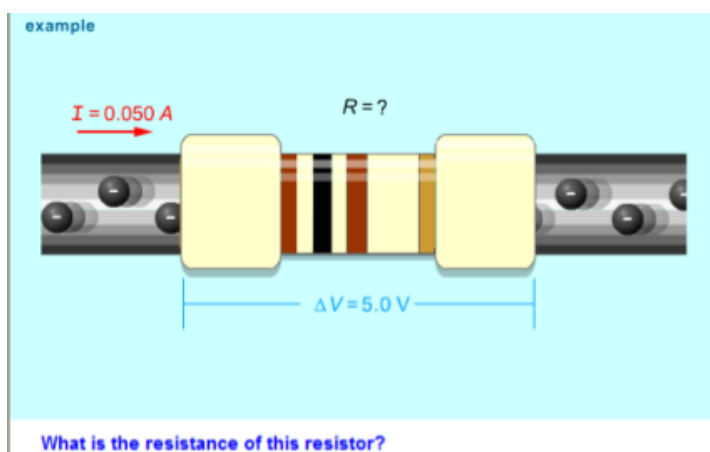
Back to electricity

The water pressure is a good analogy for electrical potential. Electrical potential is the potential for electrons to flow. Electrical Potential is also called VOLTAGE. As current passes through a resistor, it loses some Electrical Potential. We also call this a voltage drop, or the change in voltage.

Voltage, Resistance and Current are connected through OHM'S LAW.

$$\Delta V = IR$$

ΔV = Voltage is measured in Volts
 R = Resistance is measured in Ohms
 I = Current is measured in Coulombs



$$\Delta V = IR$$
$$5.0 \text{ V} = (0.050 \text{ A}) R$$
$$R = 100 \Omega$$

Resistors come in many forms

Nearly all electrical components have some resistance.

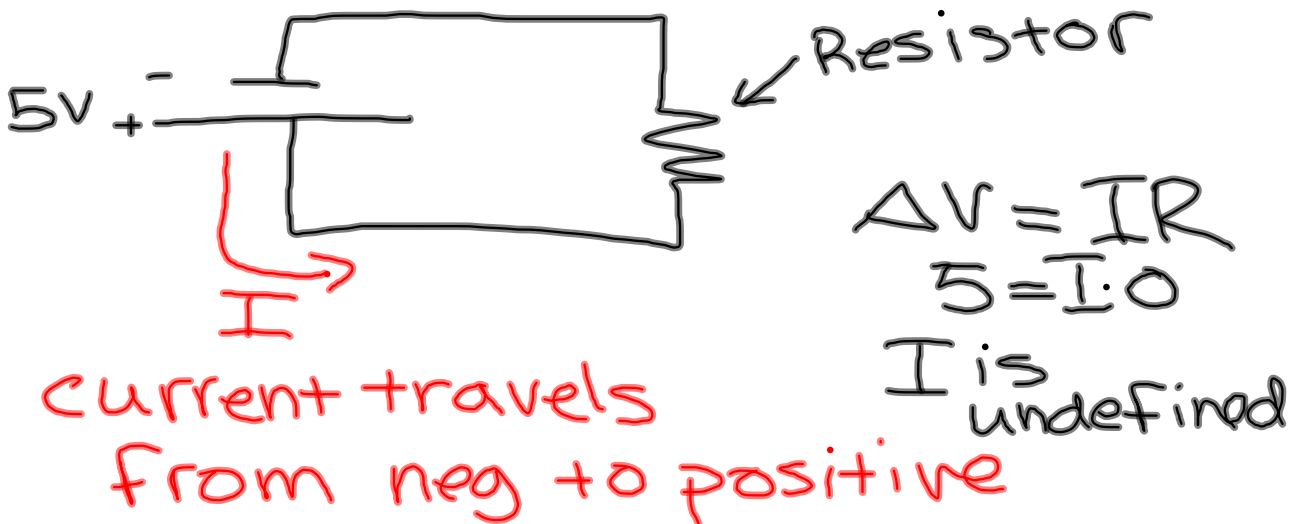
Resistance dissipates some energy generally through heat.
This is why computers get hot.

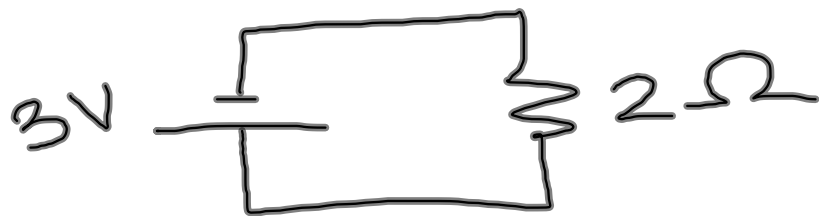
Batteries and other power sources

Batteries and other power sources create a potential difference. They add voltage into the circuit.

A battery is kinda like a water pump. It pumps water to the top of the system and then the water flows down till it reaches the ground.

In an electrical circuit a battery adds potential energy (voltage). This voltage is then lost to resistance as it flows through a circuit. In order to have a complete circuit with a current there must be both a voltage source and at least one resistor.





$$\Delta V = IR$$

$$3V = I(2\Omega)$$

$$I = 1.5A$$