Definitions of voltage, current, resistance

Voltage is provided by a battery. Voltage is measured in units of volts. **If the battery doesn't change, the total voltage doesn't change.**

Resistance is provided by a resistor, a lamp, or any electronic device. The units of resistance are ohms (Ω). **If the resistors don't change, the total resistance doesn't change.**

Current relates to the amount of charge flowing through a resistor. The units of current are amps.

Ohm's law states that voltage is equal to current multiplied by resistance: $V = IR$.

Resistors in series

Resistors are connected in series if they are connected in a single path.

The equivalent resistance of series resistors is the sum of all of the individual resistors.

Series resistors each carry the same current, which is equal to the total current through the circuit.

The voltage across series resistors is different for each, but adds to the voltage of the battery.

In Ohm's law, use the voltage of the battery with the equivalent resistance of the circuit; or, use the voltage across a single resistor with the resistance of a single resistor.

Resistors in parallel

Resistors are connected in parallel if the path for current divides, then comes immediately back together.

The equivalent resistance of parallel resistors is less than any individual resistor.

The voltage across parallel resistors is the same for each, and equal to the total voltage.

Parallel resistors each carry different currents, which add to the total current in the circuit.

The more resistors in parallel, the smaller the equivalent resistance.

Ammeters and Voltmeters

An ammeter measures current through a resistor. It is connected in series with a resistor.

A voltmeter measures voltage across a resistor. It is connected in parallel with a resistor.