Resistance	p. 279

Resistance : opposes the passage of electric current and changes electric energy into heat and light. A good resistor will force the electrons to give up a great deal of energy.
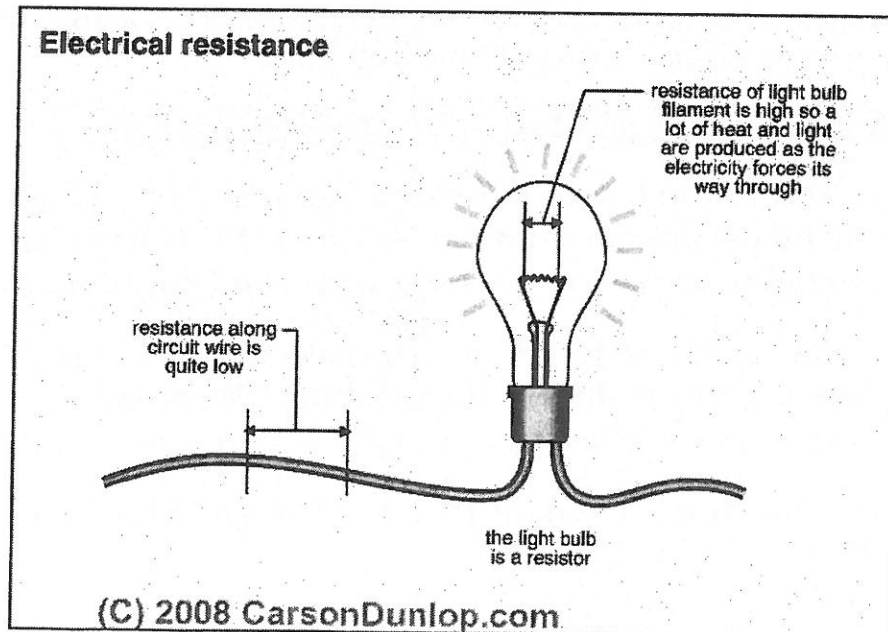
The light bulb in the circuits you built is a **resistor**. It resisted the flow of electrons 400x more than the connecting copper wire! This build up of electrons lit the bulb and heated it up. Heating coils of toasters and blow driers are resistors too!

• a **good** conductor (copper wire) has a **low** resistance
• a **poor** conductor (insulator) has a **high** resistance

In circuits resistors are used to control current or voltage. **Variable resistors** can control the amount of resistance ex. dimmers, volume (surge protectors) or temperature controls (thermostats).

☐ **Fill in the following using these words: heat, electrons (2x), light, conductors, move**

Current is the movement of _____ through _____ (wires), **voltage** makes the electrons _____, **resistors (loads)** oppose the motion of the _____. In resistors, the energy of the moving charge (electrons) is converted to other energies like _____ and _____ as it passes through the load.

Electrical resistance

resistance of light bulb filament is high so a lot of heat and light are produced as the electricity forces its way through

resistance along circuit wire is quite low

the light bulb is a resistor

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Complet "Designing Circuits" Problem Sheet.

The unit for resistance is the **ohm** (**Ω**) and it is measured with an ohmmeter or a **multimeter**.

Resistance affects both **current (I)** and **voltage (V)**. (Table 4.6 p. 281).

Ohm's Law:

$$R = \frac{V}{I} \qquad \text{resistance} = \frac{\text{voltage (potential difference)}}{\text{current}}$$

Units = volts/ampere = **ohms (Ω)**

Ohm's Law can be rearranged to calculate current (I) or voltage (V):

$$I = \frac{V}{R} \qquad\qquad V = RI$$

☐ **Draw and label Fig. 4.16 p. 281.** Note how the diagram shows how we measure voltage by attaching the leads of the voltmeter **ACROSS** the load or source, and we measure current by attaching the leads of the ammeter or galvanometer **INTO** the circuit.

☐ **Resistance Problems. Do model problem below, then #1 – 8 on "Resistance Problems" practice sheet.**

Practice Problem: What is the resistance of an electric heater, if a current of 12.5 A runs through it when it is connected to a 120V wall outlet?

☐ **Do Inv. 4-C   SERIES AND PARALLEL CIRCUITS , pg. 287.**

a)   Copy Table A and B onto notebook paper and fill in the "Predicted brightness" and the "Current (A)" column on each table using what you know about series and parallel circuits.

b)   Now: use the Phet site "Circuit Construction (DC only)" to test your predictions and fill in the columne "Observed brightness" and correct the current column if you need to.

c)   Answer questions 1-4, 6 for Part A: Series, and for Part B: Parallel.