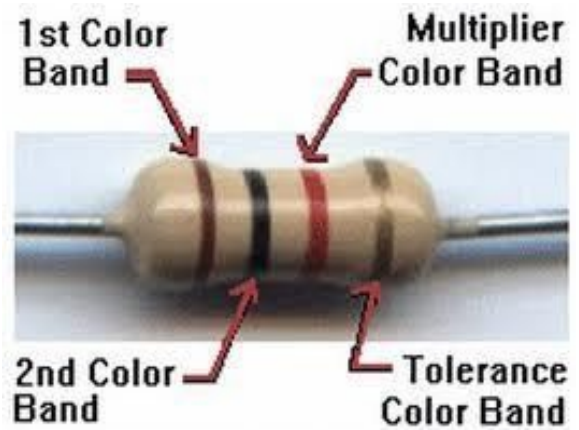


Applying Electronics - Lab 3 : Resistors In Series

A **resistor** is a passive two-terminal electrical component that implements electrical resistance as a circuit element. Resistors act to reduce current flow, and, at the same time, act to lower voltage levels within circuits. Resistors may have fixed resistances or variable resistances, such as those found in thermistors, varistors, trimmers, photoresistors and potentiometers.



The current through a resistor is in direct proportion to the voltage across the resistor's terminals. This relationship can be represented by Ohm's Law:

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

where I is the current through the conductor in units of amperes, V is the potential difference measured across the conductor in units of volts, and R is the resistance of the conductor in units of ohms (symbol: Ω)

Inventory

Using the inventory listed below, double check and isolate to make sure you have all the necessary parts before you go any further.

1 k Ω resistor (Brown, Black, Red, Gold)

1 k Ω resistor (Brown, Black, Red, Gold)

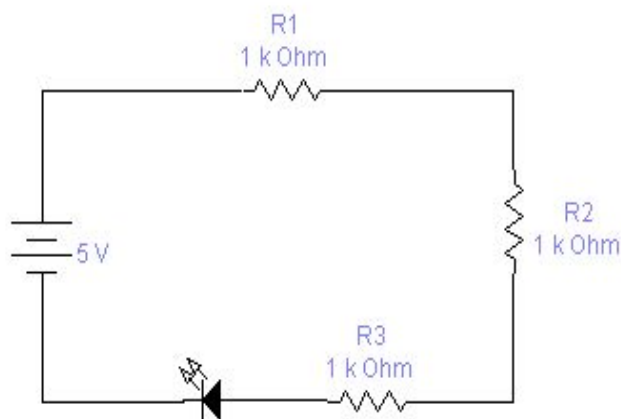
1 k Ω resistor (Brown, Black, Red, Gold)

Red LED

Battery and Build Circuit (Lab 1)

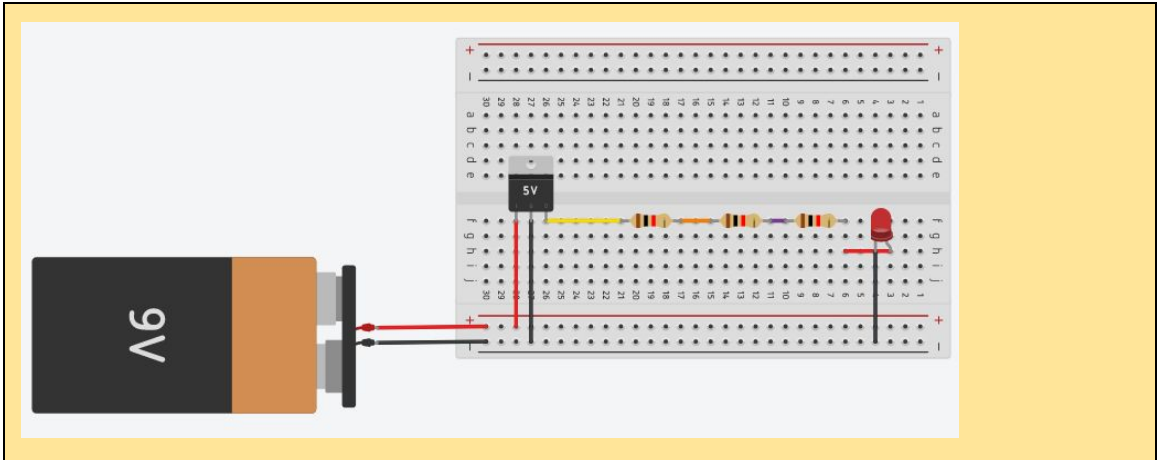
Using the schematic diagram (below), build the lab experiment with the electronic parts listed above.

Wire the circuit below in Tinkercad. Remember to use the regulator to use exactly 5 volts.



Paste your screenshot of the circuit working:

Applying Electronics - Lab 3 : Resistors In Series



Theory:

In this simple electronic circuit, the electrons flow from the battery through the LED, through 3 resistors and back to the battery. The total resistance in the circuit is the sum of all 3 resistors, or 3000 ohms. The formula is $\text{Total Resistance} = R_1 + R_2 + R_3 + \dots + R_n$

Use a virtual multimeter to measure the voltage drop across each resistor separately and then the total. Write the values and the sum below.

R1 1.06V R2 1.06V R3 1.06V R_T 3.18V

Use a virtual multimeter to measure the voltage drop across the LED.

LED: 1.83 volts

What is the total current for this circuit? You can use the voltage drop across the LED, you learned above, to help you solve this. Express your answer mathematically.

$$\begin{aligned} V_T &= 3.18 + 1.83 \\ V_T &= 5.01\text{V} \\ R_T &= 3000\Omega \\ I &= V/R \\ I &= 5.01/3000 \\ I &= 0.00167 \text{ or } 1.67 \text{ mA} \end{aligned}$$