

V = voltage (units: volts, V)

I = current (units: amps, A)

R = resistance (units: ohms, Ω)

$$\mathbf{V = IR}$$

Physics
Building Parallel Circuits

Name _____
Date _____

Objective – *To investigate the effects on current when resistors are connected in combination.*

Electric Circuit Sketch – *Draw the circuit you are to build by using the symbols for electric circuits.*

Procedures

1. Build the first part of the circuit by connecting the power supply, ammeter*, switch and **1 light bulb**.
* The analog ammeter should be connected at the 500 mA location.
2. Build the second part of the circuit by connecting the voltmeter in the appropriate location according to the circuit sketch above. Adjust the dial on the power supply so that approximately 3 V is running through the circuit. **This is to be held constant at 3 V for the duration of the lab.**
3. Record the value of the total current from the analog ammeter. Record your observations of the light produced from 1 light bulb above the data table.
4. Move the voltmeter from the battery and record the voltage at the 1st bulb. Perform the following steps to determine the current at bulb 1 using the digital ammeter.
 - a) Remove the red probe from its current location ($V\Omega$) on the meter to the spot that reads **mA**.
 - b) Switch the dial to 200 mA.
 - c) Remove the wire connection for the 1st bulb where it enters the bulb.
 - d) Clamp this removed wire to the red probe of the digital ammeter.
 - e) Touch the black probe of the digital ammeter to the empty metal position on the 1st bulb.
 - f) Record the value for current (remember to use A) in the data table.
 - g) Remove the ammeter and reconnect the circuit.
 - h) Switch the probe back to its initial position ($V\Omega$) and change the dial to 20 V.
5. Connect a 2nd light bulb parallel to the 1st light bulb according to the diagram above. Record the value of the total current. Record your observations of the light produced above the data table.
6. Record the voltage at the 1st and 2nd bulbs. Determine the current (I_1 and I_2) at each light bulb following steps a-h from question 4.
7. Connect a 3rd light bulb parallel to the 2nd light bulb according to the diagram above. Record the value of the total current. Record your observations of the light produced above the data table.
8. Record the voltage at the 1st, 2nd and 3rd bulbs. Determine the current (I_1 , I_2 , I_3) at each light bulb following steps a-h.
9. Unscrew one of the light bulbs and record what happens in the space below.

Data tables & questions on the following page

Light Observations

1st bulb

2nd bulb

3rd bulb

Data

No of Light Bulbs	V_{total} (V) 3 V Max	V_1 (V)	V_2 (V)	V_3 (V)	I_{total} (A)	I_1 (A)	I_2 (A)	I_3 (A)
1								
2								
3								

Post-lab Questions –

1. What happens to the brightness of the lights when more bulbs were added in parallel?
2. Explain why a light bulb that is unscrewed has no effect on the remaining bulbs in the circuit.
3. What happens to the total current when resistors are placed in parallel?
4. How do individual currents (I_1 , I_2 and I_3) compare with the total current? Try adding the values together as you compare.
5. How does the voltage observed at each resistor (V_1 , V_2 and V_3) compare with the total voltage?