

Notes Part 2: Ohm's Law, and a brief introduction to Series Circuits and Parallel Circuits

1. Define the following terms. Give their units and symbols.

Voltage: The "pressure" that pushes charge
Volts through a circuit.
(V) symbol and units

Current: Amperes or "Amps" (A); The amount
of flow in an electric circuit
symbol is "I" units

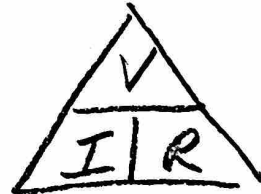
Resistance: Ohms (Ω), Symbol = R
units

Anything that resists (slows down) flow
through a circuit

2. The terms above are related by an equation known as Ohm's Law. Write Ohm's Law.

$$V = IR$$

↑ Voltage ↑ Current ← Resistance



3. If a circuit has a resistance of 5Ω and $3A$ of current is running through the circuit, what is the circuit's voltage?

$$V = IR$$
$$V = (3A)(5\Omega) = 15V$$

4. How much current runs through a circuit with a voltage of $20V$ and a resistance of 4Ω ?

$$I = \frac{V}{R}$$
$$I = \frac{20V}{4\Omega} = 5A$$

5. How much resistance is in a circuit if the voltage is 12V and there are 6A of current running through the circuit?

$$\frac{V}{IR}$$

$$R = \frac{V}{I} \quad R = \frac{12V}{6A} = 2\Omega$$

6. Write Ohm's law in a way that shows what is happening in a circuit when...

- a. Voltage is kept the same, but resistance is decreased.

$$V = IR \Rightarrow V = I R$$

- b. Voltage is kept the same, but current decreases.

$$V = IR \Rightarrow V = I R$$

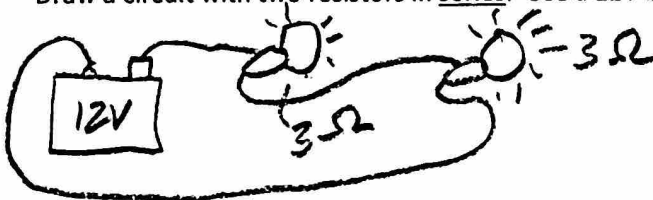
- c. Current increases, but resistance is kept constant.

$$V = IR \quad V = I R$$

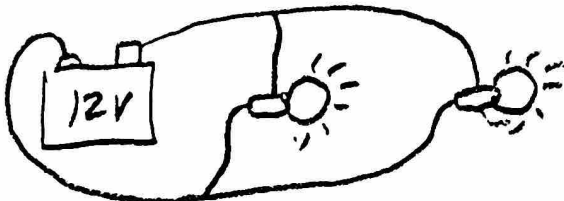
- d. Resistance decreases, but current is kept constant.

$$V = IR \quad V = I R$$

7. Draw a circuit with two resistors in series. Use a 12V battery and two 3Ω light bulbs.



8. Draw a circuit with two resistors in parallel. Use a 12V battery and two 3Ω light bulbs.



9. Which of the above types of circuits is more common in household wiring? Why?

Parallel. If you unscrew one bulb in a parallel circuit, the other bulb still works. (But not in series)