Name: _____

Wire Resistance and Ohm's Law PhET MiniLab

Ohm's Law

Introduction: When an electrical potential exists in a circuit, a current may flow. Current is the flow of electrons in a circuit. Resistance in the circuit slows the flow of the electrons, reducing the current in the circuit. We will use the mathematical form of Ohm's Law frequently when we investigate electric current and circuits later in this unit.

Additional Material Needed: Clean Drinking Straw

Procedure Part I Wire Resistance:

- Blow through the drinking straw.
- Cut the drinking straw in half and blow through a half-straw.
- Describe the effect of length on ease to blow air through the straw. _____
- Cut the halves again in half.
- With the four pieces, blow through one, then blow through all four made into a larger, square-shaped straw.
- Describe the effect of straw size (diameter) on ease to blow air through the straw. _____
- Now, open the PhET Simulation *Electricity, Magnets, and Circuits → Resistance in a Wire* Run Now!

As wire length (cm) increases, the resistance (Ω) _____

As wire area (cm^2) increases, the resistance (Ω) _____

As wire density (Ωcm) increases, the resistance (Ω) _____

Procedure Part II: Ohm's Law: Electricity, Magnets, and Circuits → Ohm's Law Run Now!

mA is milliamps, and _____ milliamps equals one Ampere.

- Move the potential (volts) and resistance (ohms) sliders and observe the current (amps)

As voltage increases, current _____.

As resistance increases, current _____.

Fill out the tables below and check your work in the simulation. (½ pt each)

- Remember, the simulation shows milliamps.
- You should show Amperes

V =	**I** *	**R**
8.0 V	**A**	800 Ω
2.0 V	.044 A	**Ω**
V	.0058 A	430 Ω
V	.069 A	100 Ω
6.4 V	**A**	300 Ω

Conclusion Questions: (½ pt each)

1. Incandescent light bulbs have a very thin filament that glows when hot. Thin filaments have very *high / low* resistance.
2. The 12V battery in your car operates a 25 amp car stereo. What is the resistance of this stereo system? _____
3. A "2D" Maglite flashlight runs on 3.0V. What is the current through the bulb if resistance is 15 Ω ? _____
4. How many volts must an iPod charger provide to charge an iPOD using .85 Amps at 35 Ω? _____
5. You need to buy a long extension cord to power a stereo at your spring break BBQ. You need 200feet. You have a 50 ft cord that will work. You rationalize that four such 50 ft cords will do the job. Is this a good idea? Why or Why not? _____