Name _____ # _____ Date _____

Section 279 280 281 (circle one) St. Mary's Physics

Series Circuit Lab

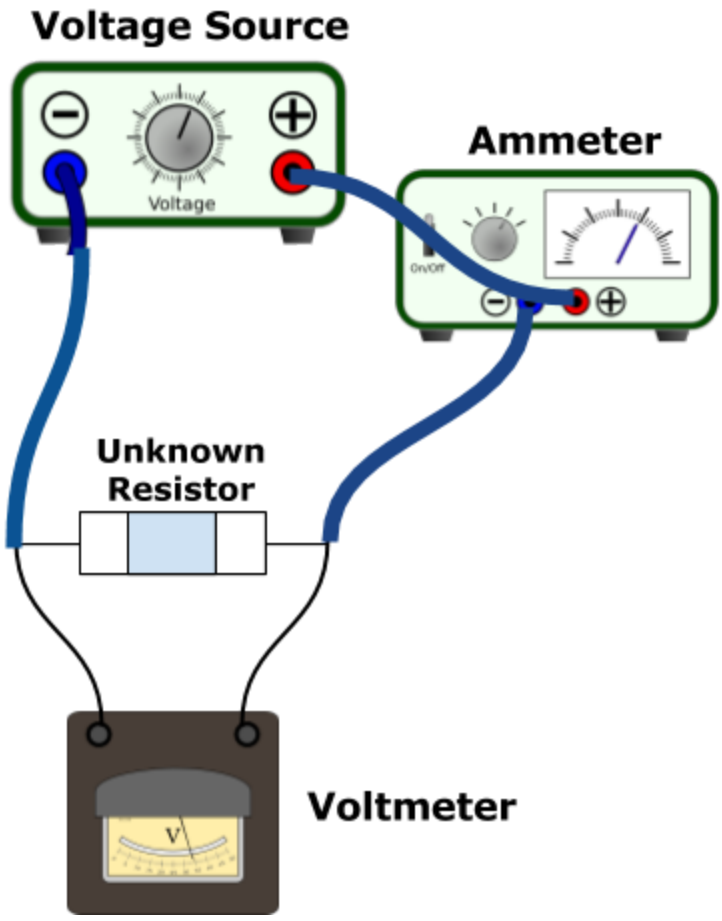
Assign a group member to one of the following roles:

- Recorder (Records data) _____
- Reader (Reads instructions and checks off each procedure upon completion)

  _____
- Circuit Constructor and Meter Reader _____

I. Constructing Series Circuit #1 - Unknown Resistor

Construct the series circuit below



Important: Reverse terminal connections if meter needle moves backward

Voltmeter - Read middle scale Ammeter - Read lower scale

Small divisions on Voltmeter = _____Small divisions on Ammeter = _____

Ohm's Law: Voltage = IR R = _____

(3 pts each)

Voltage (Volts)	**Measured Current** (Amps)	**Resistance** (Ohms)

Average Resistance Value: _____ ohms **(2 pts)**

Follow-up Questions

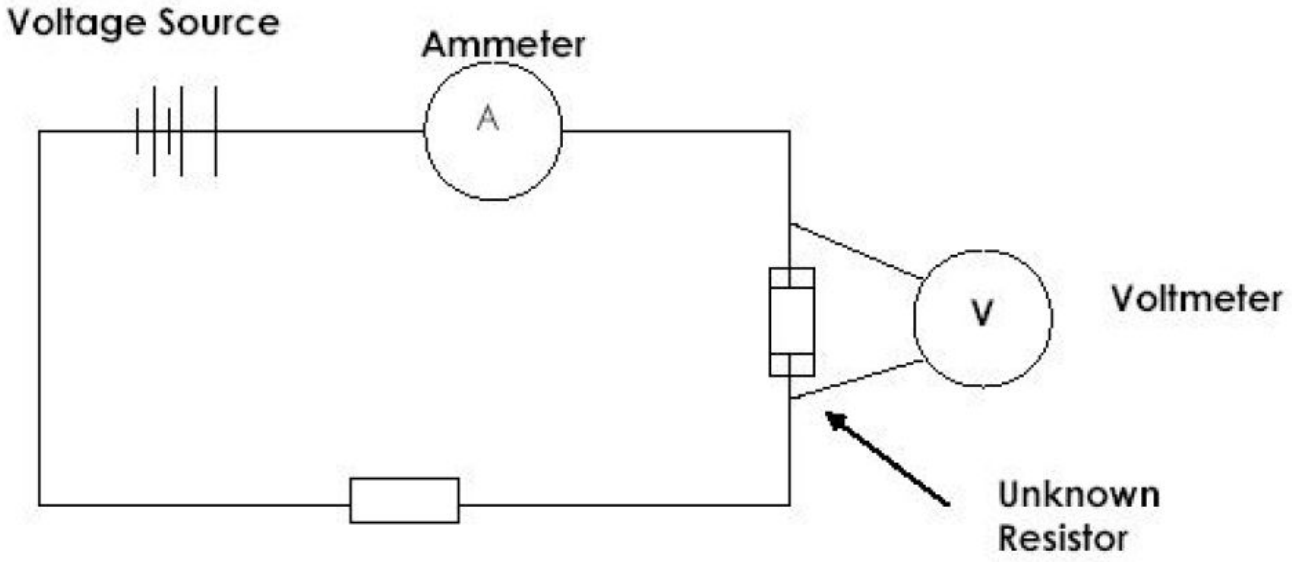
1. According to Ohm's Law, what is the mathematical relationship between voltage and current? **(4 pts)** *Direct?* *Direct Square?* *Inverse?* *Inverse Square?*

2. How much current would you have gotten if you could have raised your voltage to 12 V? Explain your answer using and equation. **(4 pts)**

3. If you plotted your Voltage versus Current data what do you predict the general shape of your plot would be? **(2 pts)** **Explain your answer (2 pts) Include a Sketch**

II. Constructing Series Circuit #2 – 2 Resistors in connected in series

What is the size of the resistance of your second resistor? _____



30 Ω Resistor

Look up the series circuit equations in your reference table. Write them below. **(4 pts)**

_____ _____

_____ _____

Current Readings (3 pts each)

Total Current (I_T) (amps)	**Unknown Resistor (I_1)** (amps)	**Current in 30 Ω Resistor** (I_2)(amps)

B. Voltage Readings

DON'T MEASURE THE TOTAL VOLTAGE WITH METER – USE A SERIES CIRCUIT EQUATION!

(4 pts each)

Measured Voltage in Unknown Resistor **(V_1)** (volts)	Measured Voltage in 30 ohm Resistor **(V_2)** (volts)	**(V_T)** (Use Equation from reference table) (volts)

C. Finding total resistance using 2 methods

Method #1 - Use $\mathbf{V_T = I_T R_T}$ to find R_T **(4 pts)** (Show all work)

Total Voltage from Source **(V_T)** (See Table Above)	Total Current from Source **(I_T)** (See previous page)	Total Resistance **(R_T)** (Calculate) (4 pts)

Method #2 - Use $\mathbf{R_T = R_1 + R_2}$ to find R_T **(4 pts)** (Show all work below)

Equation Substitution with units Answer with Units

1) If you added another resistor to this circuit, what effect would it have on the size of the total current? **(3 pts)**

a) Use a relevant equation to explain why **(6 pts)**

2) If the total voltage supplied to your circuit remained unchanged, how much resistance must be added to your circuit to achieve a total current of .1 amperes?

(Show all work) **(6 pts)**