Electric Pressure, Current and Resistance **Name:__________________**

Purpose:

The purpose of this activity is to determine the mathematical relationship between battery voltage (Δ**V**), current (**I**), and resistance (**R**) for a simple circuit.

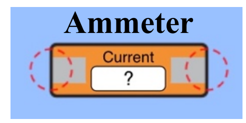
Getting Ready:

Navigate to the DC Circuit Builder Interactive at Tigerphysics.org → Unit 12 Electricity and Circuits

Observe the tools in the Toolbox region on the right side of the simulation. Experiment with these tools to create a circuit. Create a simple circuit with a battery, a light bulb, and wires. Once you connect 2 elements tap on the dashed circle that connects them and click on the scissors. This will break apart the elements.

Build, Measure, Analyze

1. Starting with a clear workspace.
2. Using the tools in the Toolbox area, create a simple circuit consisting of a single battery, a single bulb, a single switch, and a single ammeter (for measuring current in amps, pick the ammeter that connects to the circuit as show in the picture to the right), and wires.



3. If you click on the battery you can change the Electric Potential (Voltage) of the battery. Set the Electric Potential to 6.0 Volts.
4. Click Conventional for type of current to show.
5. The ammeter reads the current (**I**) in amps. Close the switch and Record the ammeter reading in Table 1. Repeat steps 2 and 3 until Table 1 is complete.
6. If you click on any part of the circuit like a battery, light bulb, or resistor you can change the properties of the item. You can increase the Electric Potential of batteries, or Resistance of Light Bulbs and Resistors. The resistance (**R**) of the light bulb is displayed when you click on it. Record this resistance value above Table 1. Then double the value of the light bulb's resistance and repeat the experiment for Table 2. Complete Table 3 with a resistance value that is three times as large.

Table 1		
R = _________ Ω		
#	**ΔV (Volts)**	**I (amps)**
1		
2		
3		
4		
5		
6		
Teacher Initials:		

Table 2		
R = _________ Ω		
#	**ΔV (Volts)**	**I (amps)**
7		
8		
9		
10		
11		
12		

Table 3		
R = _________ Ω		
#	**ΔV (Volts)**	**I (amps)**
13		
14		
15		
16		
17		
18		
Teacher Initials:		

For the following questions, make a **claim** (answer) and support it with **evidence** (reference to specific trials) and **reasoning** that explain why those specific trials support the claim.

7. Observe your data tables. What effect does a doubling of the battery voltage (Δ**V**) have upon the current (**I**)? (Be sure to use **claim-evidence-reasoning** format.)

8. What effect does a tripling of the battery voltage (Δ**V**) have upon the current (**I**)? (Be sure to use **claim-evidence-reasoning** format.)

9. What effect does a doubling of the resistance (**R**) have upon the current? (Remember: **CER**)

10. What effect does a tripling of the resistance (**R**) have upon the current? (Remember: **CER**)

Teacher Initials: _____________

11. Inspect your data and write an equation that relates the ΔV to the I and R values. Support your **claim** with **evidence** and **reasoning**.

12. Predict the missing values if the following trials were performed.

A. $\Delta V = 24$ V R = 10 Ω I = _______ A

B. $\Delta V = 12$ V R = 40 Ω I = _______ A

C. $\Delta V = 6$ V I = 4.0 A R = _______ Ω