## Physics Lab Instructions

Read and follow the steps to complete the investigation.
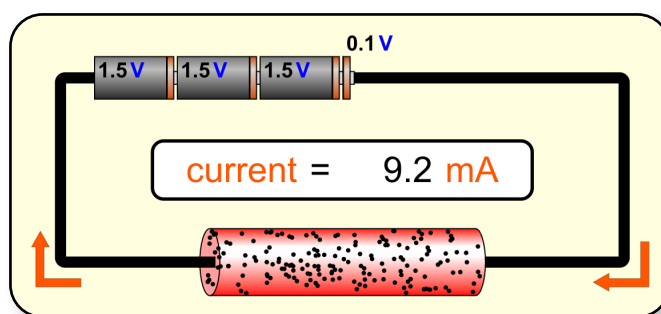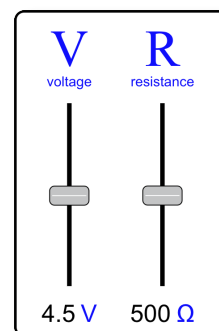
### Ohm's Law Online Lab

**Explore the Simulation**

The opening screen of the simulation shows the symbols for the three variables you will be studying. V stands for voltage, I stands for current, and R stands for resistance. The size of these letters in the equation represents the magnitude of each of the variables and can be used to show how the variables are related.

On the right side of the screen are sliders to regulate the voltage and the resistance. The default voltage is 4.5 V, and the default resistance is 500 Ω.

$$V = {}^{I} R$$

V — voltage   R — resistance

4.5 V   500 Ω

The circuit is shown on the lower left of the screen. The voltage is represented by the batteries shown on the top of the circuit. The resistance is represented by the red cylinder at the bottom of the circuit. The arrows show the direction the current flows, and the amount of current is shown in the middle of the circuit.



0.1 V   1.5 V   1.5 V   1.5 V

current = 9.2 mA

1. The default voltage is 4.5 V. Move the slider for voltage up and observe the changes in the circuit and the equation. Answer Questions 1 and 2 on your assignment worksheet.

2. Move the voltage slider back to 4.5 V and increase the resistance by moving the resistance slider up. Observe the changes in the circuit and the equation and answer Questions 3 and 4 on your assignment worksheet.

3. Move the sliders for voltage and resistance to produce the SMALLEST current possible. Answer Question 5 on your assignment worksheet.

4.  Move the sliders for voltage and resistance to produce the HIGHEST current possible. Answer Question 6 on your assignment worksheet.

**Quantitative Relationship Between Variables**

In this part of the investigation, you will observe the changes in the current when you keep the resistance the same and change the voltage.

1.  Set the resistance slider to 10 Ω. Set the voltage slider to 1.0 V and record the voltage and the current in the data table on Question 7 of your assignment worksheet.

2.  Move the voltage slider to 2.0 V and record the current in the data table on Question 7 of your assignment worksheet.

3.  Increase the voltage by 1.0 V increments and record the new current until the voltage reaches 5 V.

4.  Repeat Steps 1 – 3, but set the resistance to about 300 Ω. If you cannot get it to exactly 300 Ω, get it as close as possible. Record the data on the data table on Question 8 of your assignment worksheet.

5.  Repeat Steps 1 – 3, but set the resistance to about 700 Ω. Record the data on the data table on Question 9 of your assignment worksheet.

6.  Answer the conclusion question on Question 10 of your assignment worksheet.