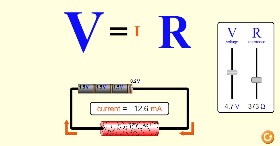
**Physics 360 Lab: Ohm’s Law**

Open the PhET simulation [Ohm’s Law](https://phet.colorado.edu/sims/html/ohms-law/latest/ohms-law_en.html) simulation.

[](https://phet.colorado.edu/sims/html/ohms-law/latest/ohms-law_en.html)

Move the resistance slider down to 100Ω. Keep the voltage at 4.5V. Record the current in the table below. Repeat up to 600Ω in increments of 100Ω.

|  |  |  |
| --- | --- | --- |
| Voltage (V) | Resistance (Ω) | Current (mA) |
| 4.5 | 100 | 45 |
| 4.5 | 200 | 22.5 |
| 4.5 | 300 | 15 |
| 4.5 | 400 | 11.3 |
| 4.5 | 500 | 9 |
| 4.5 | 600 | 7.5 |

What did the current do as the resistance increased? Is this consistent with Ohm’s Law?

Current decreased as resistance increased. Yes it is consistent with Ohm’s Law for constant voltage.

If we solve Ohm’s Law for current we get I = V/R. Use this equation to calculate the current for 4.5V and 200Ω. Show your work. Does your calculated answer agree with the value found in the simulation?

I=4.5/200 = 0.0225 A = 22.5 mA

Yes the calculated value agrees.

Reset the simulation so that the resistance returns to 500Ω. Leave the resistance at 500Ω and use the voltage slider to set the voltage at 1.0V. Record the value of the current in the table below. Increase the voltage up to 6.0V in increments of 1.0V and fill in the table.

|  |  |  |
| --- | --- | --- |
| Voltage (V) | Resistance(Ω) | Current (mA) |
| 1.0 | 500 | 2 |
| 2.0 | 500 | 4 |
| 3.0 | 500 | 6 |
| 4.0 | 500 | 8 |
| 5.0 | 500 | 10 |
| 6.0 | 500 | 12 |

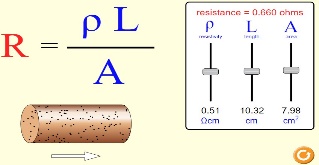
What did the current do as the resistance increased? Is this consistent with Ohm’s Law?

Current increased with increase in voltage with constant resistance. Yes it is consistent with Ohm’s law.

Use Ohm’s Law to calculate the current if 3.0V are dropped across a 500Ω resistor. Show your work. Does your calculated answer agree with the value found in the simulation?

I=3/500=0.006 A = 6mA

Open [Resistance in a Wire](https://phet.colorado.edu/sims/html/resistance-in-a-wire/latest/resistance-in-a-wire_en.html).

[](https://phet.colorado.edu/sims/html/resistance-in-a-wire/latest/resistance-in-a-wire_en.html)

Move the resistivity slider up and down. How does the resistance react? What can we say about the relationship between resistance and resistivity?

The resistance increases as we move resistivity slider up and resistance decreases as we move slider down. We can say that they are directly proportional.

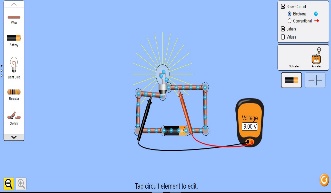
Move the length slider up and down. How does the resistance react? What can we say about the relationship between resistance and length? Why might this be the case?

The resistance increases as we move length slider up and resistance decreases as we move length slider down. We can say that they are directly proportional. Resistance increases as length increase as resistor act as series and resistance adds up in series.

Move the area slider up and down. How does the resistance react? What can we say about the relationship between resistance and area? Why might this be the case?

The resistance decreases as we move area slider up and resistance increases as we move area slider down. We can say that they are inversely proportional. Resistance decreases as area increase as more electrons can flow through increased area.

Open [Circuit Construction Kit DC](https://phet.colorado.edu/sims/html/circuit-construction-kit-dc/latest/circuit-construction-kit-dc_en.html).

[](https://phet.colorado.edu/sims/html/circuit-construction-kit-dc/latest/circuit-construction-kit-dc_en.html)

Build a simple circuit with a battery, light bulb (resistance) and wires.

Use the voltmeter to measure the voltage across the battery and then across the light bulb. What are the values? Are they equal?

The voltage across the battery and light bulb are 9 V. They are same.

Click on the light bulb to see its resistance. What is it?

The resistance is 10 ohm.

Using Ohm’s Law V = IR find the current in this circuit.

I=9/10=0.9 A

Grab the ammeter and measure the current in the circuit. Does this measurement agree with the calculation you did above?

Yes the current measurement is same.

Use the resistance slider to change the resistance of the light bulb to 20 Ω. What happens to the current?

Current becomes half to 0.45A.

Use Ohm’s Law to confirm that your calculated answer for the current agrees with the value found in the simulation. Show your work.

I =9/20 =0.45 A

Yes both values agrees.

Use the resistance slider to change the resistance of the light bulb to 5.0 Ω. What happens to the current?

The current increases to 1.8 A.

Use Ohm’s Law to confirm that your calculated answer for the current agrees with the value found in the simulation. Show your work.

I= 9 /5 =1.8 A

Yes both value agrees.