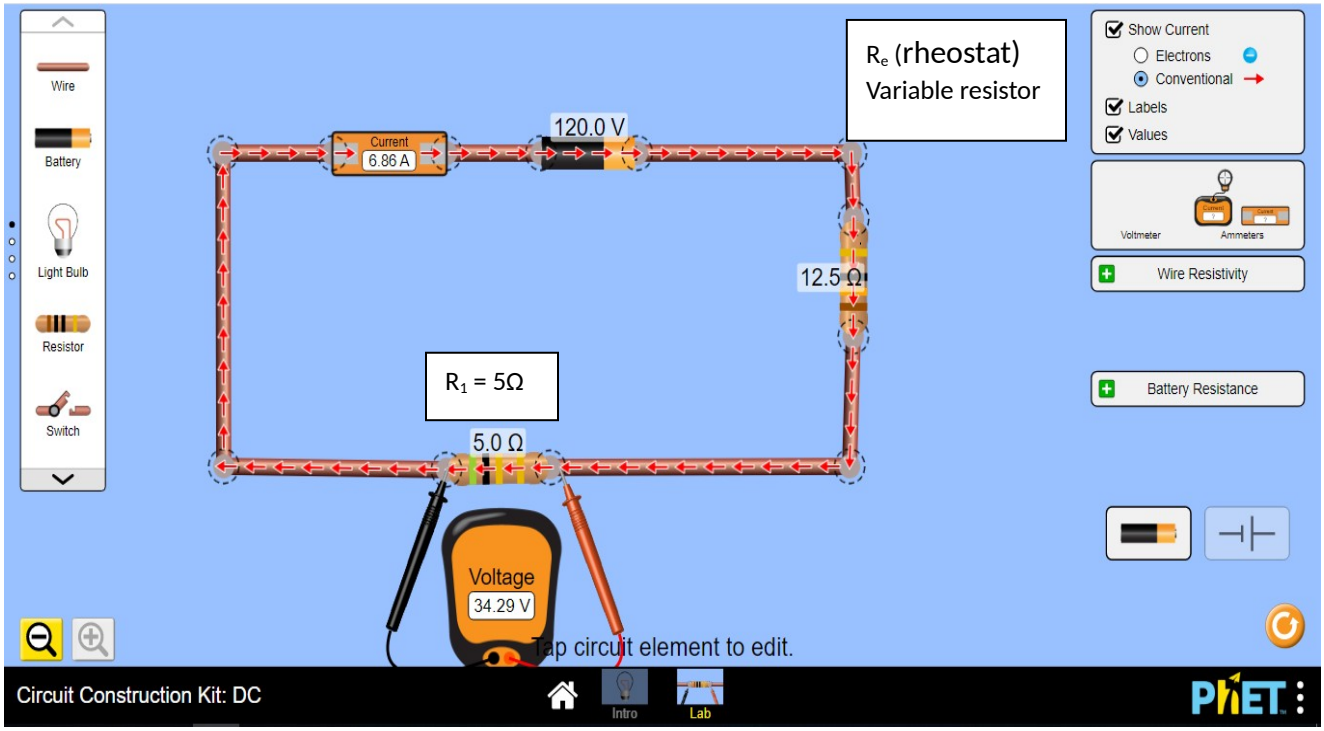
Ohm's Law

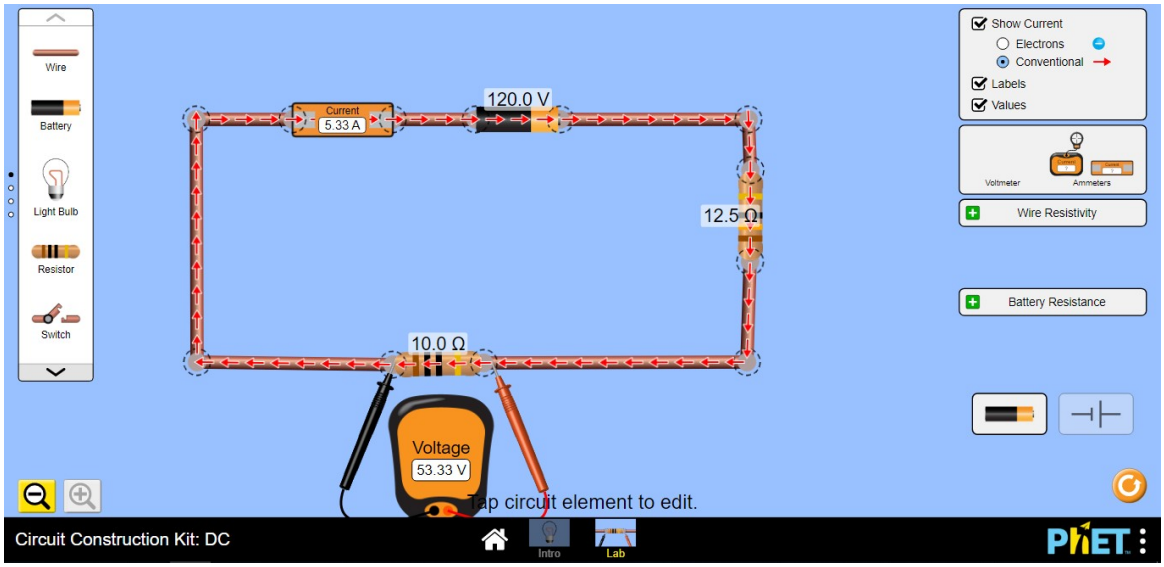
To do the experiment by using PHET interactive simulation follow the following steps:

1) Click on the following link from PHeT Colorado Simulation
   https://phet.colorado.edu/en/simulation/circuit-construction-kit-dc

2) Download Circuit Construction Kit: DC
3) Click on Lab
4) Choose Conventional Current
5) Use the components in the left side to build the circuit shown below:

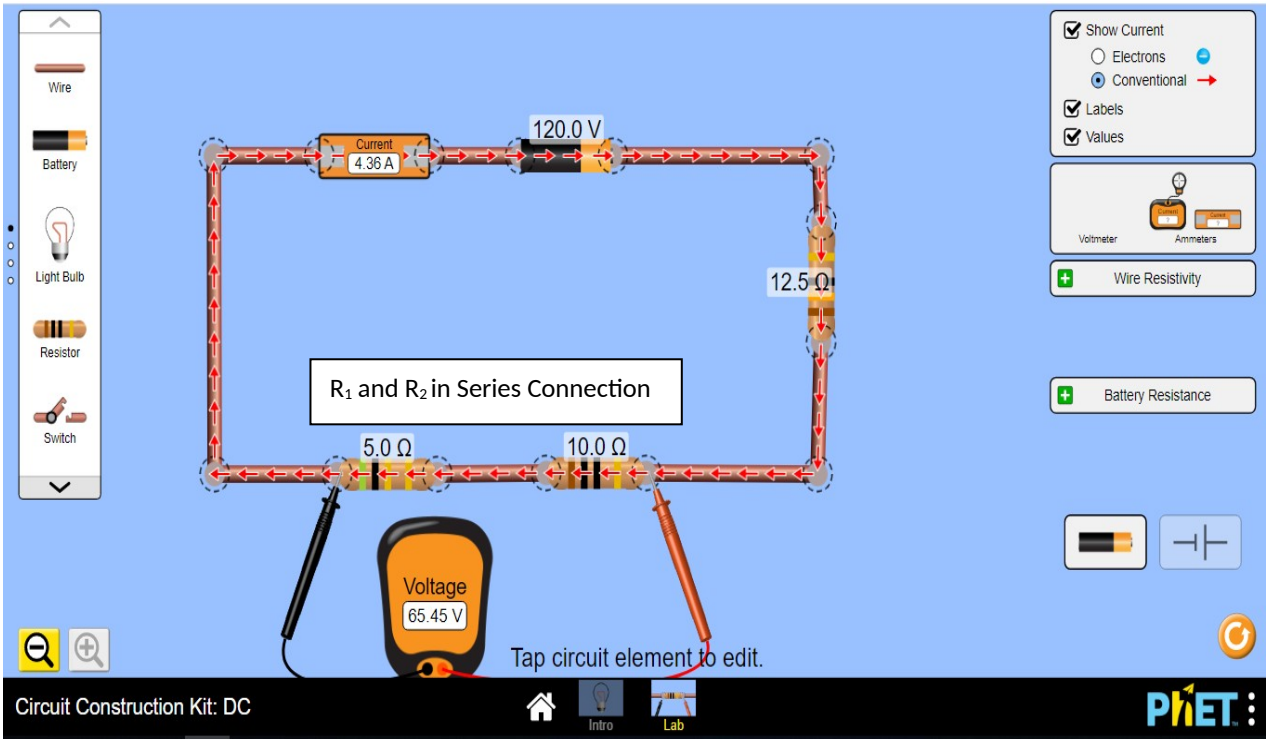


6) Click on the resistor (R_1) and fix it at 5Ω. That is R_1 = 5Ω.
7) Click on the Battery and fix it at 120V.
8) Click on the Voltmeter from the right side and drag it to measure (V_1) the voltage across R_1.
9) Click on the Ammeter from the right side and drag it and put it in series with R_1 (before or after R_1) to measure (I_1).
10) Vary the rheostat (R_e) to obtain 6 different readings of the electric current (I) and the corresponding values of the voltage (V). Then Record the values into table 1.
11) Replace R_1 by R_2=10Ω as shown below:

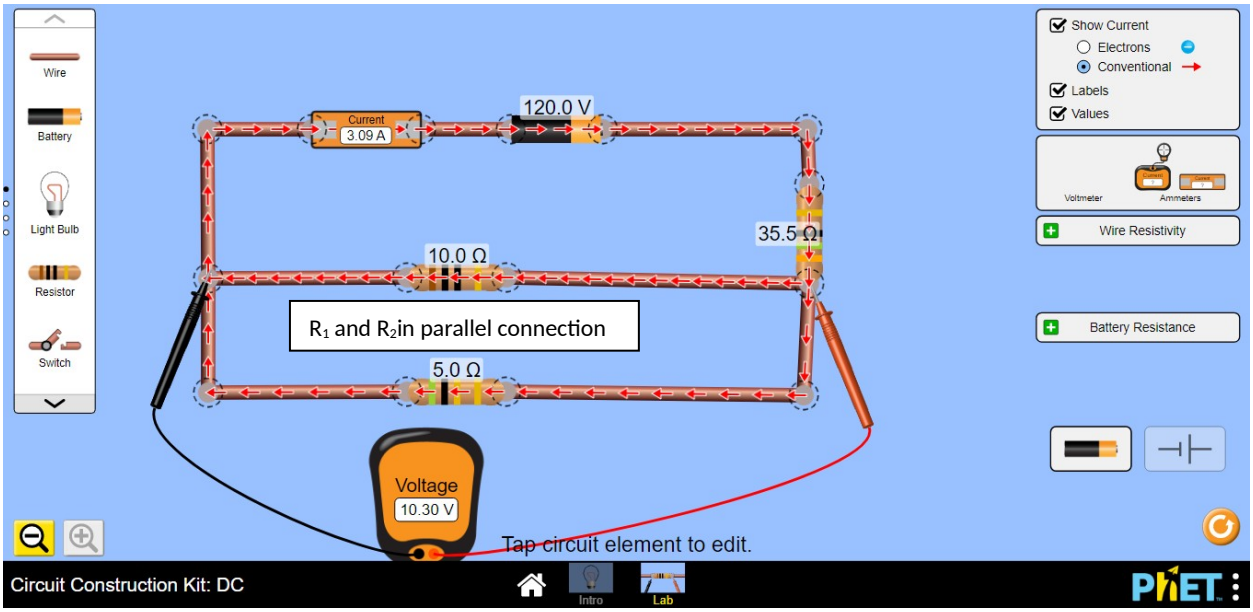


12) Again vary the rheostat (R_s) to obtain 6 different readings of the electric current (I) and the corresponding values of the voltage (V). Then Record the values into table 1.

13) Connect R_1=5Ω and R_2=10Ω in series as shown below, and again vary the rheostat (R_s) to obtain 6 different readings of the electric current (I) and the corresponding values of the voltage (V). Then Record the values into table 1.



14) Now connect R_1=5Ω and R_2=10Ω in parallel as shown below, and also vary the rheostat (R_e) to obtain 6 different readings of the electric current (I) and the corresponding values of the voltage (V). Then Record the values into table 1.



Note that the Voltmeter is always connected in parallel with the element while the Ammeter in series

Table (1)

R_1 (Ω)		R_2 (Ω)		Equivalent Resistance in series		Equivalent Resistance in parallel	
V(V)	I (A)	V(V)	I (A)	V(V)	I (A)	V(V)	I (A)

1- Plot a graph V versus I for each case?
2- Does the best straight lines passes through the origin? Explain.

3- Calculate the slope of each graph and determine the resistance (R) from the graph (slope) and experimentally? Record the results into table 2.

Table (2)

	Slope	**The experimental Resistance (Ω)**	**δ %**
Graph 1		R_1 experimentally =	
Graph 2		R_2 experimentally =	
Graph 3		R_{eq} experimentally =	
Graph 4		R_{eq} experimentally =	

4- What is the difference between Ohmic resistor and a Non-Ohmic resistor?

Ohmic:

Non-ohmic

5- When the potential difference, V, across an ohmic resistor is increased what effect does this have on:

a. The electric current (I)

b. The resistance (R)

Conclusions: