Simulation Lab: Resistance in Series and Parallel Circuits

Purpose: To determine the relationship between voltage drop and current in both parallel and series circuits.

Materials: Online simulation -
http://phet.colorado.edu/simulations/sims.php?sim=Circuit_Construction_Kit_DC_Only

Part A – Resistance in a Series Circuit

***** reminder $R_T = V_T/I_T$

1. Create a circuit with two resistors connected to a battery all in series.

Voltage (V)		Current (A)		Resistance (Ω)	
V_1	4.5	I_1	.45	R_1	10
V_2	4.5	I_2	.45	R_2	10
V_T	9	I_T	.45	R_T	20

2. Create a circuit with three resistors connected to a battery all in series.

Voltage (V)		Current (A)		Resistance (Ω)	
V_1	3	I_1	.3	R_1	10
V_2	3	I_2	.3	R_2	10
V_3	3	I_3	.3	R_3	10
V_T	9	I_T	.3	R_T	30

Part B – Resistance in a Parallel Circuit

1. Create a circuit with two resistors connected in parallel to a battery.

Voltage (V)		Current (A)		Resistance (Ω)	
V_1	9	I_1	.9	R_1	10
V_2	9	I_2	.9	R_2	10
V_T	9	I_T	1.8	R_T	5

2. Create a circuit with three resistors connected in parallel to a battery.

Voltage (V)		Current (A)		Resistance (Ω)	
V_1	9	I_1	.9	R_1	10
V_2	9	I_2	.9	R_2	10
V_3	9	I_3	.9	R_3	10
V_T	9	I_T	2.7	R_T	3.3

Analysis:

1. As more resistors are added in <u>series</u> what happens to the <u>total resistance</u>?

total resistance increases

2. As more resistors are added in <u>parallel</u> what happens to the <u>total resistance</u>?

total resistance decreases