SNC 1DI

Date: _____

# Simulation Lab: 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: Series Circuits

1. Create a circuit with a battery and one light bulb. Complete the table below.

| Voltage (V) | | Current (A) | |
|---|---|---|---|
| $V_1$ | 9 | $I_1$ | 0.9 |
| $V_T$ | 9 | $I_T$ | 0.9 |

*Draw a circuit diagram.*

2. Create a circuit with a battery and two light bulbs connected in series. Complete the table below.

| Voltage (V) | | Current (A) | |
|---|---|---|---|
| $V_1$ | 4.5 | $I_1$ | .45 |
| $V_2$ | 4.5 | $I_2$ | .45 |
| $V_T$ | 9 | $I_T$ | .45 |

*Draw a circuit diagram.*

3. Create a circuit with a battery and three light bulbs connected in series. Complete the table below.

| Voltage (V) | | Current (A) | |
|---|---|---|---|
| $V_1$ | 3 | $I_1$ | .3 |
| $V_2$ | 3 | $I_2$ | .3 |
| $V_3$ | 3 | $I_3$ | .3 |
| $V_T$ | 9 | $I_T$ | .3 |

*Draw a circuit diagram.*

Analysis:

1. What happened to the brightness of the bulbs as they were added in series?

dimmer

2. If one light bulb were to go out, what would happen?

all go out

3. Summarize voltage in a series circuit.

$V_s = V_1 + V_2 + V_3 + \ldots$

4. Summarize current in a series circuit.

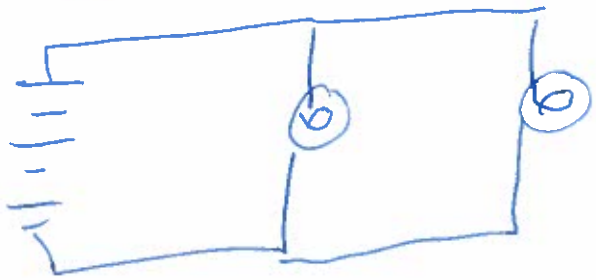
$I_s = I_1 = I_2 = I_3$

**Part B: Parallel Circuits**

1. Create a circuit with a battery and two light bulbs connected in parallel. Complete the table below.

| Voltage (V) | | Current (A) | |
|---|---|---|---|
| $V_1$ | 9 | $I_1$ | .9 |
| $V_2$ | 9 | $I_2$ | .9 |
| $V_T$ | 9 | $I_T$ | 1.8 |

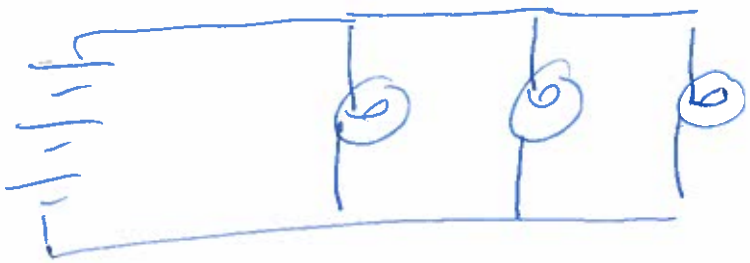
*Draw a circuit diagram.*



2. Create a circuit with a battery and three light bulbs connected in parallel. Complete the table below.

| Voltage (V) | | Current (A) | |
|---|---|---|---|
| $V_1$ | 9 | $I_1$ | .9 |
| $V_2$ | 9 | $I_2$ | .9 |
| $V_3$ | 9 | $I_3$ | .9 |
| $V_T$ | 9 | $I_T$ | 2.7 |

*Draw a circuit diagram.*



Analysis:

1. What happened to the brightness of the bulbs as they were added in parallel?

   stayed the same

2. If one light bulb were to go out, what would happen?

   others stay lit

3. Summarize voltage in a parallel circuit.

   $V_p = V_1 = V_2 = V_3 = \dots$

4. Summarize current in a parallel circuit.

   $I_p = I_1 + I_2 + I_3 + \dots$