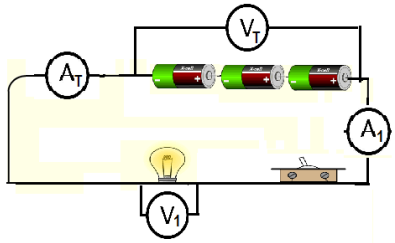
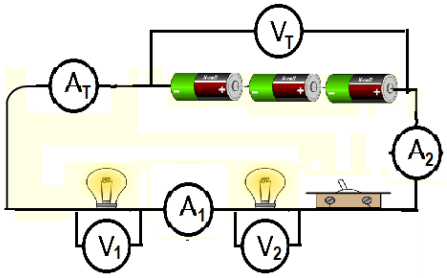
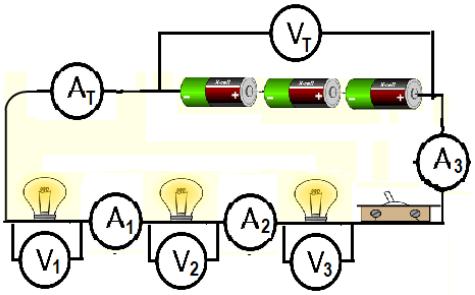
SNC 1D1 Name:_____

MEASURING VOLTAGE AND CURRENT

Question: How is the voltage and current affected as loads are added in series and parallel circuits?

Procedure:
Go to the website http://phet.colorado.edu/en/simulation/circuit-construction-kit-dc and build each of the circuits. Measure the voltage using the voltmeter and current using the ammeter in each of the circuits constructed and record your responses in the tables below.

TABLE 1: VOLTAGE and CURRENT for BULBS in SERIES

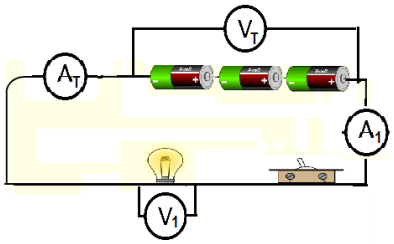
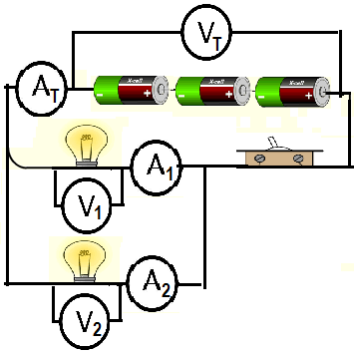
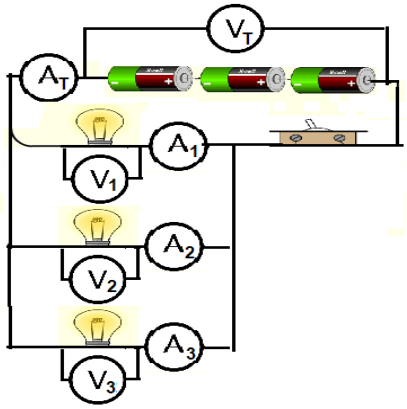
Pictorial Diagram of a Circuit	**Voltage (Volts)**	**Current (Amperes)**	**Bulb Brightness**
A single bulb 	V_T =	A_T =	Normal brightness compared to other circuits
	V_1 =	A_1 =	
Two bulbs 	V_T =	A_T =	_____ Brightness compared to a single bulb
	V_1 =	A_1 =	
	V_2 =	A_2 =	
Three bulbs 	V_T =	A_T =	_____ Brightness compared to a single bulb
	V_1 =	A_1 =	
	V_2 =	A_2 =	
	V_3 =	A_3 =	

Analysis and Conclusions:

Refer to **Table 1** to answer the **questions 1 - 6**.

1. In a series circuit containing **ONE light bulb**:
   a. Describe the brightness of the bulb._____
   b. How does the voltage drop across the light bulb compare to the voltage gain across the batteries? _____
   c. How does the current in the circuit compare to the current measured from the battery? _____
2. In a series circuit containing **TWO light bulbs**:
   a. Describe the brightness of the bulbs. _____
   b. How does the voltage drop across one light bulb compare to the voltage gain across the batteries? _____
   c. How does the current in the circuit compare to the current measured from the battery? _____
3. In a series circuit containing **THREE light bulbs**:
   a. Describe the brightness of the bulbs. _____
   b. How does the voltage drop across one light bulb compare to the voltage gain across the batteries? _____
   c. How does the current in the circuit compare to the current measured from the battery? _____
4. Finish the statement.
   Look at all three **SERIES** circuits, as more bulbs are connected in series,
   a. The brightness of each bulb _____.
   b. The size of the current measure from the battery _____.
   c. The number of paths for the current _____.
5. Finish the statement.
   In a series circuit, if one light bulb burns out,
   a. The current measured from the battery _____.
   b. The brightness of the other bulbs _____.
6. Finish the statement.
   a. Fuses are connected in _____ to the rest of the circuit, because if too much current flows, the fuse will stop the current.
   b. Switches are connected in _____ to what they control in the circuit.
   c. Ammeters are connected in _____ to what they are measuring the current through.

TABLE 2: VOLTAGE and CURRENT for BULBS in <u>PARALLEL</u>

Pictorial Diagram of a Circuit	**Voltage (Volts)**	**Current (Amperes)**	**Bulb Brightness**
A single bulb 	V_T =	A_T =	Normal brightness compared to other circuits
	V_1 =	A_1 =	
Two bulbs 	V_T =	A_T =	_____ Brightness compared to a single bulb
	V_1 =	A_1 =	
	V_2 =	A_2 =	
Three bulbs 	V_T =	A_T =	_____ Brightness compared to a single bulb
	V_1 =	A_1 =	
	V_2 =	A_2 =	
	V_3 =	A_3 =	

Analysis and Conclusions:

Refer to **Table 2** to answer the **questions 7 - 12**.

7. In a circuit containing **ONE light bulb**:
   a. Describe the brightness of the bulb._____
   b. How does the voltage drop across the light bulb compare to the voltage gain across the batteries? _____

   c. How does the current in the circuit compare to the current measured from the battery? _____

8. In a parallel circuit containing **TWO light bulbs**:
   a. Describe the brightness of the bulbs. _____

   b. How does the voltage drop across one light bulb compare to the voltage gain across the batteries? _____

   c. How does the current in each light bulb path compare to the current measured from the batteries?_____

9. In a parallel circuit containing **THREE light bulbs**:
   a. Describe the brightness of the bulbs. _____

   b. How does the voltage drop across one light bulb compare to the voltage gain across the batteries? _____

   c. How does the current in each light bulb path compare to the current measured from the batteries?_____

10. Finish the statement.
    Look at all **PARALLEL** circuits, as more bulbs are connected in parallel,
    a. The brightness of each bulb _____.
    b. The size of the current measured from the battery _____.
    c. The number of paths for the current _____.

11. Finish the statement.
    In a parallel circuit, if one light bulb burns out,
    a. The current measured from the battery _____.
    b. The brightness of the other bulbs _____.

12. Finish the statement. Voltmeters are connected in _____ to what they are measuring the voltage across.