SPH3U0 **Real Circuit Investigation** Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Learning Goal: We are learning to build series and parallel circuits and analyze basic circuit properties (current, voltage, resistance)**

**Success Criteria:**

**I can draw circuit diagrams representing the circuits I build and record voltage, resistance and current values.**

**I can use Ohm’s law to calculate bulb resistance.**

**I can draw conclusions based on my results.**

**Activity 1: Series Circuit with ONE Bulb**

1. Build a simple series circuit consisting of two batteries (in series), a light bulb and a switch. Close the switch to make sure current is flowing!
2. Add an ammeter to the circuit to measure current (I1). Measure the voltages across the batteries (Vsource) and across the bulb (V1).
3. Draw a circuit diagram and record the measured values for the current (**IT1**), battery voltage (**Vsourc**e) and bulb voltage (**V1**) on your diagram.
4. Make a note about the brightness of the bulb below your diagram.

**Activity 2: Series Circuit with TWO Bulbs**

1. Add **ONE** additional bulb to your circuit in series. Close the switch to make sure current is flowing.
2. Measure current in the new circuit (**IT2**). Measure the voltage across the batteries (**Vsource**) and across the bulbs (**V1,V2**, ).
3. Draw a circuit diagram and record the measured values for the current (**IT2**), battery voltage (**Vsourc**e) and bulb voltages (**V1,V2**) on your diagram.
4. Make a note about the brightness of the bulbs below your diagram.
5. Calculate the resistances R1 and R2 of your bulbs using Ohm’s Law.

**Activity 3: Parallel Circuit with TWO Bulbs**

1. Now change your circuit to make it a PARALLEL circuit with two branches. Add **ONE** additional bulb to your circuit. Close the switch to make sure current is flowing in each branch.
2. Measure total current in the new circuit (**IT3**) coming out of the batteries. Measure the voltage across the batteries (**Vsource**) and across the bulbs (**V1,V2**, ). Move the ammeter around to measure current in each branch (**I1,I2**).
3. Draw a circuit diagram and record the measured values for the total current current (**IT3**), battery voltage (**Vsourc**e), bulb voltages (**V1,V2** ) and branch currents (**I1,I2**). on your diagram.
4. Make a note of bulb brightness in this case.

**Summary:**

1. **Series Circuit Discussion:**
2. Discuss how the resistance across each bulb compares with the voltage across the bulb. Relate these results to the observed bulb brightness values.
3. Discuss how adding bulbs to the circuit impacted the total current in the circuit.
4. What was the most important thing you learned in this series circuit activity?
5. **Parallel Circuit Discussion:**
6. Discuss how the resistance across each bulb compares with the current flowing in each branch. How did the voltages in the branches compare? Relate these results to the observed bulb brightness values.
7. Discuss how adding bulbs to the circuit impacted the total current in the circuit.
8. What was the most important thing you learned in this parallel circuit activity?

**Real Circuit Investigation** **Rubric: Com:\_\_\_\_/12 marks App: \_\_\_\_/15 marks**

**[C]** Circuit Diagrams:

Circuit 1 0 1 2 3

Circuit 2 0 1 2 3

Circuit 3 0 1 2 3

Ammeter/Voltmeter & Measurements labelled 0 1 2 3

**[A]**Measurements & Ohm’s Law Calculations 0 1 2 3 4 5

(Appropriate Units, Accuracy and Precision)

**[A]**Summary Discussion for Series Circuit 0 1 2 3 4 5

**[A]**Summary Discussion for Parallel Circuit 0 1 2 3 4 5