Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ date \_\_\_\_\_\_\_\_\_\_\_\_ hour \_\_\_\_\_\_\_\_\_\_

Phet online simulation – Electric circuits (DC)

Log onto and run <https://phet.colorado.edu/en/simulation/circuit-construction-kit-dc>

As you go through the simulation, write your answer in the spaces below

**Create a circuit using one battery and one light bulb**

**Hit the play button at the bottom of the screen. You must do this every time you change something so the circuit is on**

**Click on the “non-contact ammeter” button on the right side.**

1. Does an ammeter measure voltage, current or resistance in a circuit? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What is the SI unit for this? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Move the ammeter over some of the wires in your circuit. What is your reading for the circuit you created? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. What type of circuit did you create? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Add one more bulb to this circuit.**

1. What is your amp reading now? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Complete the relationship statement: “As the number of bulbs in the circuit increases, the current \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.”
3. Complete the relationship statement: “As the number of bulbs increases in the circuit, the brightness of the bulbs \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_”

**Click on “Show Values” in the right panel.**

1. How much resistance is each bulb creating? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What would be the total resistance if you had 3 bulbs in this circuit? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Click on “Reset all” to clear the screen and start over**

**Create a circuit with one battery, one light bulb, and one resistor**

1. Use the non-contact ammeter to get a reading for this circuit. Record it here \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. How does this reading compare to the one you got in the first circuit you created? (Give values and do the math)

**Click on “Show values”**

1. What is the resistance reading of the resistor you added? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What is the total resistance in this circuit? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Predict what will happen if you add a second resistor to your circuit.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Add one more resistor**

1. Was your prediction (hypothesis) correct? Explain.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What is the ammeter reading with two resistors? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Predict what will happen if you add a second battery to your circuit

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Add a second battery to your circuit**

1. Was your prediction (hypothesis) correct? Explain.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What is your ammeter reading with the 2nd battery? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Click on “Reset all” to clear the screen and start over**

**Create a parallel circuit that has 2 branches using one battery and two light bulbs**

1. Put the non-contact ammeter by the battery to get the total current of your circuit Record here \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Make a sketch of the circuit you created here:
3. Put the non-contact ammeter on a wire in the 1st branch of your parallel circuit. Record Amps \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Put the non-contact ammeter on a wire of the 2nd branch of your parallel circuit. Record Amps \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. **\*Notice the total current in your circuit should equal the current from both branches. i.e. IB1 + IB2 = Total I (current). Did this happen in your circuit? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
6. Go back to your first circuit that used one battery and had two light bulbs. How does the current in your parallel circuit compare to the current in your earlier circuit? (Give the numbers and do the math)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What relationship exists between voltage and current? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What relationship exists between resistance and current? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Play around with the program and create two additional circuits that we have not already made. Draw and label your circuits below. Give the total current and resistance for each.**

**Circuit 1 Drawing:**

**Circuit 2 Drawing**