**PreAP Physics – Circuit Construction Kit (DC Circuits) PhET Lab**

Today, you will use the Circuit Construction Kit PhET lab to qualitatively explore series and parallel circuits.

**PreLab**

Draw a simple diagram for a series and parallel circuit below using your notes/homework.

|  |  |
| --- | --- |
| Series Circuit | Parallel Circuit |
|  |  |

**Beginning Observations**

1) Open the Circuit Construction Kit (DC Only) PhET simulation. What can you change about the simulation?

2) Build a simple circuit with a battery, wires, light bulb and voltage source. Draw it below.

|  |  |
| --- | --- |
| PhET diagram (draw what you see on the screen) | Circuit diagram (use symbols we have learned in class) |
|  |  |

3) What are the main differences between what you see on the screen and what you drew in your circuit diagram?

4) What flows through the wires when there is a closed circuit? What on the screen represents these?

**Part 1 – Series Circuit**

Construct a simple series circuit with the following amounts of light bulbs using the PhET simulation. Remember in a series circuit, there is only on path for electricity to flow. Keep the battery source the same. Draw the proper circuit diagram in your table and rank the relative brightness in your table.

|  |  |  |
| --- | --- | --- |
| **Number of Light Bulbs** | **Circuit Diagram** | **Relative Brightness of bulbs (use words like brightest, least bright, etc.)** |
| **1** |  |  |
| **2** |  |  |
| **3** |  |  |

What can you conclude about what happens to the brightness of the bulbs as you add more bulbs in series? Why do you think this is the case?

**Part 2 – Parallel Circuit**

Construct two parallel circuits one with 2 light bulbs in parallel and one with 3 light bulbs in parallel and rank the relative brightness of the bulbs. Remember, in a parallel circuit there are multiple pathways for electricity to flow. Keep your battery source the same.

|  |  |  |
| --- | --- | --- |
| **Number of Light Bulbs in Parallel** | **Circuit Diagram** | **Relative Brightness of bulbs (use words like brightest, least bright, etc.)** |
| **2** |  |  |
| **3** |  |  |

What can you conclude about what happens to the brightness of the bulbs as you add more bulbs in parallel? Why do you think this is the case?

**Conclusion Q’s**

1. How does the parallel circuit compare to the series circuit?

2. What happens when you break a parallel circuit (try it out in the sim if you need to!)? How would this property be useful when designing circuits?

3. What are the advantages and disadvantages of series and parallel circuits?