Simple circuits Series and parallel circuit with PHET Sim

Objective : Analysis and compare the current flow, voltage across each component in the series and parallel circuits using PHET simulation.

I**nstructions for using the PhET Simulation:**

1. open the link in your browser: https://phet.colorado.edu/en/simulation/circuit-construction- kit-dc
2. In the simulation you can drag and drop the required component.
3. You can increase the length of the wire by holing one end of the wire and dragging to the required side.
4. You can change the values by right clicking the component.

Instructions for Activity:

1. Follow the activity and complete the table for each activity.
2. Complete the comparison table at the end.
3. For drawing use pencil and ruler.

INTRODUCTION

Construct a simple circuit using a cell switch and a bulb using the PhET simulation.
Draw the symbolic representation of your simple circuit in the space provided.

Drawing of Simple circuit.

Discussion:

Discuss these two question with your group members and write the answer in the space provided.

1.Is there more than 1 way to make a working circuit, using 3 bulbs, one cell and wires .
If yes, draw your circuits in the box below.
If no Explain why is it not possible?

……

……

complete the column heading with the name of the circuit.

A**CTIVITY -1**

1. You have to design a circuit in the PhET Simulation with **one bulb, two bulbs and three bulbs** consecutively with one power supply (one cell), and required wires.
2. For each design you need to draw the simple circuit in the space provided and complete the given table (Table-1) with required measurements voltmeter to measure voltage and ammeter to measure current
3. use the following date in the table to design the circuit.

Circuit with one bulb (5 ohms, one cell (9V)	
Circuit with two bulbs of 5 ohms each, one cell (9V)	Circuit with two bulb of 5 ohms and 10 ohm, one cell (9V)
Circuit with three bulb 5 ohms each, one cell (9V)	Circuit with three bulb of5 ohms,10 ohms and 15 ohm and one cell (9V)

Table 1:

	Voltage across each bulb			Current in the circuit	Total voltage	Voltage of the cell
One bulb						
Two bulb with 5 ohm						
Two bulb with 5 and 10 ohm						
Three bulb with 10 ohm						
Three bulb with 5,10 and 15 ohm						

Discuss your result with your friend sitting besides you and answer the following questions.

1. What do you notice about the brightness of the bulb when you change the bulbs with different resistance?

……

2. Is there any change in the current when you increase the number of bulbs with different resistance? If yes how does the current changes?

……

3.Is the voltage across the each bulb changing? If yes how does the current changes?

……

4. Is the total voltage across the bulbs in each circuit for different combination remain same or changes for different combinations? is it same as the voltage of the cell?

……

ACTIVITY -2

1. You have to design a circuit in the PhET Simulation with **one bulb, two bulbs and three bulbs** connected from the same point of the cell , and required wires.
2. For each design you need to draw the simple circuit in the space provided and complete the given table (Table-1) with required measurements voltmeter to measure voltage and ammeter to measure current
3. use the following date in the table to design the circuit.

Circuit with one bulb (5 ohms, one cell (9V)	
Circuit with two bulbs of 5 ohms each, one cell (9V)	Circuit with two bulb of 5 ohms and 10 ohm, one cell (9V)
Circuit with three bulb 5 ohms each, one cell (9V)	Circuit with three bulb of5 ohms,10 ohms and 15 ohm and one cell (9V)

Table 2:

	Voltage across each bulb			Current in each branch of the circuit				Total voltage	Voltage of the cell
One bulb									
Two bulb with 5 ohm									
Two bulb with 5 and 10 ohm									
Three bulb with 10 ohm									
Three bulb with 5,10 and 15 ohm									

Discuss your result with your friend sitting besides you and answer the following questions.

1.What do you notice about the brightness of the bulb?

……

2.Is there any change in the current? If yes how does the current changes?

……

3.Is the voltage across the each bulb changing? If yes how does the current changes?

……

4. What is the total current back to the cell from each branch in the circuit? is it same from the each branch? if no how are they different?

……

Comparison between series and parallel circuit.

	Series	Parallel
Current		
Voltage		
Resistance		
Brightness		