

# Electric Circuits simulation (Phet)

The aim of this lesson is to use the Electric Circuit simulation (by Phet) to investigate the properties of circuits and to discover some circuit 'rules' that are always true. You are going to take measurements of current and potential difference in series and parallel circuits.

## Series circuits:

A series circuit is one in which all the components come one after the other in a single loop. We say that they are 'in series' with each other.

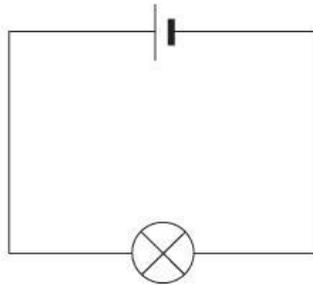


Figure 1

1. Make the circuit shown in figure 1.
2. Use the voltmeter to measure the potential difference (voltage) across the battery.  
Write this in the box
3. Use the voltmeter to measure the potential difference (voltage) across the bulb.  
Write this in the box
4. Add additional cells to the circuit and measure the total potential difference across all the cells. Write a sentence describing how to find the total voltage across a number of cells in series.

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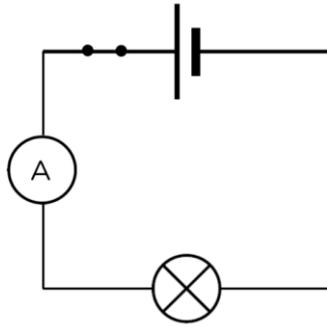


Figure 2

5. Make the circuit shown in figure 2.
6. Try moving the Ammeter to other points within the circuit. What do you notice?  
Write a sentence describing your findings.

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7. Return the Ammeter to the original position and then start increasing the number of cells within the circuit. Write a sentence describing how the current changes.

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8. Go back to just using a single cell. Right click on the bulb and change the resistance (we will learn about this later) to 10 ohms. Now right click on the battery and change the voltage to the amounts shown in the table below. Record the Ammeter reading for each voltage reading.

Potential Difference (volts)	Current (Amps)
4	
8	
12	
16	

9. Describe how the current changes as the PD is increased.

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10. Now right click on the cell and set the voltage to 25 volts. Keeping the voltage constant, alter the resistance of the bulb and fill in the table below.

Resistance (Ohms)	Current (Amps)
10	
20	
30	
40	

11. Describe the relationship between the resistance and the current?

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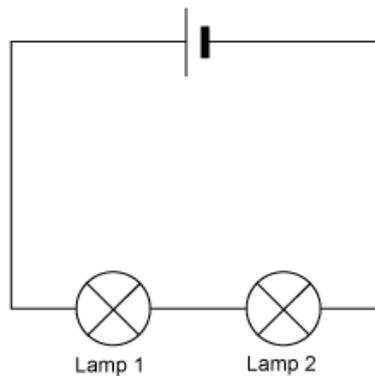


Figure 3

12. Set up the circuit as shown in figure 3. Use an Ammeter to check that your answer to question 6 is still correct.

13. Change the resistances of the two bulbs and measure the potential difference across them. Also measure the battery voltage (Keep this constant throughout the experiment) and fill in the table below.

Battery voltage (V)	Resistance lamp 1 (Ohms)	Resistance lamp 2 (Ohms)	Voltage across lamp 1 (Volts)	Voltage across lamp 2 (Volts)	Voltage across both lamps (Volts)

Parallel circuits:

A parallel circuit is one in which all the components each have their own loop to the circuit. The components are said to be in parallel with each other.

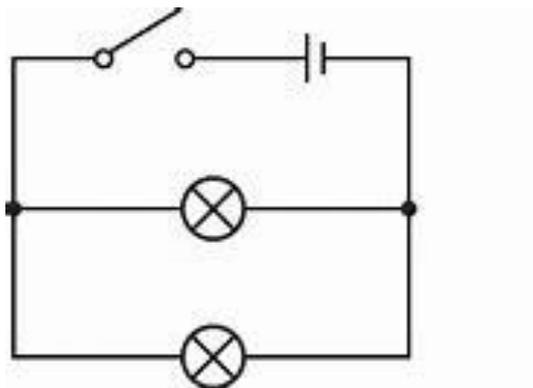


Figure 4

- 14. Set up the circuit as shown in figure 4. Close the switch.
  
- 15. Take measurements of the current at all points within the circuit. Do you notice a pattern in how the current behaves at the junctions? Write this pattern down.

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- 16. Take measurements of the voltage around the circuit. Do you notice a pattern in the voltage across each component when compared to the battery voltage? Write it down.

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