

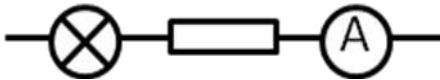
N4

Series Circuits

When components are connected in line, we say that they are connected in series.

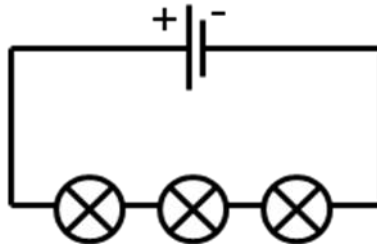


The three bulbs are connected in series



If the components form a circuit, the circuit is called a series circuit.

The bulb, resistor and ammeter are connected in series.



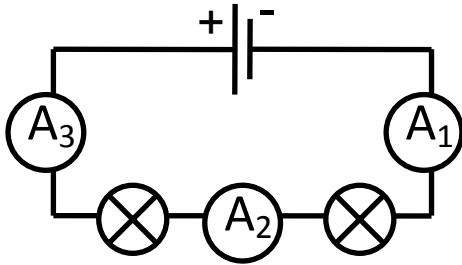
In the circuit, the current from the battery passes through each of the bulbs in turn before returning to the battery.

The cell and the three bulbs are connected in series. In a series circuit, there is only one path for the current to take from the negative terminal of the battery to the positive terminal.

N4

Current and voltage in series circuits

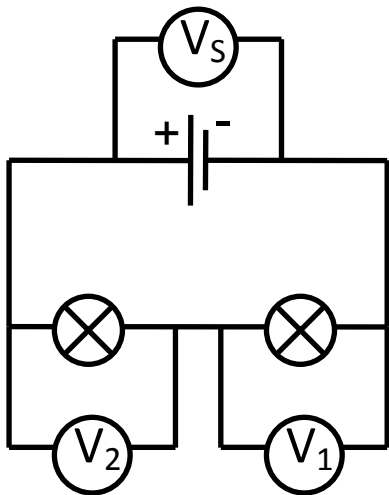
The current through every component in a series circuit is identical and is the same as the current from the battery.



Each ammeter will have the same reading.

$$A_1 = A_2 = A_3$$

The sum of the voltages across each component in a series circuit adds up to the supply voltage.

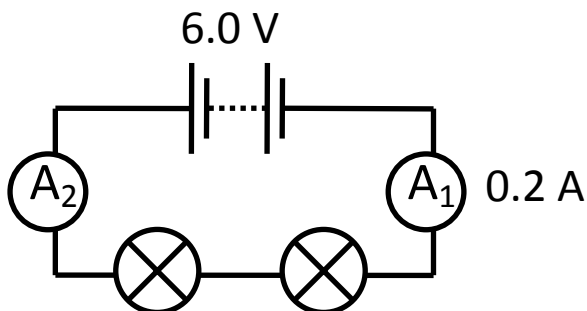


The voltmeter readings across the lamps in this circuit add up to the voltage across the battery.

$$V_s = V_1 + V_2$$

Examples

1. In the circuit shown below, the current readings on A_1 is 0.2 A. What is the current reading on the other ammeter and through each lamp?

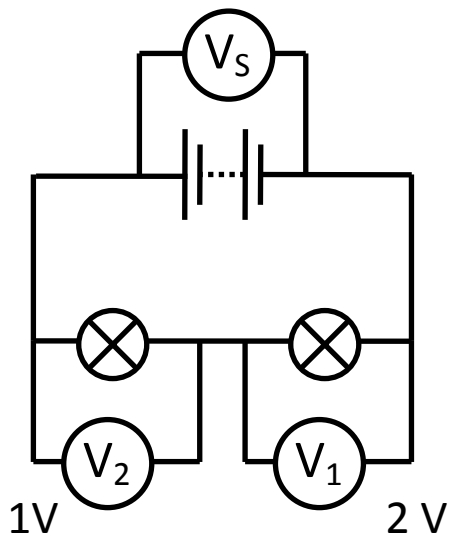


In a series circuit, the current is the same at all points.

Reading on $A_2 = 0.2 \text{ A}$

Current through each lamp = 0.2 A

2. Find the voltage of the battery in the circuit shown below.



In a series circuit, the voltage across each component adds up to the supply voltage.

So the battery voltage = $2 + 1 = 3V$