



Series Circuits

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Circuits

■ Electrical Circuit

- A set of electrical components that are connected to provide one or more paths for moving charges
- A _____ electrical loop in which charge can flow
- Must have a _____ potential (Voltage) and _____ potential (Voltage) for current to flow

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Circuit Safety

- Short Circuit

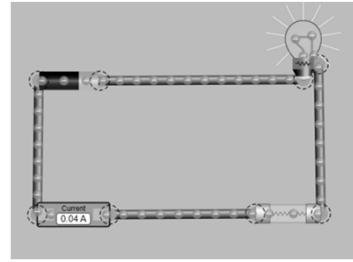
- A circuit with _____ resistance.

- Fuse

- A piece of metal that _____ when the current in the circuit becomes too great.

- Circuit Breaker

- A resettable switch that _____ when the current in a circuit reaches a set value.



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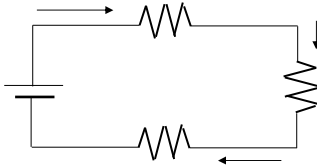
Voltage and Circuits

- Voltage is the energy per unit charge supplied by the source of electrical current.
- Any battery or generator is a _____ source.
- A voltage source must be connected to a circuit to produce a _____ in the circuit.
- Each element in a circuit “uses up” some of the voltage supplied. This is called a voltage _____.

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Series Circuits

- Circuits in which there is only _____ path for the current to take.



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General Rules for Series Circuits

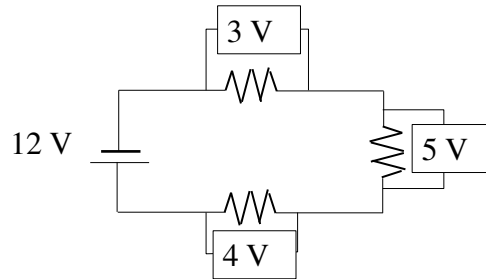
- The current in all parts of the circuit is the same (_____ Current)
- The sum of all the separate voltage drops is equal to the applied voltage (Voltage _____ up)
- The total resistance in a series circuit is equal to the _____ of the individual resistances
- Ohm's Law can be used for any resistor, or for the entire circuit.

$$V = IR$$

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Kirchoff's Second Law

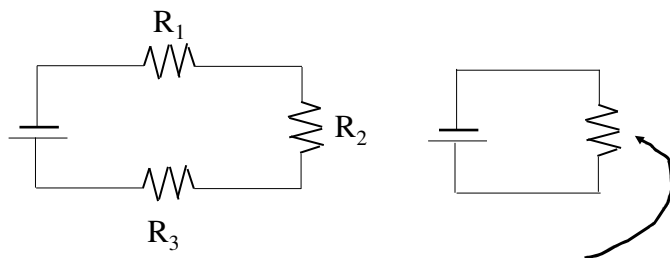
- The _____ of all changes in potential in a complete circuit is equal to zero



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Equivalent Resistance (Series)

- A single _____ that can be placed in a circuit in place of all other resistors in the circuit



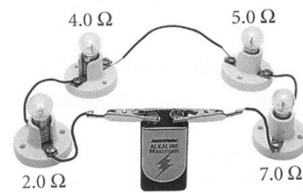
$$R_{\text{eq(series)}} = R_1 + R_2 + R_3 + \dots$$

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Sample Problem

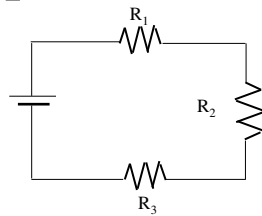
- A 9.0 V battery is connected to four light bulbs, as shown in the picture. Draw a schematic of the circuit.
- What is the equivalent resistance in the circuit?
- What is the current in the circuit?
- What is the voltage dropped across each light?

	V	I	R
Batt			
R_1			
R_2			
R_3			
R_3			



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Sample Problem



	V	I	R
Batt	144.0 V		
R_1			24Ω
R_2		3.0 A	
R_3			15Ω

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