

"Volts" wagon Beetle  
+ a Mobile "Ohm"

Name \_\_\_\_\_

## Electric Current (p. 200 - 205)

Current = Rate

Voltage = Power

Resistance = Slows Both!

### I. Current & Voltage Difference

1. Define the term electric current.

Electric Current - net movement of electric charges in a single direction

2. Electrons are constant motion in all directions in wires.

Circle One:  True  False

3. When electric current is present, electrons move in a direction <sup>the same as</sup> opposite the current flow.

Circle One:  True  False

Stick floating in a river.

4. What is the SI unit of electric current?

Ampere (A) | 1 ampere = 6,250 million, billion electrons/sec.

5. Define the term voltage difference.

Volts (V) Voltage Difference - related to the force that causes electric charges to flow p. 200

6. The force that causes a current to flow is related to a voltage difference.

Circle One:  True  False

Flows from a higher concentration of charge to a lower concentration of charge

7. Define the term circuit.

Circuit - a closed path that electric current follows

8. What happens when a break in a circuit occurs?

Current will not flow (Dead battery, cut wire, burned bulb)

### II. Batteries

1. What do batteries provide for an electrical circuit?

- Voltage difference needed to keep the current flowing.

2. How can battery circuits be maintained?

- As long as a closed path exists between terminals.

3. What are the two electrodes of a dry-cell battery?

1. Carbon Rod 2. Zinc Container

4. How do dry-cell batteries get their name?

- Electrolyte is a moist paste (not liquid solution)

$1A = 1C/s$   
↑  
Coulomb per sec

Amplitude of Ampere?

$1V = 1J/C$   
↑  
Energy per charge

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5. What are the charges of the following in a dry-cell battery?

Carbon Rod = Positive (+)

Zinc Container = Negative (-)



Voltage difference between two terminals causes current to flow.

6. How are wet-cell batteries similar and different than dry-cell batteries?

Similar = Two terminals with electrolyte solution

Different = Electrolyte is liquid in wet-cell (sulfuric acid)

7. Why does a typical car battery produce 12 volts?

Six lead or lead dioxide wet cells provide 2-volts each

8. What are the two main types of wall sockets used in the United States?

- 120-Volt (main sockets)
- 240-Volt (stoves, dryers)



**III. Resistance**

1. Define the term resistance.

Resistance - tendency for a material to oppose the flow of electrons  
(changes electrical energy into thermal energy + light)

2. Electrical conductors have higher resistance than electrical insulators.

Circle One : True  False

3. What is the SI unit of resistance? Ohms ( $\Omega$ )

4. What are three factors that increase electrical resistance? (of a given material)

- ↑ Temperature (Hallway - moving vs. not moving)
- ↑ Length (Extension Cords)
- ↓ Thickness (Wire Gauge)

**IV. The Current In A Simple Circuit**

1. What three factors are related in a simple electrical circuit?

- Voltage Difference (height of mountain)
- Current (water current)
- Resistance (rocks, trees, obstructions)

2. If voltage does not change, then increasing the resistance decreases the current in the circuit.

$\uparrow$  Resistance =  $\downarrow$  Current

3. If resistance does not change, then decreasing the voltage decreases the current.

$\uparrow$  Voltage =  $\uparrow$  Current

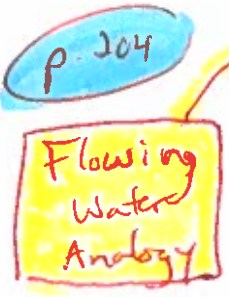
4. Define the term Ohm's Law

Ohm's Law - current in a circuit equals the voltage difference divided by the resistance

5. Write out the equation for Ohm's Law.

$I = \frac{V}{R}$

Current (amperes) =  $\frac{\text{Voltage Difference (volts)}}{\text{Resistance (ohms)}}$



Solving for Resistance  
 $R = \frac{V}{I}$