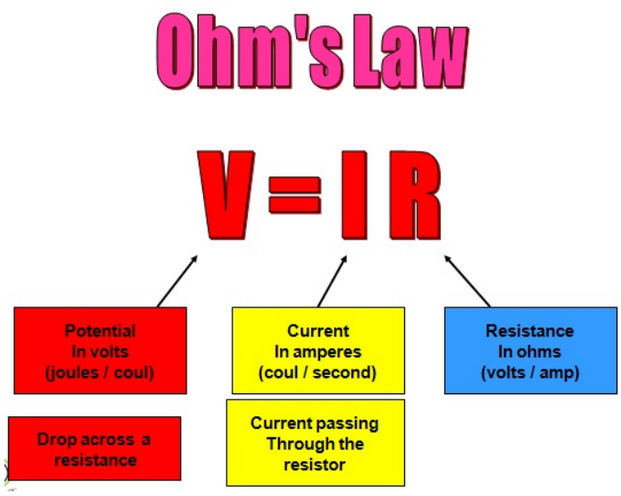
# Intermediate Science 9

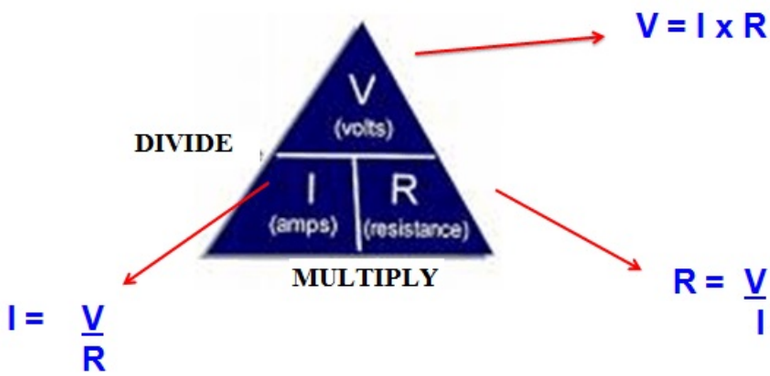
## *Unit 3*: CURRENT ELECTRICITY

### WORKSHEET 4: OHM'S LAW

Georg Simon Ohm (1789-1854): Discovered the mathematical relationship between current, voltage, and resistance.




A triangle can be used to rearrange this equation:




**Example 1: Find Voltage**

If a circuit has 2A of current running through it and the total resistance in the circuit is 19Ω, then what is the total voltage?

**Example 2: Find Voltage**

A circuit uses 0.5A of current and has total resistance of 18Ω. How much voltage is the circuit supplied with?

**Example 3: Find Current**

A toaster oven has a resistance of 12 ohms and is plugged into a 120-volt outlet.
How much current does it draw?

**Example 4 : Find Current**

A house is supplied with voltage of 120V. If the total resistance is 60Ω how much current is running through the wires?

**Example 5: Find Resistance**

A circuit is supplied with 15V of voltage and has current of 3A. What is the total resistance in the circuit?

**Example 6: Find Resistance**

If a computer uses 5A of current and is supplied with 120V of voltage, then what is the total resistance of the computer?

**Example 7: Complete the following chart:**

| Ohms | Volts | Amps |
|---|---|---|
| | 100 | 25 |
| | 150 | 10 |
| | 30 | 15 |
| 9 | | 5 |
| 6 | 48 | |

**PART A: MULTIPLE CHOICE**

1. In Ohm's Law, what does the symbol I represent?

   (A) Current
   (B) Load
   (C) Power
   (D) Voltage

2. Which of the following would not be an equation from Ohm's Law

   (A) $V = \frac{I}{R}$

   (B) $V = IR$

   (C) $R = \frac{V}{I}$

   (D) $I = \frac{V}{R}$

3. The current through a heater is 12 A when it is plugged into a 120 V source. What is the resistance of the heater?

   (A) 0.10 Ω
   (B) 10 Ω
   (C) 132 Ω
   (D) 1440 Ω

4. If 0.05 A of current flows through a 40 Ω light bulb, what voltage is dropped across the light bulb?

   (A) 0.00125 V
   (B) 2.0 V
   (C) 40.05 V
   (D) 800 V

5. What potential difference must be applied to a 26 Ω resistor to cause a current of 0.50 A to flow through it?

   (A) 6.5 V
   (B) 13 V
   (C) 26 V
   (D) 52 V

6. Using Ohm's law, what is the current drawn from a 12V battery is the circuit contains 5.5 ohms of resistance?

   (A) 6.5A
   (B) 0.46A
   (C) 66A
   (D) 2.18A

7. A 2.3A current is drawn from a 24V battery. What is the resistance of the circuit?

(A) 10.4 Ω
(B) 55.2 Ω
(C) 0.095 Ω
(D) 21.7 Ω

8. Using Ohm's law, what is the voltage of a circuit with 2.4 ohms of resistance and a current of 4A?

(A) 1.67 V
(B) 0.6 V
(C) 9.6 V
(D) 1.2 V

9. Using ohms law, calculate the current in a circuit with 3, 1.5 V batteries and 10 Ω of resistance:

(A) 0.15 A
(B) 6.67 A
(C) 0.45A
(D) 15A

10. Which graph illustrates Ohm's Law?

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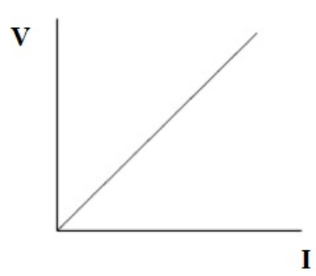
<td>(A)<br> 
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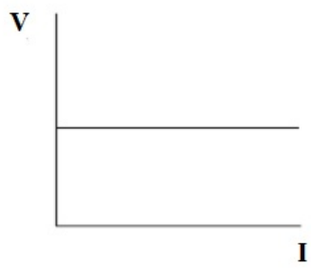
<td>(B)<br> 
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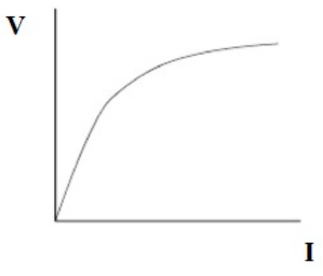
<td>(C)<br> 
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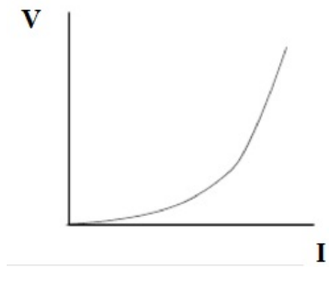
<td>(D)<br> 
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**PART B: WRITTEN RESPONSE**

1. How much current is in a circuit that includes a 9 volt battery and a bulb with a resistance of 3 ohms?

2. A circuit contains two 1.5 volt batteries and a bulb with a resistance of 3 ohms. Calculate the current.

3. What is the voltage of a circuit with 15 A of current and toaster with 8 Ω of resistance?

4. A light bulb has a resistance of 4 Ω and a current of 2 A. What is the voltage across the bulb?

5. How many ohms of resistance must be present in a circuit that has 120 V and a current of 10 A?

6. An alarm clock draws 0.5 A of current when connected to a 120 V circuit. Calculate its resistance.

7. A portable CD player uses two 1.5 V batteries. If the current in the CD player is 2 A, what is its resistance?

8. You have a large flashlight that takes 4 D-cell batteries. If the current in the flashlight is 2 amps, what is the resistance of the light bulb? (Hint: A D-cell battery has 1.5 volts.)