Chapter 8: Ohm’s law describes the relationship of current, voltage, and resistance.
Electric Potential Energy

- **Stored** electrical energy
- Ex. A battery has stored electrical energy because the electrons have the ability to do work after they leave the battery.
Electrical Potential Difference

- The change in potential energy per coulomb of charge.
- Also called voltage
- Measured in volts (V)
- Measured using a voltmeter
Electric Charge

• A building up at the negative terminal of a cell/battery which then flows from this terminal as negative charges repel one another.
Electric Current Flow
Electric Circuit

• A complete pathway that allows electrons to flow.
• Will transform electrical energy into other forms of energy.
Parts of an Electrical Circuit

- Source of Electrical Energy
- Conductor
- Control/switch
- Electrical Load
## Sources of Electrical Energy:

<table>
<thead>
<tr>
<th>Source</th>
<th>Staring Energy</th>
<th>Converts to...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friction</td>
<td>Rubbing</td>
<td></td>
</tr>
<tr>
<td>Piezoelectric crystals</td>
<td>Pressure</td>
<td>ELECTRICAL ENERGY</td>
</tr>
<tr>
<td>Photo-electrochemical cells (solar cells)</td>
<td>Solar/ light</td>
<td></td>
</tr>
<tr>
<td>Thermocouples</td>
<td>Heat</td>
<td></td>
</tr>
<tr>
<td>Generators</td>
<td>Mechanical</td>
<td></td>
</tr>
<tr>
<td>Cells/ Batteries</td>
<td>Chemical</td>
<td></td>
</tr>
</tbody>
</table>
Electric Current

• The amount of charge passing a given point in a conductor per second.
• Measured in amperes (A)
• Measured using an ammeter
Current Electricity

- The continuous flow of charge in a complete circuit.
Circuit Diagrams
See symbols on page 262.
Electrical Resistance

• Slows down the flow of electrons and transforms electrical energy.
• Measured in ohm’s (Ω)
• The ratio of the voltage to the current.
Factors that affect the amount of resistance in a wire are:

1. Length
2. Diameter (thickness)
3. Type
4. Temperature
Long, thin, tungsten wire

Short, thick, copper wire
Ohm’s Law

- The mathematical relationship comparing voltage \( V \), current \( I \) and resistance \( R \)
Ohm’s Law
Ohm’s Law

Complete the practice problems on pg. 273-5

Ohm’s Law: The current (I) that flows in a circuit is directly proportional to the voltage (V) and inversely proportional to the resistance (R).
Resistors

- Used to control current or potential difference in a circuit.
Core Lab Activity
Resistance and Ohm’s Law
Pages 278-9