

SOL 5.4 -- ELECTRICITY

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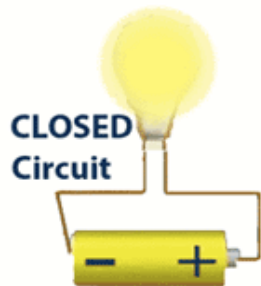
SOL 5.4 Electricity

- a. electricity flows easily through conductors but not insulators;
- b. electricity flows through closed circuits;
- c. static electricity can be generated by rubbing certain materials together;
- d. electrical energy can be transformed into radiant, mechanical, and thermal energy;
- e. a current flowing through a wire creates a magnetic field.

Central Idea: Energy can move from one location to another through electrical circuits; this energy can then be transformed into different forms for multiple uses.

ENERGY

- The flow of energy as a current through the circuit can be used to do work. The circuit is a system composed of various functioning components.
- Electricity is used every day. Humans transform electrical energy into different forms of energy to meet needs.



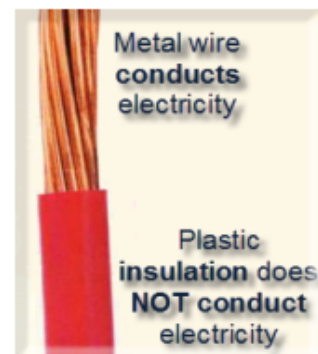
**CLOSED
Circuit**

CIRCUITS

- A **simple circuit** consists of a **bulb**, **battery**, and **wire**.
- A **closed circuit** allows electricity to **flow** within the circuit.
- If there is an **opening** in the circuit, electricity will **not** flow.

CONDUCTORS AND INSULATORS

- **Conductors** are materials which allow **electricity** to easily flow through them.
 - Examples of conductors include **metals**.
- **Insulators** are materials that **do not** allow electricity to flow easily through them.
 - Examples of insulators include **rubber**, **wood**, and **plastics**.





STATIC ELECTRICITY

- **Static electricity** is the transfer of **negatively** charged particles between materials.
- Common examples of static electricity include **lightning**, **clothes sticking together** when coming out of a dryer, and getting a **shock** when touching a **door knob**.



Electrical to
Mechanical (motion)



Electrical to
Light (radiant)

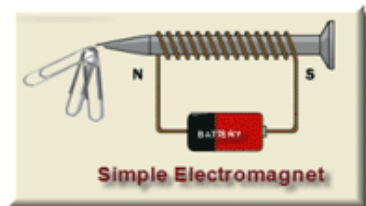


Electrical to
Thermal (heat)



ENERGY TRANSFORMATIONS

- In a **lamp**, **electrical** energy is **transformed** into **radiant** energy.
- In a **fan**, **electrical** energy is **transformed** into **mechanical** energy.
- In a **toaster**, **electrical** energy is **transformed** into **thermal** energy.



MAGNETIC FIELDS

- A **current flowing** through a **wire** creates a **magnetic field**.
- **Wrapping a wire** around certain iron-bearing metals (e.g., an iron nail) and creating a closed circuit is an example of a **simple electromagnet**.
- The **strength** of an electromagnet is mainly affected by the number of **coils**, the amount of **current**, the gauge of the **wire**, and the iron core.