Principles of Engineering Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Unit 1.2 – Energy Sources – Study Guide Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Period \_\_\_\_\_\_

Concepts

1.      Energy sources can be classified as nonrenewable, renewable, or inexhaustible.

2.      Energy can come from many sources, but challenges include harnessing, storing, transportation, and the ability to be used for work.

3.      Engineers must consider tradeoffs and consequences regarding emerging energy technology.

4.      Energy must be distributed to the end user and generally converted to a usable form based on user need.

5.      Energy often needs to be converted from one form to another to meet the needs of a given system.

6.      Energy is neither created nor destroyed; however, within mechanical systems energy is lost between the input and the output.

Performance Objectives

It is expected that students will:

* Identify and categorize energy sources as nonrenewable, renewable, or inexhaustible.
* Create and deliver a presentation to explain a specific energy source.
* Summarize and reflect upon information collected during a visit to a local utility company.
* Define the possible types of power conversion.
* Calculate work and power.
* Demonstrate the correct use of a digital multimeter.
* Calculate power in a system that converts energy from electrical to mechanical.
* Determine efficiency of a system that converts an electrical input to a mechanical output.
* Calculate circuit resistance, current, and voltage using Ohm’s law.
* Understand the advantages and disadvantages of parallel and series circuit design in an application.

Essential Questions

1.      What sources of energy are available for use? What are the benefits and drawbacks regarding efficiency, usefulness, and the environment?

2.      What emerging technologies are or may be on the horizon that will provide energy more efficiently?

3.      What are the different energy sources that are used to deliver energy to your community?

4.      Describe examples in your community of individuals or businesses harnessing their own energy.

5.      Describe where and how the electricity that reaches your home is produced.

6.      Describe and identify inefficient use of energy and power at home, school, or work.

7.      What is the relationship between resistance, current, and voltage within an electrical system?

8.      Explain the distinguishing characteristics between series and parallel circuits.

9.      Describe how to calculate the efficiency of an electrical mechanical system.

Vocabulary

Ampere

Current

Electrical Energy

Electricity

Electromagnetic Induction

Efficiency

Energy

Energy Conversion

Entropy

Generator

Geothermal Energy

Gravitational Energy

Induction

Inexhaustible Energy

Kinetic Energy

Nonrenewable Energy

Ohm

Ohm’s Law

Parallel Circuit

Potential Energy

Power Converter

Power Grid

Renewable Energy

Resistance

Work

Turbine

Power

Rotor

Series Circuit

Volt

Voltage