

# Energy

*by*

Nada Saab-Ismael, PhD, MAT, MEd, IB

[nhsaab.weebly.com](http://nhsaab.weebly.com)

[nhsaab2014@gmail.com](mailto:nhsaab2014@gmail.com)

## **P4.1 Energy Transfer**

Moving objects and waves transfer energy from one location to another. They also transfer energy to objects during interactions (e.g., sunlight transfers energy to the ground when it warms the ground; sunlight also transfers energy from the sun to the Earth).

**P4.1A** Account for and represent energy into and out of systems using energy transfer diagrams.

**P4.1B** Explain instances of energy transfer by waves and objects in everyday activities (e.g., why the ground gets warm during the day, how you hear a distant sound, why it hurts when you are hit by a baseball).

**Items;**

1. Renewable and Nonrenewable Resources.
2. Some Types of Energy.

# Energy

No machine can operate without fuel. Gasoline is the fuel for automobiles. Food is the fuel for the human body. Food gives you the ability to do work. It gives you energy.

Energy (E) is the ability to do work. Work (W) is the transfer of energy.

Both work and energy have the same unit, the joule (J) . So if you do 5000 J of work on an object, you have transferred 5000 J of your energy to it.

$$W = \Delta E$$

**W** is the work done on an object, in joules

**$\Delta E$**  is the change in energy of the objects, in joules.

Moving objects and waves transfer energy from one location to another.

Moving objects also transfer energy to other objects during interactions.

Sunlight transfers energy from the sun to the Earth. The ground gets warm.

# Renewable and Nonrenewable Sources of Energy

Sources of energy are classified as renewable or nonrenewable.

Renewable sources can be replaced within a human lifetime. They would include sources such as solar, wind, biomass and tides.

Nonrenewable sources cannot be replaced with a human lifetime. Once consumed, such a resource is gone. Examples include, coal, oil, natural gas and uranium.

# Some Types of Energy

## Example 1: *Research Question;*

Define each type of energy listed below (a-h). Explain how each type of energy is used to do work. You can add illustrations such as pictures.

- a. Gravitational potential energy
- b. Kinetic energy
- c. Heat energy
- d. Radiant energy
- e. Chemical potential energy
- f. Elastic energy
- g. Electrical energy
- h. Nuclear energy

**Example 2: *Research Question***; Sources of energy include; Petroleum, Natural gas, Coal, and nuclear energy. Answer:

- a) What are some pros and cons of each energy source?
- b) What would be your recommendations if it were your job to plan the future use of these sources in the United States.

**Example 3: *Research Question***; Alternative sources of energy include: Tidal Energy, Wave Energy, Wind Energy, Biomass, Geothermal Energy, Solar Energy and Hydroelectric Energy.

Answer:

- a) Define each type of energy listed above (Tidal, Wave, Wind, Biomass, Geothermal, Solar, Hydroelectric).
- b) Which of these renewable energy forms are the most feasible to your community? Give reasons for your answer.

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*The edition was dedicated to the memory of Stella Kupferberg, Director of the Photo Department: “We miss you, Stella, and shall always remember that a well-chosen photograph should speak for itself, without the need for a lengthy explanation”*

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