

# A Ball of Energy

By Gabrielle Sierra



The word “energy” can mean a whole lot of different things. It comes in many forms, but they are all important. Energy lends life and movement to many elements of our world.

The word energy comes from the Greek word “energeia,” which dates all the way back to the work of Aristotle, a famous philosopher. The term “energy” is used in many different forms of study, including the natural sciences. Energy is necessary in order to perform mechanical work.

The joule is the International System of Units’ unit for measuring energy. But energy can also be expressed through other units like calories, kilocalories, and ergs. Each of these additional units comes with a conversion formula to the joule.

For us on earth, the sun is the major source of energy. This is what allows plants to grow and also influences our ocean’s currents. The sun loses energy by emitting light, lending a small fraction of it to earth. This transfer allows for us to have light, which travels on a variety of wavelengths.

Solar energy can be harnessed to produce many things, including electricity and heat. Some believe that solar energy can eliminate the more harmful pollutants on our earth resulting from energy powered by gas or coal. There are ways to capture solar energy with panels and use it for everyday tasks like cooking, heating water to shower, and driving.

More and more architects and urban planners are incorporating solar energy into their designs of homes and office buildings. These methods, which were first employed by the Chinese and Greeks, are used to capture solar energy and then provide buildings with light and warmth. Solar-powered cars have been in development for a long time, and many believe they are a viable solution to pollution.

Solar energy is a clean form of energy, as is wind energy, captured by turbines and windmills and channeled into grids. These are both alternatives to fossil fuels, which pollute the environment. Wind and solar energy are both renewable and clean.

The meaning of the word “energy” changes when you get into the physical sciences. Of the many forms of energy that have been defined by the physical sciences, one of the best known is called kinetic energy.

Kinetic energy is a term related to physics that describes the energy an object possesses due to motion. Measuring an object’s kinetic energy means measuring the amount of force an object needs to accelerate.

There are several forms of kinetic energy. These include: vibrational energy, or energy due to a vibrating motion; rotational energy, or energy due to a rotating motion; and translational energy, the energy due to the movement from one location to another.

A good way to examine kinetic energy is by looking at a roller coaster. The cars of a roller coaster reach their highest kinetic energy when they are at the bottom of a hill. But when they start rising again their kinetic energy becomes potential energy instead, which is the energy an object has in relation to its position in space.

One of the best ways to examine potential energy is by looking at a bow and arrow. Energy is transferred from the potential energy in the archer’s arm into the bow as it is drawn back. When it is released, the potential energy in the bow is transferred through the string and becomes kinetic energy as the arrow shoots outward.

Heat is another type of energy. Heat can be transferred from one body to another in a whole bunch of ways, including processes called conduction, radiation, and convection.

Conduction means that the heat is transferred by the diffusion and collision of particles within a body due to a temperature change. Radiation means that the heat is transferred through

electromagnetic waves or moving particles. Convection means the heat is transferred through the movement of liquids. It is important to remember that heat is always associated with a process, such as flow and transfer.

One of the most common uses of the word “energy” is in reference to food energy. This is the energy that animals and humans derive from their food. The human body uses energy for a wide range of things, including metabolism in our organs and tissues and to move. That is why people who lead a sedentary lifestyle (or sit around a lot) require less energy.

Name: \_\_\_\_\_ Date: \_\_\_\_\_

1. Select the word that is NOT a type of energy covered in the text.

- A Kinetic
- B Solar
- C Stationary
- D Food

2. How does the author contrast solar energy with fossil fuels?

- A Solar energy is Chinese and fossil fuels are Greek.
- B Solar energy is clean and renewable while fossil fuels cause pollution.
- C Fossil fuels are classified as kinetic energy and solar energy is classified as potential energy.
- D Fossil fuels are older than solar energy.

3. The sun loses energy by transferring light to the earth. On earth, we are able to use the light for solar power among other things.

What conclusion can you draw from the above statement?

- A Light is the only way to transfer energy.
- B The heat from the sun is a result of the light energy.
- C Energy lost by one object can be captured or used by another.
- D The sun uses kinetic energy.

4. If somebody leads a very active lifestyle, what will they require?

- A less energy from food
- B more heat energy
- C solar power
- D more energy from food

5. What is the passage mostly about?

- A several different types of energy, what they do, and how they work
- B how humans use energy from the sun
- C the difference between kinetic energy and potential energy
- D how to measure energy

6. Read the following sentence: "The meaning of the word energy changes when you get into the physical sciences."

What did the author want to communicate to the reader by using this sentence?

- A that she was going to continue her explanation of solar energy
- B that she was going to remind the reader that energy is a scientific topic
- C that she was about to transition the focus of her article to the physical sciences
- D that she was going to introduce the definition of potential energy

7. Choose the answer that best completes the sentence below.

Radiation transfers heat through electromagnetic waves; \_\_\_\_\_, convection transfers heat through liquid.

- A however
- B so
- C for instance
- D as a result

8. What is the major source of energy for humans on Earth?

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**9.** When an object starts moving on its own, potential energy becomes kinetic energy.

Use evidence from the text to support this statement.

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**10.** Use evidence from the passage to explain what solar energy can be used for and how solar energy is different from other forms of energy.

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## Teacher Guide &amp; Answers

**Passage Reading Level:** Lexile 1070

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8. What is the major source of energy for humans on Earth?

**Suggested answer:** The sun is the major source of energy for humans on Earth.

9. When an object starts moving on its own, potential energy becomes kinetic energy.

Use evidence from the text to support this statement.

**Suggested answer:** The potential energy in an arrow becomes kinetic energy after it is shot. The potential energy in a rollercoaster car going up a hill becomes kinetic energy when it starts to go down the hill. In both cases, the potential energy became kinetic when an outside force (the arm or the rollercoaster) stopped causing the movement of the object.

10. Use evidence from the passage to explain what solar energy can be used for and how solar energy is different from other forms of energy.

**Suggested answer: Answers will vary and can include:** Solar energy can generate electricity and heat, it can help plants grow, and make cars move. The passage says that solar energy is a clean form of energy. Some people believe solar energy pollutes less than energy from gas or coal.