

Introduction to Energy-SWS

Katie Spence

Say Thanks to the Authors

Click <http://www.ck12.org/saythanks>

(No sign in required)



To access a customizable version of this book, as well as other interactive content, visit www.ck12.org

CK-12 Foundation is a non-profit organization with a mission to reduce the cost of textbook materials for the K-12 market both in the U.S. and worldwide. Using an open-content, web-based collaborative model termed the **FlexBook®**, CK-12 intends to pioneer the generation and distribution of high-quality educational content that will serve both as core text as well as provide an adaptive environment for learning, powered through the **FlexBook Platform®**.

Copyright © 2013 CK-12 Foundation, www.ck12.org

The names “CK-12” and “CK12” and associated logos and the terms “**FlexBook®**” and “**FlexBook Platform®**” (collectively “CK-12 Marks”) are trademarks and service marks of CK-12 Foundation and are protected by federal, state, and international laws.

Any form of reproduction of this book in any format or medium, in whole or in sections must include the referral attribution link <http://www.ck12.org/saythanks> (placed in a visible location) in addition to the following terms.

Except as otherwise noted, all CK-12 Content (including CK-12 Curriculum Material) is made available to Users in accordance with the Creative Commons Attribution-Non-Commercial 3.0 Unported (CC BY-NC 3.0) License (<http://creativecommons.org/licenses/by-nc/3.0/>), as amended and updated by Creative Commons from time to time (the “CC License”), which is incorporated herein by this reference.

Complete terms can be found at <http://www.ck12.org/terms>.

Printed: December 5, 2013

flexbook
next generation textbooks



CONCEPT

1

Introduction to Energy-SWS

- Define energy.
- Give the SI unit for energy.
- Identify different forms of energy.



These young children are very active. They seem to be brimming with energy. You probably know that lots of things have energy—from batteries to the sun. But do you know what energy is? Read on to find out.

Defining Energy

Energy is defined in science as the ability to move matter or change matter in some other way. Energy can also be defined as the ability to do work, which means using force to move an object over a distance. When work is done, energy is transferred from one object to another. For example, when the boy in the **Figure 1.1** uses force to swing the racket, he transfers some of his energy to the racket.

Q: It takes energy to play tennis. Where does this boy get his energy?

SI Unit for Energy

Because energy is the ability to do work, it is expressed in the same unit that is used for work. The SI unit for both work and energy is the joule (J), or Newton • meter (N • m). One joule is the amount of energy needed to apply a force of 1 Newton over a distance of 1 meter. For example, suppose the boy in the **Figure 1.1** applies 20 Newtons of force to his tennis racket over a distance of 1 meter. The energy needed to do this work is 20 N • m, or 20 J.



FIGURE 1.1

Two Types of Energy and Many Forms

If you think about different sources of energy—such as batteries and the sun—you probably realize that energy can take different forms. For example, when the boy swings his tennis racket, the energy of the moving racket is an example of mechanical energy. To move his racket, the boy needs energy stored in food, which is an example of chemical energy. Other forms of energy include electrical, thermal, light, and sound energy. The different forms of energy can also be classified as either kinetic energy or potential energy. Kinetic energy is the energy type of moving matter. Potential energy is energy type that is stored in matter. You can learn more about the different forms of energy at this URL: http://www.eia.gov/kids/energy.cfm?page=about_forms_of_energy-basics

Q: Is the chemical energy in food kinetic energy or potential energy?

A: The chemical energy in food is potential energy. It is stored in the chemical bonds that make up food molecules. The stored energy is released when we digest food. Then we can use it for many purposes, such as moving (mechanical energy) or staying warm (thermal energy).

Q: What is an example of kinetic energy?

A: Anything that is moving has kinetic energy. An example is a moving tennis racket.

Summary

- Energy is defined in science as the ability to move matter or change matter in some other way. Energy can also be defined as the ability to do work.
- The SI unit for energy as well as work is the joule (J), or Newton • meter (N • m).
- Energy exists in different forms, such as mechanical energy and chemical energy. Most forms of energy can also be classified as either kinetic energy or potential energy.

Vocabulary

- **energy:** Ability to cause changes in matter, or ability to do work.

Practice

At the following URL, unscramble the letters to identify different forms of energy. <http://www.learnaboutenergy.org/projects/energypuzzles/puzzle4.html>

Review: Answer these questions in a Word Document.

1. How is energy defined in science?
2. True or False: Energy is matter.
3. True or False: Energy effects or changes matter.

4. What is the SI unit for energy?
5. Name two forms that energy may take.
6. Which type of energy is the energy of a moving tennis ball? Is it kinetic energy or potential energy?
7. Create a table, using the link above, dividing the different forms of energy into the two types of energy. For each form, give two examples of that type of energy. For example chemical energy examples could be food or batteries.

References

1. . . used under license from shutterstock.com