What Are Light and Heat?

Harcourt
SCHOOL PUBLISHERS

Photo Credits: Cover: David Trood Pictures/Getty; p. 2: Harcourt; p. 3: Photodisc/PictureQuest; p. 4: Harcourt; p. 5: Harcourt; p. 6: Harcourt; p. 7: Jim W. Grace/Photo Researchers, Inc.; p. 8: Thinkstock/Getty Images; p. 9: Photodisc Green/Getty Images; p. 10: Harcourt; p. 11: Royalty-Free/Corbis.

Printed in the United States of America

ISBN 0-15-343920-3

1 2 3 4 5 6 7 8 9 10 039 10 09 08 07 06 05

What Are Light and Heat?

Harcourt
SCHOOL PUBLISHERS

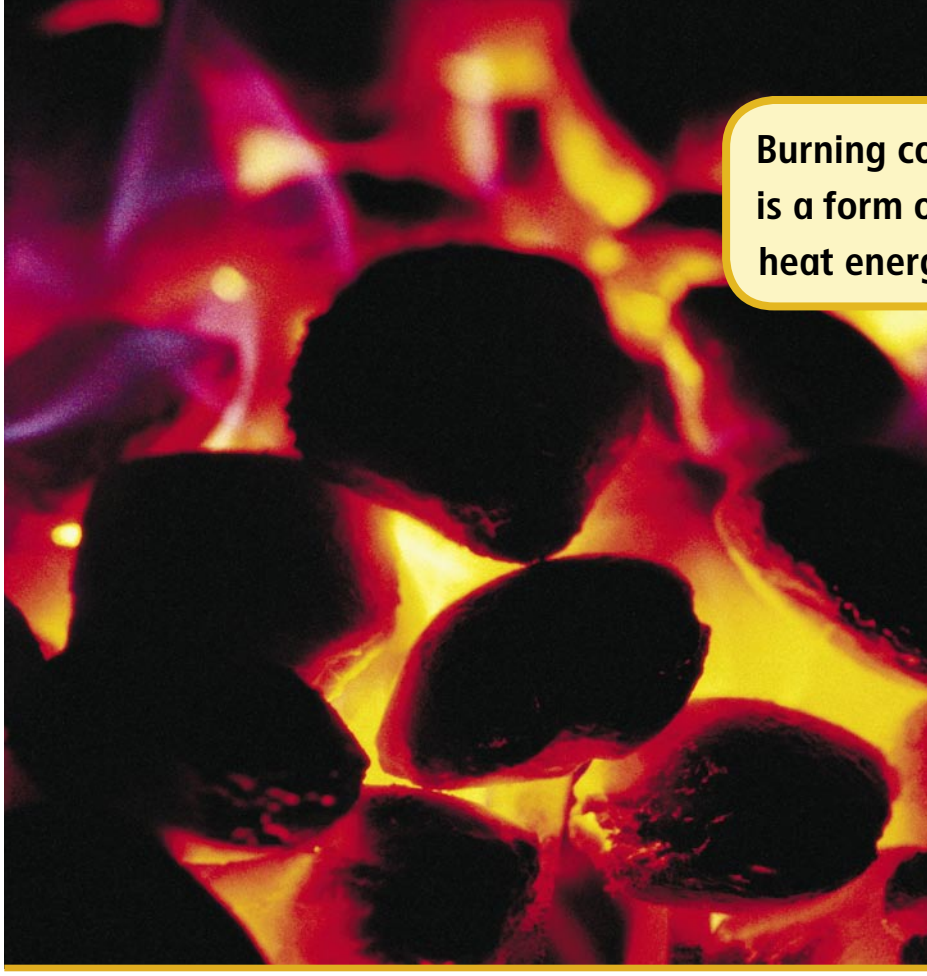
Orlando Austin New York San Diego Toronto London

Visit *The Learning Site!*
www.harcourtschool.com

Energy Around You

Look at the world around you. Find things that change or move. A light bulb changes a room from dark to light. Butter melts in a frying pan. A car moves down a road. These events require energy. **Energy** is something that causes matter to change or move.

Wind energy moves this sailboat across the water.



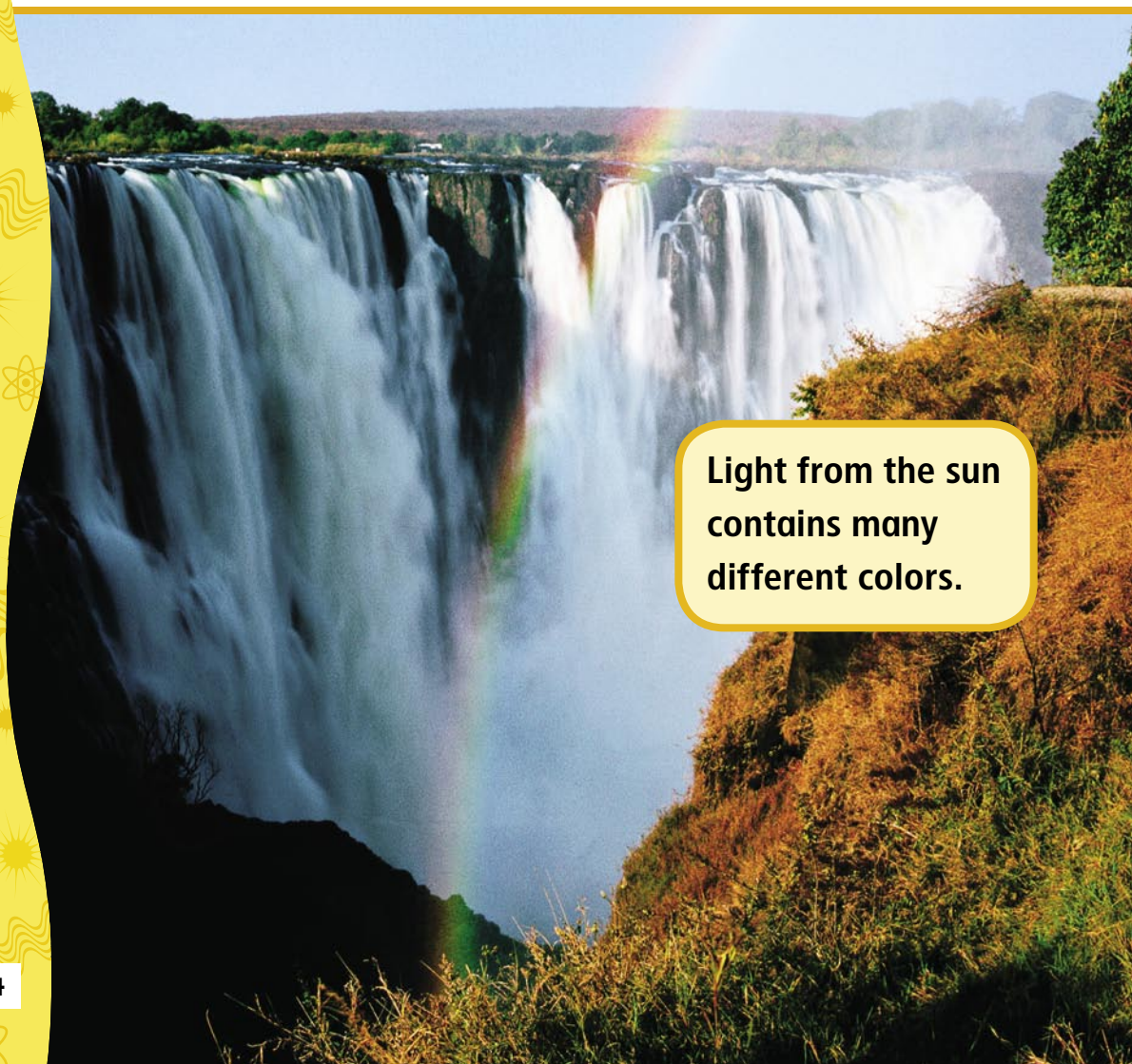
Burning coal is a form of heat energy.

Light, sound, and heat are all forms of energy. Where does energy come from? Most of the energy on Earth comes from the sun. Wind and moving water are other sources of energy. We also get energy from fuel. Coal and oil are two kinds of fuel we use.

Focus Skill **MAIN IDEA AND DETAILS** **Name at least three sources of energy.**

Looking at Light

Light is energy that lets you see. Most of the light energy that helps us to see comes from the sun. Light is made up of many colors. You can see these colors in rainbows. Sometimes, you can see some of the colors of light in the sunset.



Light from the sun contains many different colors.

Without sunlight, plants and animals could not live.

All living things depend on the sun for energy. Plants use light energy to grow. Without sunlight, plants would die. Animals need light energy from the sun. Without the sun, the Earth would be too cold for animals or plants to live.

Focus Skill

MAIN IDEA AND DETAILS

What are two good things the sun provides for us?

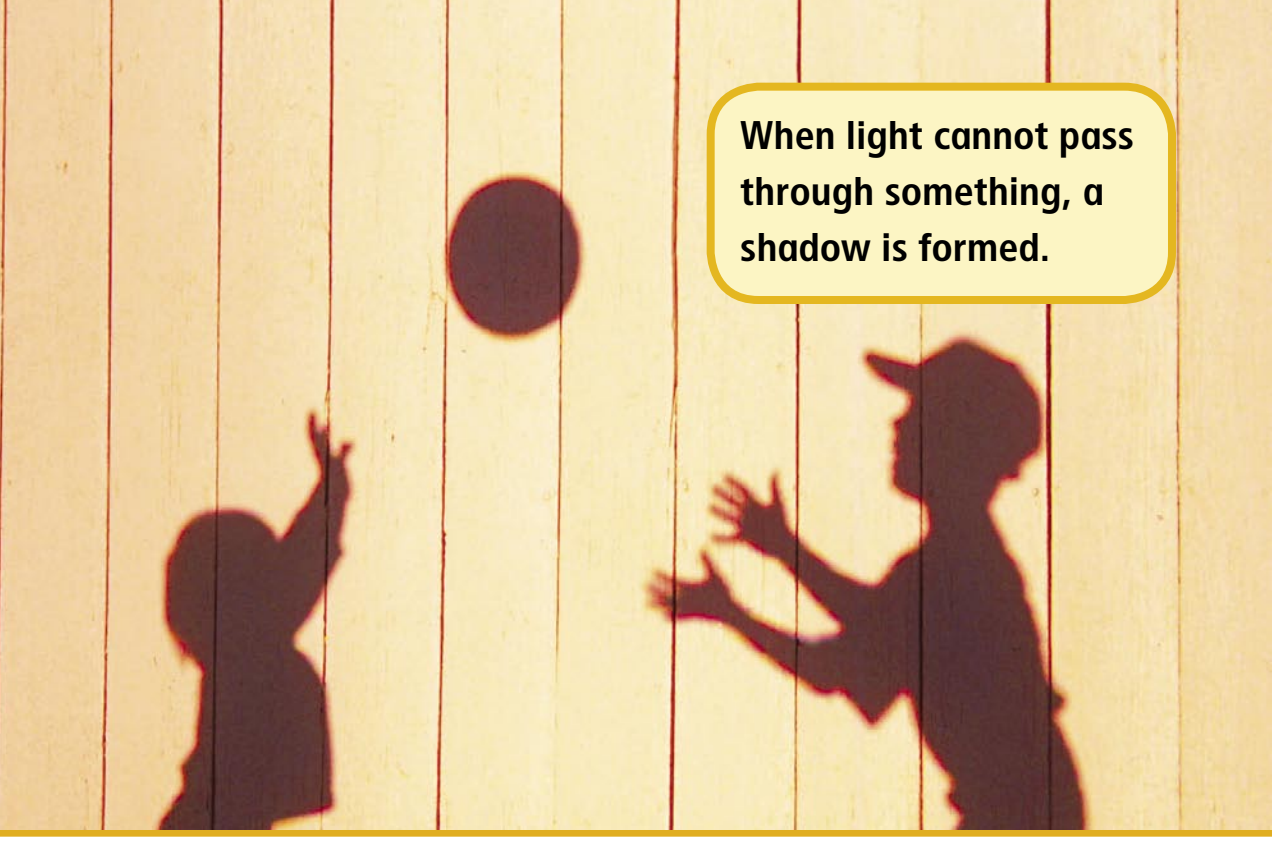
Fast Fact

In order, the colors of the rainbow are red, orange, yellow, green, blue, and violet.

Light Moves

Light moves in straight lines, but it also bounces off objects. Everything you can see has light bouncing off it. When you see yourself in a store window, light bounces off you to the window. Then it bounces back to your eye.

These coins look shiny because their smooth, flat surfaces bounce more light back to your eye than a rough, bumpy surface would.



When light cannot pass through something, a shadow is formed.

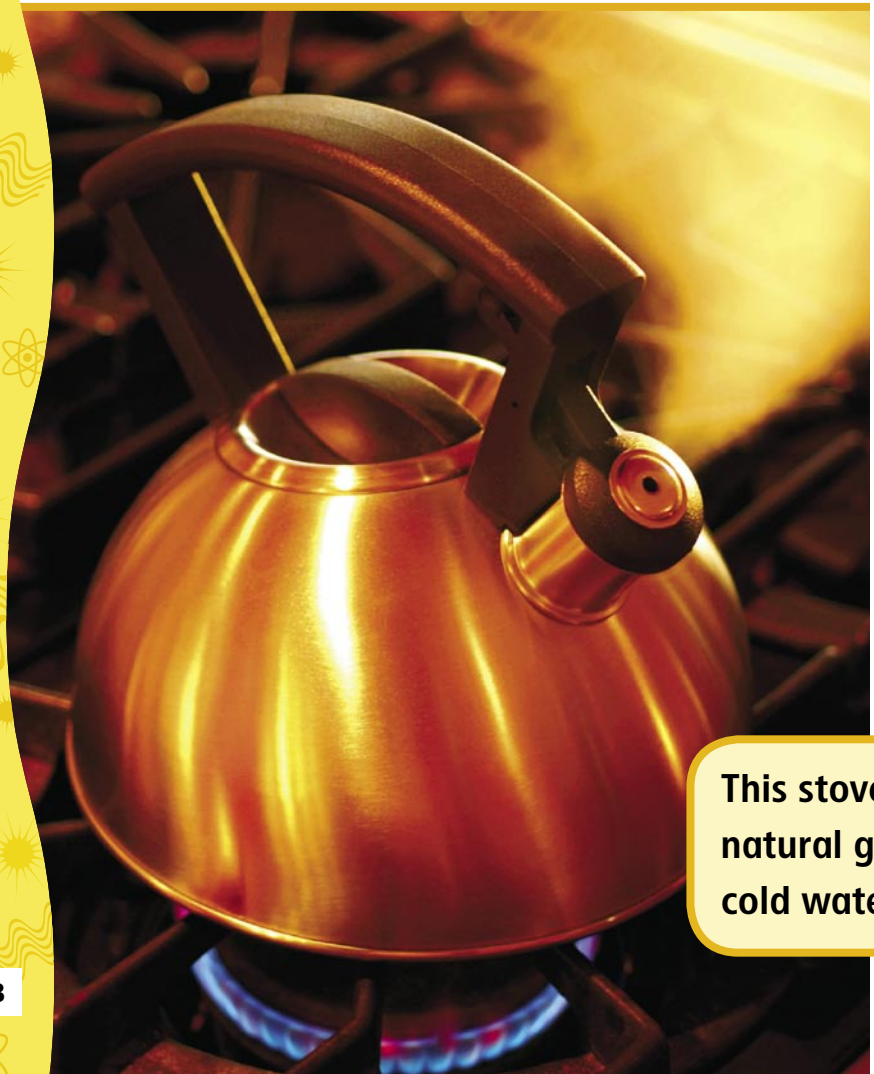
Light can pass through some objects. Light easily moves through a clear, empty drinking glass. If you fill the glass with apple juice, less light moves through it.

Shadows form when light shines on objects that let no light pass through. A shadow shows where light is blocked from hitting the ground.

Focus Skill **CAUSE AND EFFECT** **What makes a coin look shiny?**

Heating Up

You learned that the sun is a source of light and heat. **Heat** is energy that makes things warmer. Heat can come from burning fuels. Gas and wood are two sources that can be burned for heat. You could not have hot water without a source of heat energy.



This stove burns natural gas to make cold water hot.

When wood is rubbed with sandpaper, friction makes the wood warm.

Fast Fact

Long ago there were no matches or stoves. People used only friction to start fires.

Heat also comes from rubbing two objects together to create friction. **Friction** is a force that slows down objects when they rub against each other. It makes them warmer. To warm up on a cold day, you might use friction heat by rubbing your arms.

Focus Skill **MAIN IDEA AND DETAILS** What are some sources of heat energy?

Changing Energy

Energy can change from one form to another. For example, you learned that a light bulb gives off light. Some of its light energy is changed into heat energy.

You learned that when you rub your hands together, you make heat energy. Did you know you produce energy in the rubbing sound you hear?

Focus Skill

MAIN IDEA AND DETAILS

Name ways light and heat are alike and different.

Light bulbs get very hot because some light energy changes to heat energy.

This campfire produces both heat and light on a cold night.

Summary

Energy is all around you. Two types of energy are light and heat. Both light and heat come from the sun and from other energy sources. Heat can also be made by friction when two objects rub against each other.

Glossary

energy Something that can cause matter to move or change. Light and heat are kinds of energy. (2, 3, 4, 5, 8, 9, 10, 11)

friction A force that slows down objects when they rub against each other. Friction also causes the objects to get warmer. (9, 10, 11)

heat Energy that makes things warmer. Heat can be used to cook food or melt things. (3, 8, 9, 10, 11)

light A form of energy that lets you see. The sun and fires give off light energy. (2, 3, 4, 5, 6, 7, 8, 10, 11)

Think and Write

1. What is energy?
2. **MAIN IDEA AND DETAILS** What is happening to light when you see yourself in a store window?
3. **CAUSE AND EFFECT** What effect does rubbing two objects together have?
4. Write a description of what a shadow is and how it is formed.

Hands-On Activity

Choose two objects, such as wooden blocks. Rub them together to see if friction makes them warmer.

School-Home Connection

With a parent, choose objects from home. Use them to make shadows using light energy from a lamp or the sun.