
CHAPTER 7

ENERGY CONSERVATION

In this chapter students explore the uses of some common sources of energy and ways that individuals can conserve energy. The 50-minute lesson begins with a warm-up activity in which students discuss the meaning of the concept of **energy conservation** and why it is important to conserve energy. Next, students work in groups to brainstorm ideas and complete a chart outlining the ways people use some common energy sources. Then, individual students fill out a questionnaire to examine their own behavior and find out how energy efficient they are as individuals. The lesson concludes with a short writing activity in which students reflect on what they have learned in the lesson and list some actions they plan to take to conserve energy.

Through listening, speaking, reading, and writing activities on the topic of energy conservation, students improve their language skills by learning and using new vocabulary and concepts related to the topic. Some teachers may decide to present the activities described in the section on [Classroom Applications](#) in one 50-minute lesson. Other teachers may prefer to combine the activities with some of the materials outlined in the section on [Internet Resources](#) to develop a longer lesson or a more extensive unit of several related lessons.



BACKGROUND INFORMATION

Sources of Energy

Energy is often defined as the capacity to do work or the ability to make things move. It is the power that humans use to produce heat and drive machines, and it is an important part of our everyday life. Electrical energy turns on lights and computers, cools refrigerators, heats toasters, and brings pictures to television screens. Burning gasoline produces energy that powers the engines of motor vehicles such as cars, trucks, and buses.

The main sources of energy in the world are **fossil fuels**—coal, oil, and natural gas—and wood. (Most electricity, another major source of energy, is produced by coal-burning **plants**.) Some other sources of energy include wind power, water, **solar energy**, and **nuclear energy**.

Environmental Problems

Using some energy **resources** creates environmental problems. Today fossil fuels supply about 90% of the world's energy needs. Burning fossil fuels for energy releases **carbon** into the air and contributes to the **greenhouse effect**. Burning fossil fuels also releases other chemicals that create **smog** and **acid rain**. These two forms of **pollution**—smog and acid rain—damage human health and the environment, including **wildlife**, water, and **vegetation**. The more energy people use, even in such everyday acts as turning on a light, taking a hot shower, or driving a car, the more pollution they help to cause.

Using fossil fuels means using them up. They are **nonrenewable** sources of energy; nature cannot re-create them at the very fast rates at which people are using them up today. At sometime in the future, all of these nonrenewable sources of energy will run out. The world will need to use other, **renewable**, energy sources such as wind power, wave power, **geothermal power**, solar energy, and **hydroelectricity**.

Using wood for energy also create environmental problems. More than two-thirds of the people in developing countries depend upon wood as their primary source of energy. Each year over 28 million acres of tropical forest are cleared for fuel needs, crop production, and cattle ranching. Forests are disappearing so quickly that they do not have time to re-grow. This deforestation also contributes to the greenhouse effect.

Using nuclear energy causes other problems. Producing nuclear energy results in unwanted and dangerous **by-products**. When atoms are split to produce nuclear energy, **hazardous** nuclear waste is produced. It is not always easy to dispose of this nuclear waste safely.

Energy Conservation

Because using some energy resources creates environmental problems, energy conservation is important. Energy conservation means using energy without waste. Some common examples of energy conservation include turning off the lights when leaving a room, setting the thermostat lower in the winter, wearing a sweater to keep warm around the house, and riding a bicycle or walking instead of driving a car.

Some people think energy conservation means keeping their house too cold in the winter or too hot in the summer. But it is not necessary to be uncomfortable when conserving energy or using it more efficiently. We can conserve energy in a number of different ways: by doing without, by changing the way we live and the way goods and services are produced, and by using energy efficiently. When we practice intelligently, energy conservation may not even be noticed.



CLASSROOM APPLICATIONS

Preliminary Lesson Planning

Materials Preparation:

- Duplicate enough copies of the chart "Some Sources of Energy" in [Appendix A](#) to give one copy to each group of three or four students.
- Duplicate enough copies of the questionnaire "Are You an Energy Saver?" in [Appendix B](#) to give one to each student.

Vocabulary Considerations:

Before using the chart "Some Sources of Energy" and the questionnaire "Are You an Energy Saver?" consider what vocabulary your students will need to know in order to carry out the lesson successfully. Which vocabulary items are your students already familiar with and which items will be new for them? Some important terms and their definitions are included in the

[glossary](#).



WARM-UP ACTIVITY (APPROXIMATELY 10 MINUTES)

Purpose:

- To stimulate students' interest in the topic of energy conservation
- To introduce and review key vocabulary related to the topic
- To activate students' background knowledge about the topic

Procedures:

1. Write the phrase "energy conservation" on the board, and ask the class what they think the term means.
2. As student volunteers give their answers, write key words from their responses on the board. If students are unfamiliar with the concept of energy conservation, be prepared to provide the class with relevant information (see [Background Information](#) at the beginning of this chapter), adding words to the board as you introduce key ideas.
3. Ask students why it is important to **conserve** energy. (Using some energy sources causes environmental problems. For example, clearing forests too rapidly does not give them enough time to re-grow. Burning fossil fuels creates smog and acid rain and also contributes to the greenhouse effect.) As volunteers suggest different reasons, list their answers on the board.
4. Explain to the class that in today's class they are going to be talking about some different sources of energy and some ways that people can conserve energy.



ACTIVITY #1 (APPROXIMATELY 20 MINUTES)

Purpose:

- To explore some of the ways people use energy sources
- To practice speaking, listening, and note-taking in a meaningful way
- To share ideas and discuss what the students already know about energy sources
- To give students the opportunity to use key vocabulary and ideas associated with the topic

Procedure:

1. Divide the class into groups of three or four students.
2. Distribute one copy of the chart Some Sources of Energy to each group.
3. Explain the task to the students. They are to work together in their groups and talk about the ways people use each of the energy sources listed on the chart. (For example, some people use wood to heat their homes.) Explain that each group should choose a "secretary" to write their group's answers in the appropriate column or columns on the chart.
4. Students work in groups, filling in the charts. As groups talk and fill in the charts, make a copy of the chart on the board.
5. After groups have completed their charts, ask for volunteers to give "summary reports" of their group's answers to the class. As students read out their reports, write on the board their answers in the appropriate columns on the chart.

6. After all reports have been given, encourage the class to add any other ideas they may have thought about as the reports were being given. As students give new responses, add their ideas to the chart on the board.



ACTIVITY #2 (APPROXIMATELY 10 MINUTES)

Purpose:

- To increase students' awareness of how they as individuals can conserve energy
- To encourage students to evaluate their own behavior in relation to energy conservation
- To practice reading in a meaningful way

Procedure:

1. Explain to the class that they are now going to have a chance to examine their own behavior and find out how energy efficient they—as individuals—are.
2. Distribute the questionnaire "Are You an Energy Saver?" giving one copy to each student.
3. Explain the task to the students. They are to work individually, reading each question and marking their answers by putting a check mark in the appropriate column. When they have finished answering the questions, they should add up their score according to the scoring system at the bottom of the questionnaire.



COOL DOWN ACTIVITY (APPROXIMATELY 10 MINUTES)

Purpose:

- To conclude the lesson
- To allow students to reflect on and assess what they have learned in the lesson
- To practice writing

Procedure:

1. Ask students to write one or two paragraphs, summarizing what they have learned in this lesson and listing some actions they plan to take to conserve energy.
2. Allow students 5 minutes or so to write their paragraphs.
3. After students have finished writing their paragraphs, ask for volunteers to read their sentences aloud to the class.



EXTENSIONS

1. Have individual students or groups of students each create a poster on ways to conserve energy.
2. Have the class create and perform a skit on the pros and cons of energy conservation.
3. Have students write a one-page essay on the energy source they would choose as the one "best" source of energy for the world. Tell them that their essays should include and explain the reasons for their choice.

Refer to the [Internet Resources](#) section for more information and lesson planning ideas.



APPENDIX A

Some Sources of Energy		
<p>Here is a list of some common energy sources. What are some ways we use each source? Work with the people in your group and talk about the different ways people use each source. (For example, some people use wood to heat their homes.) Write your answers in the appropriate column or columns.</p>		
Wood	Water	Solar Energy
Fossil Fuels	Wind	Nuclear Energy
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APPENDIX B

Are You an Energy Saver?			
How often do you . . .	Always	Sometimes	Never
1. avoid heating or cooling unused rooms of your home?			
2. turn off the lights when you are the last person to leave a room?			
3. use cool water, whenever possible, instead of warm or hot water?			
4. ride your bike or walk to school?			
5. turn off the TV when not in use?			
6. turn off the radio when not in use?			
7. close drapes , shutters , or window shades on cold, cloudy days to keep the cold air out?			
8. recycle plastic?			
9. recycle cans?			
10. recycle paper			
11. recycle glass?			
12. wash only full loads in a washing machine or dishwasher?			
13. close drapes, shutters, or window shades on very hot days to keep the cool air in?			
14. replace high wattage light bulbs with lower wattage ones where bright lights are not needed?			
15. put on a sweater when your home feels cold, instead of turning up the heat?			

Scoring:

Always = 2 points
 Sometimes = 1 point
 Never = 0 points

Your Score:

25-30 Congratulations! You're a super energy saver!

15-24 Very good. You're doing a lot to save energy.

5-14 You need to become more energy **efficient**.

0-4 You *really* need to become more energy efficient.

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