

- If nonrenewable energy sources like wind and water are nonpolluting, why don't we use them much more than fossil fuels?
- Why do you think that so many people waste energy?
- Brainstorm a list of suggestions for conserving energy.

Follow-up Activities

- Have students create a huge, running list of all the ways that they and their families use energy. Have them go back to their list to identify which ones are so important that they could not be eliminated or reduced. Then have each student create a specific conservation plan, with regard to at least one of the remaining uses, to which he/she will adhere for at least one week (procure parent involvement for this project). After the week is over, debrief how easy/difficult the conservation efforts were for the class members. Write it up for the school/local newspaper as a feature article.
- Have students bring in toys and tools that use solar cells as energy resources. Have groups of students experiment with amounts and types of light (sun, incandescent, fluorescent, flash-light...) necessary for these devices to work well.
- Replicate the composting investigation in a protected outdoor area on the school grounds. Have students follow-up with plantings of flowers/seedlings using that composted soil.
- Divide the children into small groups and have them build simple solar ovens to heat cookies or melt chocolate and marshmallows. Construction worksheets can be downloaded at www.eren.doe.gov/buildings/k-12activities/pdfs/k3make.pdf.

Suggested Internet Resources

Periodically, Internet Resources are updated on our Web site at www.LibraryVideo.com

- www.eren.doe.gov/roofus/roofus.html
These pages from the "Get Energy Smart" site developed by the Department of Energy showcase Roofus, an energy-wise canine with a solar doghouse. The site also provides worksheets and other energy resources.
- www.sprint.com/epatrol/ep-energy.html
The E-Patrol is an online club for kids that teaches them energy safety and suggests how they can help save energy in their own homes.

- www.epa.gov/students/recycle_city.htm
"Recycle City" from the Environmental Protection Agency helps students discover how recycling helps reduce waste and save money with games, puzzles, and an interactive book.

Suggested Print Resources

- Appelhof, Mary, Mary Frances Fenton, and Barbara Loss Harris. *Worms Eat Our Garbage: Classroom Activities for a Better Environment.* Flower Press, Kalamazoo, MI; 1993.
- Fowler, Allan. *Energy From the Sun.* Children's Press, Danbury, CT; 1997.
- Showers, Paul. *Where Does the Garbage Go?* HarperCollins Publishers, New York, NY; 1994.

TEACHER'S GUIDE CONSULTANT

Conrad M. Follmer

25 years as a K-5 Science & Math coordinator for a Pennsylvania public school system, currently an independent consultant to elementary schools.

TITLES

- ALL ABOUT HEAT
- ALL ABOUT THE TRANSFER OF ENERGY
- ALL ABOUT THE CONSERVATION OF ENERGY
- ALL ABOUT THE USES OF ENERGY
- WHAT IS ENERGY?

Teacher's Guides Included and Available Online at:

800-843-3620



Copyright 2000 by Schlessinger Media, a division of Library Video Company
P.O. Box 580, Wynnewood, PA 19096 • 800-843-3620
Executive Producers: Andrew Schlessinger & Tracy Mitchell
Programs produced and directed by PhotoSynthesis Productions Inc.
All rights reserved



All About the Conservation of Energy

Grades K-4

This guide is a supplement, designed for educators to use when presenting this program in an instructional setting.

Before Viewing: Research in learning suggests that it is important for the teacher to discover what the students know — or think they know — about a topic, at the start of a new unit, so that their accurate conceptions can be validated and reinforced, and their misconceptions identified and corrected. Therefore, after reviewing the pre-viewing discussion questions provided for your class, create an "Everything We Know About..." list. Preview key vocabulary words and have students raise additional questions they hope will be answered by this program. Most importantly, students should be told that as "science detectives" they must listen closely, so that after viewing the program, they will be able to tell whether or not the facts/beliefs they put on their list were scientifically accurate.

After Viewing: After a brief discussion about the program, challenge your "science detectives" to prove or disprove the accuracy of the facts they put on their "Everything We Know About..." list. Discuss what else they learned and use the follow-up questions and activities to inspire further discussion. Encourage students to research the topic further with the Internet and reading resources provided.



Program Summary

Whenever we move or change the things that are around us, we use energy. Most of the devices in our lives, such as lights, refrigerators and televisions, work with electrical energy. Many people believe that we use too much energy and that someday we could run out of energy resources. While this is true, there are things that we can do every day to save energy and to use it more wisely. This is called energy conservation.

Today, most electrical energy is generated by the burning of fossil fuels like coal, oil and natural gas. Fossil fuels come from the preserved remains of plants and animals that lived millions of years ago. These plants and animals contain stored energy from the sun that we can release through burning. Fossil fuels are called nonrenewable resources because once they are used they are gone forever.

There are many ways to conserve energy. We can turn off lights and appliances when they are not needed and hang laundry out to dry in the sunlight instead of using a dryer. Instead of using heaters or air conditioners, we can add or remove layers of clothing. Instead of burning gasoline in our cars, we can walk or ride bicycles! If we have to get somewhere fast, we can carpool or use public transportation.

Recycling is another good way to conserve energy by making paper, glass and metal products from old paper, cans and bottles. Because the supplies of coal, oil and gas are going fast, and because the burning of fossil fuels creates pollution, scientists are always searching for new, clean energy resources. Solar energy, windmills, hydroelectric dams, geothermal plants and biomass incinerators are all used today as alternatives to the burning of fossil fuels.

Vocabulary

The following words are included for teacher reference or for use with students. They are listed in the order in which they appear in the video.

energy conservation — Saving energy and using it wisely.

energy — The ability to make things happen or to do work.

work — To move or change something. Doing work takes energy.

fossil fuels — Energy resources that are created within the Earth from the remains of plants and animals of millions of years ago. Coal, oil and gas are examples of fossil fuels.

fossils — The preserved remains of plants and animals that lived millions of years ago.

nonrenewable energy — Energy resources that cannot be replaced as quickly as they are used. Fossil fuels like coal, oil and natural gas are examples of nonrenewable energy sources.

(Continued)

recycling — Using materials like glass bottles and aluminum cans to make new materials. Recycling saves energy because it allows us to make things over and over again.

composting — A natural way of recycling kitchen scraps and yard wastes, changing them back into usable soil.

renewable energy — Energy resources that can be replaced as they are used. The sun, wind and moving water are examples of renewable energy sources.

solar energy — Energy that comes from the sun. Solar energy is the Earth's greatest source of heat and light energy, and is a renewable, nonpolluting energy source.

wind energy — Energy that is produced when the wind blows. Wind energy turns windmills to generate electricity and is a renewable, nonpolluting energy source.

hydroelectric energy — Energy that is produced when water falls from dams or rivers, turns machines and generates electricity. Hydroelectric energy is a renewable, nonpolluting energy source.

geothermal energy — Energy that is generated from using the heat from inside the Earth. Geothermal energy is a renewable, nonpolluting energy source.

biomass energy — Energy that is created from the burning of wood, garbage and other previously living things that have stored the sun's energy. Biomass energy is a renewable, polluting energy source.

incinerator — A place where waste materials like trash are burned.

Pre-viewing Discussion

Before students generate their list of "Everything We Know About..." this topic, stimulate and focus their thinking by raising these questions so that their list will better reflect the key ideas in this show:

- What is energy and why is it important?
- Where does the energy to run the machines and appliances we use every day come from?
- How can we conserve energy?

After the class has completed their "Everything We Know About..." list, and before watching the show, ask them what other questions they have that they hope will be answered during this program. Have students listen closely to learn if everything on their class list is accurate and to hear if any of their own questions are answered.

Focus Questions

You may wish to ask your class the following questions to assess their comprehension of key points presented in the program:

1. What is energy? What is work? Give examples of each.
2. What is energy conservation? Why is it important?
3. What are fossil fuels? Give examples.
4. Explain what fossils are. What do fossils have to do with fuel?
5. How were fossil fuels formed? What is the original, main source of energy for all of fossil fuels?
6. What appliances and other machines do we use all of the time to help make our lives easier and more enjoyable?
7. Why do they say that fossil fuels are nonrenewable energy sources?
8. What are the major problems with using fossil fuels?
9. What is recycling? How does recycling help to conserve energy?
10. What is the purpose of composting and how is it done?
11. What are the Earth's renewable energy sources? Why are they called renewable?
12. What is solar energy? How is it used?
13. How are windmills used to generate electricity?
14. How is moving water used as an energy resource?
15. What is geothermal energy? How and where is it used?
16. What is biomass energy? How is it used?
17. Give examples of energy sources that are polluting and nonpolluting.

Follow-up Discussion

The most important part of this segment is to examine both the facts and beliefs generated by the class in their "Everything We Know About..." list. Research indicates that students will retain their previous misconceptions — in preference to the new information - until they actively recognize and correct their own errors. Because of this, it is important to lead students to the correct ideas while identifying and correcting any misconceptions from the class list. After reviewing the list, encourage students to share the answers they got to the questions raised, before viewing the program.

Raising a thought-provoking question is a good way to assess the overall depth of student understanding. A couple of suggestions are listed below: