

- Discuss some of the pros and cons of using alternative energy sources.

Follow-up Activities

- Students can maintain a "Natural Resources Log" that records all of the natural resources, renewable and nonrenewable, that they use in the course of a day. After the log is completed, have students share their entries. In the ensuing discussion, encourage students to brainstorm ways to conserve these resources throughout their day, at home and at school.
- Recycling is one way to preserve the Earth's supply of natural resources. Encourage students to establish a recycling program at your school, if one is not already in place. Students can also contact local government officials to inquire about the types of recycling projects available in your area and the various benefits of recycling to your community.
- Have students write to the Environmental Protection Agency (EPA) or other agencies that monitor the uses of fossil fuels to ask questions about the supply of the Earth's natural resources and the steps being taken to preserve these resources. Given the relative urgency of the depletion of these resources, organizations such as the EPA can help students to discover how the U.S. and the world are progressing in the development of affordable alternative energy sources.

Suggested Internet Resources

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

- www.teachcoal.org/lessonplans/index.html
The American Coal Foundation offers lesson plans, organized by grade level and by subject, on the formation of coal, the history of the coal mining industry, how electricity is generated from coal and other topics related to this natural resource.
- www.mii.org/teacherhelpers.html
The Mineral Information Institute is dedicated to educating students about minerals and other natural resources from the Earth. This Web site presents a great deal of information for teachers about natural resources, including lesson plans and activities.
- www.eia.doe.gov/kids/energyfacts/index.html
The "Energy Kid's Page" from the Energy Information Administration, a part of the U.S. Department of Energy, explains renewable and nonrenewable sources of energy, discusses how humans use energy and offers ways to improve energy efficiency.

Suggested Print Resources

- Landau, Elaine. *The History of Energy*. Twenty-First Century Books, Minneapolis, MN; 2006.
- Morgan, Sally. *Alternative Energy Sources*. Heinemann, Portsmouth, NH; 2002.
- Stille, Darlene. *Natural Resources: Using and Protecting Earth's Supplies*. Coughlan Publishing, Mankato, MN; 2005.

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Natural Resources

Grades 5-8

Students in grade 5-8 classrooms possess a wide range of background knowledge. Student response to this video program is sure to be varied, so the teachers at these grades need all the help they can get! This guide has been designed to help the 5-8 science teacher by providing a brief synopsis of the program, previewing and follow-up questions, activities, vocabulary and additional resources.

Before Viewing: Extensive research tells how important it is for the teacher to discover what the students know — or think they know — about a topic, before actually starting a new unit. Therefore, after prompting discussion with the pre-viewing questions, lead your class to create an "Everything We Think We Know About..." list. You may also wish to preview key vocabulary words, and have students raise additional questions they hope will be answered.

After Viewing: Have your students share video excerpts that fascinated or surprised them, then challenge your students to prove or disprove the accuracy of the facts they put on their "Everything We Think 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

In order for living things to continue living, supplies of natural resources are required. Natural resources are sources of energy for all life on Earth and are created by the Earth's processes. Some of these resources, such as sunlight, air, water, soil, plants and animals, are being continually created and are readily available. These are called renewable natural resources. Many other resources are in limited supply and can require millions of years to form. These resources, such as coal, oil and natural gas, are called nonrenewable natural resources. Once these resources are used up, it will not be possible to replace them.

There are many renewable natural resources on the Earth. Sunlight is one of the Earth's greatest natural resources. Energy from the sun produces food energy for all living things through the process of photosynthesis. Sunlight also drives the wind, waves and running water on the Earth's surface and can even be used to generate electricity. Some other renewable resources such as air, water and soil are being threatened by pollution. Clean air, essential for the survival of animal life, is polluted by tiny particles from the burning of fossil fuels, and the natural release of pollen and dust. Fortunately, much is being done to control the causes of air pollution. Water is another vital resource and nothing on Earth could survive without it. Although Earth's natural water cycle continually recycles the supply of fresh water, many sources of fresh water, both above and below ground, are being polluted by runoff containing fertilizers and pesticides, and by oil spills and industrial waste. Once again, humans are working on this problem. Soil, another essential natural resource, supports vital food crops, trees for lumber and paper, and many other types of plants. Though soil is renewable, it takes much longer to form than other renewable resources. Poor farming techniques and natural disasters such as floods and droughts can also threaten this natural resource. Plants and animals also renew themselves through reproduction; however, many species have become endangered and even extinct, and loss of habitat has become a major threat to these resources. Some of the most important nonrenewable natural resources are minerals and fossil fuels.

Although there are over 3,000 kinds of minerals such as iron, aluminum and zinc, most of them are limited in supply and since they are formed deep within the Earth, it usually requires destructive mining techniques to extract them. Fossil fuels, including coal, oil and natural gas, are being used at such an alarming rate that supplies of these precious sources of energy will soon run out. Humans are working hard to find alternate energy sources such as nuclear, solar, wind and geothermal energy. As humans try to limit their consumption of nonrenewable natural resources, find alternative sources of energy and natural products, and recycle products made by the burning of fossil fuels, they are buying more time. Unfortunately, time is not a renewable resource.

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.

natural resources — Materials necessary for life and energy that are supplied by the sun and by Earth's natural processes.

renewable natural resources — Materials that can be replenished and are readily available for use such as sunlight, water, air, soil and plants and animals.

nonrenewable natural resources — Materials that are in limited supply or take a very long time to form such as fossil fuels like coal, oil or natural gas.

photosynthesis — The process through which energy from sunlight is trapped by plants and converted into sugars as food.

pollutants — Substances that negatively affect the environment.

water cycle — The natural process of recycling water through evaporation, condensation and precipitation.

evaporation — The process by which liquid water is turned into water vapor. When sunlight reaches water, the sun's energy warms the water and causes it to turn into water vapor.

condensation — The process by which water vapor in the atmosphere is turned back into liquid water. When vapor in the air is cooled, it condenses into droplets and forms clouds.

precipitation — The process by which water vapor cools and condensed drops of water fall out of the atmosphere in the form of rain, snow, sleet or hail.

fossil fuels — Nonrenewable energy resources produced over millions of years by decaying plant and animal remains. Some examples of fossil fuels are coal, oil and natural gas.

geothermal power — An energy source obtained by tapping into the underground heat produced by volcanic activity.

Pre-viewing Discussion

Before students generate their list of "Everything We Think We Know About..." for 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 are natural resources? Can you provide some examples?
- Are all natural resources going to be available for use on Earth forever? Justify your answer.

After the class has completed their "Everything We Think We Know About..." list, 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

1. What are renewable natural resources? How do they differ from non-renewable natural resources?
2. Provide some examples of renewable natural resources. What are some things that threaten the supply of these resources?
3. Name some nonrenewable resources. Why is it especially important to conserve these resources?
4. Why is sunlight considered to be one of the Earth's most valuable natural resources? Could life on Earth survive without it? Explain.
5. What are some of the sources of air pollution?
6. Why is water considered a renewable resource? How is water recycled?
7. What are the consequences of having polluted ground water? Is there a solution?
8. If soil takes hundreds to thousands of years to be formed, why is it considered to be a renewable resource?
9. What are some of the threats to soil as a renewable resource?
10. Why are the Earth's plants and animals considered to be natural resources? What are some of the ways that these resources are useful to maintaining life on Earth?
11. What are some of the threats to the Earth's natural living resources like plants and animals? What are some of the measures being taken to protect these resources?
12. With 3,000 different kinds of minerals, why are they considered nonrenewable? What would be the effect on our way of life if the supply of all minerals was depleted?
13. What are the fossil fuels? Why are they nonrenewable?

Follow-up Discussion

Research indicates that students will retain their previous misconceptions about a topic, in preference to new information, until they actively recognize and correct their own errors. Therefore, it is important to have your students re-examine the facts/beliefs they put on their "Everything We Think We Know About..." list. It might also be helpful to review the list by marking each entry with a "+" or "-" to show which facts were correct and which were incorrect.

Thought-provoking discussions provide a good way to assess the overall depth of student understanding. The following are some suggested discussion topics.

- Ask students to discuss what steps they would take to protect our natural resources if they had tremendous influence as world leaders.
- Have students explain which natural resource they believe is most critical for the survival of life on Earth.

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