

The Planet Patrol



Lesson 3:	Energy Comes in Many Shapes, Sizes and Forms
Objective:	<ul style="list-style-type: none"> ▪ Students will be able to recognize that nonrenewable energy sources come from fossils and that their supplies are limited ▪ Students will be able to understand that a limited supply of something — e.g., a nonrenewable resource — increases the difficulty of obtaining it ▪ Students will be able to better understand the difference between renewable and nonrenewable energy sources
Materials:	<p>Cardstock (various colors) Energy puzzle pieces cut apart (1 set per team)(run on cardstock) Energy letter cards (1 set) Baggies to store puzzle pieces Approximately 150 rocks (fish rocks) A piece of coal A pinwheel Small cups (4 per team) Permanent marker Data sheet (one per team)</p>
Websites:	<p>Energy Quest http://www.energyquest.ca.gov/</p> <p>EcoKids-World Energy Facts http://www.ecokidsonline.com/pub/eco_info/topics/energy/world/index.cfm#</p> <p>Alliance to Save Energy http://www.ase.org/section/audience/consumers/kids (scroll down for various animated features)</p>
Activity:	<p>Prior to starting the lesson, hide the various rocks around the room. Hide rocks in areas that might be somewhat difficult to find.</p> <p>Organize students in pairs. Give each group a bag with the energy puzzle pieces. Have students put the puzzle pieces together. Have students guess how they are related. If students are having a difficult time begin to place letters up that spell ENERGY. Place them up in random order. Explain to students the letters are not in order. Continue until the students guess the word energy.</p>

Explain to students that energy can be grouped into two categories: renewable and nonrenewable.

Renewable energy resources can be replenished in a short period of time. The five renewable sources used most often include hydropower (water), solar, wind, geothermal, and biomass.

Non-renewable energy resources are an energy resource that is not replaced or is replaced only very slowly by natural processes. Primary examples of non-renewable energy resources are the fossil fuels--oil, natural gas, and coal. Fossil fuels are continually produced by the decay of plant and animal matter, but the rate of their production is extremely slow, much slower than the rate at which we use them. Any non-renewable energy resources that we use are not replaced in a reasonable amount of time (our lifetime, our children's lifetime, etc.) and are thus considered "used up" and not available to us again.

Have a discussion with the students about the pictures on the puzzle pieces whether they are renewable or nonrenewable energy sources.

Show a piece of coal. Explain that coal is one type of nonrenewable energy. Lead a discussion on how coal is used and that it must be burned in order to release energy.

Demonstrate the movement of the pinwheel by blowing toward it. Again, ask students to identify the source of the energy. (If they say "you," be sure to translate that into "wind" or "nature.") Also, ask how the pinwheel uses the wind — how it is captured or harnessed. Students should be able to recognize that the shape of the pinwheel creates the rotation when a current of air strikes it. (This Web site has an excellent graphic of a wind machine: <http://www.eia.doe.gov/kids/energyfacts/sources/renewable/wind.html>)

Ask students to suggest which one of the energy sources is more likely to run out of its supply. In comparing the two energy sources, students should explain why they think one will likely run out and the other is not likely to run out. Label the two energy sources: nonrenewable (coal) and renewable (wind). Put up the overhead to complete the definitions of nonrenewable and renewable resources.

Arrange students in pairs and hand out the data sheet [reproducible], plastic cups, and markers. Have them label the cups 1 through 4. Tell them that they are going to be searching for a nonrenewable source of energy (such as the coal discussed earlier) symbolized by rocks hidden throughout the classroom.

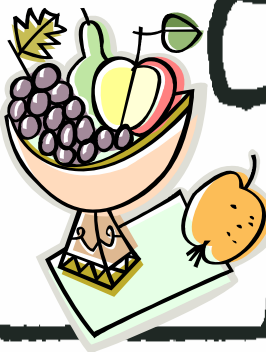
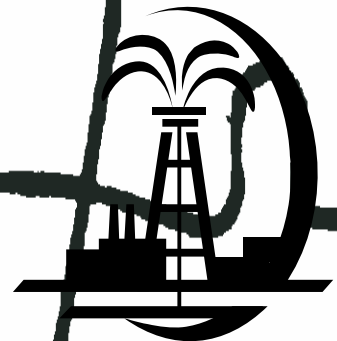
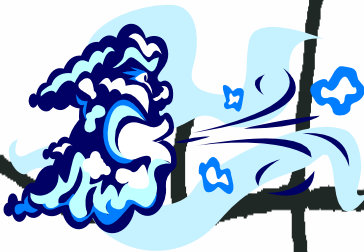
Give students four 30-second opportunities to find rocks. After each search, have them count, record, and deposit the pennies into a cup (one

labeled for each of the four searches). At the end of their four searches, they should make a bar graph and analyze their data.

When the paired groups have completed the data sheet, ask for volunteers to share their results. Once a few pairs share similar results, lead the class in a discussion. Through the data, students should be able to deduce that due to a limited supply initially, the search yielded smaller returns each time.

Lesson adapted from Alliant Energy

How are these pictures related?



E

N

E

R

G

y

Hunting for Fossil Fuel

Pretend you have been hired to find sources of natural gas or coal. Natural gas is used to heat many homes and operate many appliances such as stoves and dryers. Coal is often used to generate electrical power, which we use throughout the day.

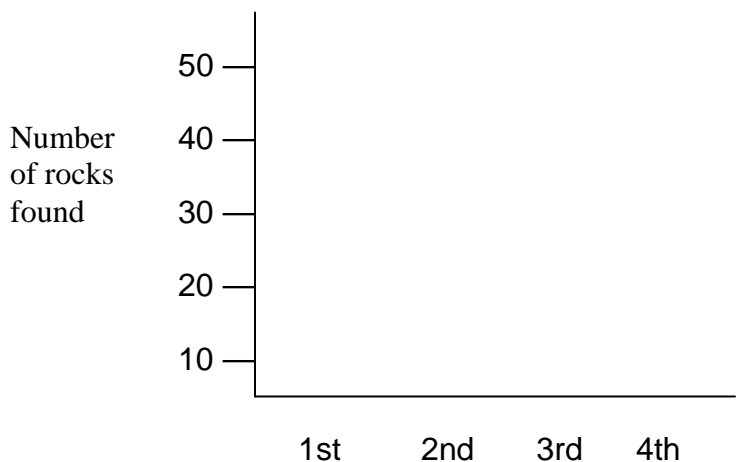
Coal and natural gas are called fossil fuels, because they come from the remains of dinosaurs and ancient plants that existed before our time. When they died and became buried deep in the earth, the heat and pressure of the earth's layers gradually transformed them into coal, natural gas, and other energy sources. Fossil fuels are sometimes called "nonrenewable" energy sources because once we find them and use them, they are gone forever!



In this exercise, you will be asked to search for rocks (let's pretend those rocks are coal deposits) in four 30-second sessions. After each search, you will count the rocks, record the total in the area below, and deposit them in the correctly numbered cup. After the fourth search, recount each cup of rocks one at a time and make a bar graph to show the number of rocks you found in each search.

Good luck searching!

First search _____
Second search _____
Third search _____
Fourth search _____



Questions:

1. Look at your graph. In which search did you find the most rocks? _____
2. What is the difference between the number of rocks you found in your tallest graph and your shortest graph? _____
3. Why do you think it became increasingly harder to find rocks?

4. If you were really searching for coal, what does your graph data tell you? _____

