



Pedaling to Save Energy

Program Purpose

Through stories, songs, and interactive activities, introduce energy concepts and their relation to students' everyday lives.

Length of Program: 1-1 ½ hrs

Age: Grades 3-5

Maximum Number of Participants: 25

Objectives:

After completion of all activities, students will be able to:

- Define Energy
- Able to list at least 5 common energy sources
- Describe the difference between green and renewable energy
- Understand how energy is used in a home
- Describe how fossil fuels are created

Preparation:

Before the class arrives:

- Locate the program box in the work room
- Decide which activities to use based on age appropriateness
- Set up NRG Bike and associated equipment

Materials:

Energy Activity: Energy at Home worksheet
NRG Bike
NRG Meter
Electric Alarm Clock
Cell Phone Charger
Microwave
Fan
Hair Dryer
NEED SONGBOOK

Outline:

- I. Introduction
- II. Energy Activity : Energy at Home worksheet
- III. NRG Wasters
- IV. NRG Bike
- V. NRG Jeopardy
- VI. Conclusion

Introduction:

Introduce yourself to the class and explain that we will be talking about energy. What is energy, and what does

it mean to you when your mom says "You've got a lot of energy!"

Where does energy come from? Energy is defined as the ability to do work, whether it is you running up the stairs or a plane flying over head. Not all energy is created the same way. Energy can come from wind, water, sun, natural gas, oil and coal. Some energy is always there for our use, like the sun. More energy is produced from the sun in one day than humans have ever used! Other examples of continuous energy sources are water and wind. But sometimes, the energy we use comes from deep within the Earth, from plants and animals that died millions of years ago. These sources are called fossil fuels, which are nonrenewable, and include coal, peat, oil and natural gas. Nonrenewable resource means that they are not readily available, limited supply, and take hundreds of thousands of years to create. One of the most used fossil fuels is coal.

Coal was formed when plants and animals died millions of years ago, and the materials were buried in mud in a swamp or bog. Usually when a plant or animal dies it is decomposed by bacteria and turned into soil. However when the plants and animals died they were covered in rock, silt, sediment and water without any bacteria. All of these things pushed down so hard with so much pressure that coal was formed.

Oil and natural gas were formed in a similar process. 300 million years ago microscopic sea animals died and sank to the sea floor. They were then buried by sediment and compressed. The extreme pressure changed them from a solid to a liquid or gas. The liquids and gases then bubbled up through the sediment until they reached solid rock and were trapped.

All fossil fuels are carbon based which means they are from plants and animals. When they are burned they produce carbon dioxide a greenhouse gases. Greenhouse gases act like a giant blanket covering the Earth. They let the Sun's rays in but then trap heat close to the Earth's surface. Fossil fuels also release other chemicals that are considered pollution. Pollution makes it hard for animals to breathe and for plants to grow. That's why we are trying to use more renewable energy sources.

Renewable energy uses things that have an unlimited supply. Some examples are solar, wind, water and biomass. People often confuse these renewable energy sources with being green. Green means that they do not

produce any greenhouse gases. Most renewable energy sources do not produce gases after they have been established but do during initial production. An example is a wind turbine, the wind makes the blades move which produces electricity. This energy was produced for free and without creating any gases. However the wind turbine needed to be made. The factory that made it probably used coal based electricity to run its machines. Then the turbine had to be moved by a gas burning truck into its new location. Although it does take fossil fuels to build and place the turbine, the energy it produces will be much cleaner than if the same amount of energy was created from coal. No matter how the energy is produced it will be used the same ways. How much energy do you use daily? How much energy is used when electronics are "off"? How can we eliminate energy wasters?

Energy Activity: Energy at Home

Complete activity sheet and discuss ways to save energy at home.

Energy Wasters

Now that we know a few of the energy users in our homes lets test them to see how much energy they use. Ask students which appliances they think will use the most energy. If the appliance is turned off is it still using energy? How often do you use them? How many are in your house? Using the energy meter test several small appliances to see which uses the most energy. Check them in the on and off positions. What can we do to use less energy?

Energy Bike

Light Bulb or Heat Bulb?

Students will use the energy bike to determine what type a light bulb is more energy efficient and cost effective. An incandescent bulb is much harder to pedal and draws four times more current than a compact fluorescent bulb, but is no brighter. Where is all that pedaling energy going? Don't touch the bulbs to find out! The cyclist's legs feel what the current meter shows - that four fluorescent bulbs can be lit with the same amount of power that it takes to light a single incandescent bulb.

All Motors Created Equal?

Students will determine when an appliance uses the most energy. Watching the current meter as they pedal, students see that when the fan is switched on, there is a brief surge as the motor starts. The current then settles to a lower, steady run value, which is pretty easy to pedal, and cyclists enjoy the cooling breeze. Switch off the fan and switch on the hair dryer. Whoa! Why is it so hard to pedal when it doesn't blow nearly as much air as the fan? Students are amazed at the effort needed for such a small amount of heat.

NEED Songbook:

Throughout the class period, there will be break periods to sing songs about energy and ways to save energy. This would be a good time to sing the tune of "What Ya Gonna Do with an Energy Waster?"

NRG Jeopardy

Divide the class into four or five smaller groups to play this energy game. Remember all responses must be in the form of a question.

Review and Conclusion:

Ask the students to list ways that they can save energy in their own lives. Have them list off at least three ways that they can save energy! What are some of the sources of energy, and are they renewable or non-renewable sources? Are any sources truly green? What do you already do at home? Again touch on the benefit that renewable energy is having on the plants and animals, including us humans!!! "The plants, animals, and Mother Earth say, Thank you!!!"

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