Life With Energy

Grades: K-4

Topic: Energy Basics

Owner: Earthday Network

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Life With Energy

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Grade Level: Elementary School
Subject Correlation: Social Studies, Math
Objectives: Students will be able to:

1. Describe ways in which technology affects the environment, both bad and good.
2. Identify different forms of energy and the advantages/disadvantages of different forms of energy.
3. Determine the benefits as well as the environmental harms of using energy to improve our quality of life.

Length: 40 minutes

Teacher Preparation: May want to bring in some electric or battery-powered appliances to demonstrate how we use electricity in our daily lives. To demonstrate the weight of one pound, 20 pounds, and a gallon, the teacher may want to bring in something that weighs a pound and an empty gallon container.

Outline (with times)

10 minutes

Introduction: Life Without Energy

Energy figures into almost every human activity: it heats our homes, fuels our cars, ploughs our soil and powers our machinery. Harnessing the world's energy supply has brought standards of living to new heights. Americans (western lifestyles) are so accustomed to energy use that one can scarcely imagine surviving at a time before it existed.

Humans have only learned to harness energy in our personal daily lives in the last 150 years or so. As a class, list five to ten ways we use energy in our daily lives. Think about how our ancestors lived without these devices 200 years ago. Examples:

Light bulbs – candles
Heaters – fire places
Air conditioners – open windows
Microwaves – fire powered ovens
Television – read books
Computers – pen and paper
movies – theater
cars – horse and buggies
telephones – letters
radios – live entertainment
synthesizers – pianos and organs
Internet – library

20 minutes

Activity: Life With Energy

Students will enjoy the following worksheet which will help them understand how much energy they use in a typical day and where the energy actually comes from. For additional information, please visit EDN's Renew Our Future Teacher's Guide on the Teachers Corner of the EDN Web site. Also see the elementary version of "Renew Our Energy" located in the Energy is Everywhere lesson in the Science section of this curriculum.

The Energy We Use

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Energy provides us with a means of using fun and convenient appliances. But what exactly *is* energy and where does it come from? Scientists define energy as "*the ability to do work*." For example, we harness energy to run factories, provide heat and light in our homes and schools, power our cars and school busses, and many other things!

People can take energy from different sources: fossil fuels (gas, oil, coal), nuclear power, wind power (windmills), solar power (from the sun) hydroelectric power (water dams) and a few new innovative ways. Energy is very useful to us, but energy costs us money to use in our cars, homes, work, and schools. In addition, most of the energy people use comes from fossil fuels – and this causes a lot of pollution as well as other problems.

Use the chart on the next page to determine how much energy you use in a day by checking each appliance you use and how many hours you use the item. Before you begin, here are some key concepts to keep in mind while doing the exercise. As a class, discuss the following:

Keep in mind:

- A *'watt'* is a unit that measures how much energy is used by a machine or appliance.
- Burning one pound of coal produces 926 watt-hours of energy and emits 2.64 pounds of carbon dioxide into the atmosphere.
- Using one gallon of gasoline (6.5 pounds) will move the average car between 15 and 25 miles and emit 20 pounds of carbon dioxide into the atmosphere.
- Carbon dioxide is a major greenhouse gas, which causes global warming.
- Using natural gas produces half as much carbon dioxide as coal or oil.
- Using renewable energy, such as solar, wind, or water instead of fossil fuels like coal and oil produces no carbon dioxide.

Appliance	Watts per hour	X	Hours per day	=	Total
Refrigerator	700				
Freezer	700				
Dishwasher	1450				
Microwave	2100				
Toaster	1200				
Oven	1600				
24 inch TV	125				
Video Games	20				
VCR/DVD player	30				
CD Player	30				
Stereo	55				
Cell Phone	20				
Radio	20				
Electric Clock	4				
Clock Radio	5				
Electric Blanket	400				
Washing Machine	1150				
Dryer	5750				
Vacuum	900				
Air Conditioner	4500				
Ceiling Fan	75				
Electric Fan	50				
14 Inch Computer Color Monitor	100				
Ink Jet Printer	35				
Laser Printer	1200				
60 Watt Bulb (each)	60				
Hair Dryer	1500				
Electric Toothbrush	6				
TOTAL					

10 minutes

Questions for follow up:

1. How many pounds of coal are burned to produce the watts used in one day? How many pounds of carbon dioxide are produced from burning this amount of coal? What are the consequences of this?
2. How can you change your daily routine to use less energy? Try to save at least 100 watts.
3. Why do some appliances use more energy than others?
4. Describe some advantages of using less energy in your daily routine – like walking or riding your bike to a friend's house down the street instead of having a parent drive you.